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Book review

ICE Themes Recycled Aggregates: Use in Concrete

R. K. Dhir and C. Q. Lye (eds). ICE Publishing, London, UK, 2019, ISBN 978-0-7277-6463-8, £125·00, 495 pp.

This collection of papers around the theme of the use of recycled aggregates (RA) in concrete is a key reference work for civil engineers and their clients as we attempt to re-orientate our industry towards fulfilling the aims of the circular economy. It provides valuable insights in the move to reutilise a wide range of materials from building, demolition and excavation wastes to substitute for quarried and sea-sourced raw materials. Given the vast quantities of demolition, construction and excavation wastes, in excess of 100 million tonnes per annum in the UK, there is obviously considerable potential to divert even more of this to substitute for naturally sourced aggregates.

Professor Dhir and Dr Lye represent a great combination of academic, mainly at the University of Dundee, and practitioner, senior technical manager with G&W Group, Singapore where Dr Lye is responsible for R&D and quality control of concrete products.

The foreword written by the two editors is a very comprehensive review of the full content of the volume. However, importantly it also covers a number of pointers to areas where further research should be directed to ensure greater recovery and the use of RA.

The papers included in this compilation have exclusively been drawn from the full spectrum of Institution of Civil Engineers (ICE) periodicals over the period from 1985. Professor Dhir noted that he had used the recently developed analytical systemisation technique to select and classify the 250 RA papers that were initially identified from ICE Publishing-sourced materials. The limited number of papers that were then selected were then closely examined and categorised.

These resulting papers were then divided into six sections for the book covering

- characteristics of RA – two papers
- designing concrete containing RA – two papers
- deformation properties of RA – six papers
- durability aspect of RA concrete, use of recycled concrete aggregates in structural concrete – seven papers
- environmental impact, case studies and standards and specifications – four papers.

Obviously, the majority of the papers focus on the structural and technical perspectives of RA and the selected papers have been organised in order to avoid repetition but still providing comprehensive coverage of the issues. These papers are also sourced from throughout the world so there are some minor technical differences in quality controls and specifications, but over time the differences have reduced significantly. There is detailed information on many of the main national specifications provided in the final chapter of the book.

One issue that is not fully covered is the economic supply–demand relationship between natural materials and RA. The UK and the Netherlands, for example, have landfill taxes, which push up the cost of disposal of demolition waste and therefore these provide the finance for processing, sorting and even upgrading demotion wastes. Another important and linked factor is the development of local and regionalised market opportunities for the potential supply of reclaimed demolition waste. This is covered in part in Rod Collins' contribution in Chapter 23 looking at one materials exchange programme.

The title is great – it can be read in two ways: as a simple descriptive phrase or equally as a call to arms to ensure that we obtain maximum utility from the whole spectrum of reclaimed aggregates that can be used in construction projects to ensure our industry becomes more circular.

Jeff Cooper