Book review

Concrete Mix Design, Quality Control and Specification, fourth edition

K. W. Day, J. Aldred and B. Hudson. CRC Press, Boca Raton, FL, USA, 2013, ISBN 978-0-4155-0499-7, £134, 349 pp.

Mix proportioning of concrete remains an area of interest for all concrete technologists and engineers, both academics and practitioners

Chapter 1 of the fourth edition of *Concrete Mix Design, Quality Control and Specification* by Ken Day, James Aldred and Barry Hudson offers advice to engineers specifying concrete. The tone of the book is set in this chapter in that it is a book meant more for practising engineers and concrete technologists rather than research or academic professionals. Chapter 1 on specification is followed by three chapters on ingredient materials, and these are succeeded by Chapter 5, on the properties of concrete. Chapter 6 deals with specifications. This chapter highlights the necessity of specifying performance(s) rather than compressive strength alone, as had been the practice until recently. This is certainly an appropriate step forward in accordance with current understanding.

'Mix design' – that is, obtaining mix proportions – is mostly an empirical procedure involving good understanding of the art of mix proportioning with adequate background knowledge of concrete science, and this is covered in Chapter 8. Ideally, one would like to solve this as an optimisation procedure with all constraints known in the form of equations. However, with the current state of knowledge it is impossible to generalise equations involving decision variables such as mix parameters and performance characteristics (measures of workability, strength etc.). Empirical equations, charts and so on may not be universally applicable,

and hence the mix design procedure is not unique and varies depending upon guidelines such as those issued by UK Department of the Environment and the American Concrete Institute, and even from individual to individual. The Conad method is one more, and it has served its purpose very well.

The aspects of statistics relevant to quality control (QC) of concrete are dealt with in Chapter 9. The most important chapter of the book is Chapter 10, in which cusum (cumulative sum control chart) methods and the QC system are dealt with in quite an elaborate manner, with multivariate and multigrade cusum being quite unique. This chapter is definitely more illuminating than most other books on the subject.

Chapters 11 and 12 deal with the subjects of unchanging concepts and troubleshooting, and are likely to be very useful to practitioners. Chapter 13 on the future of concrete is an added feature that provides additional value to earlier editions.

The science aspects have been dealt with relatively less in this book, perhaps in consideration of the fact that it is intended more for those involved in concrete practice rather than research. In any case, there are a large number of such books generally available.

The systematic and logical sequencing of the subject matter is a positive aspect of the book. It would be a useful volume for practising engineers, especially the initial guidelines provided for selection of ingredient materials, writing specifications and so on. Like previous editions of the book, this edition also justifiably fills in voids in the knowledge base and information required by concrete technologists in construction practice.

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