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# Book review

## CONCRETE MIX DESIGN, QUALITY CONTROL AND SPECIFICATION, 3RD EDITION

Ken W. Day, Taylor and Francis, London, 2006, ISBN 978-0-41539-313-3, £89.99, 384 pp.

Before reviewing this book it is important to stress Ken Day's authority to write on the subject. Day graduated from Manchester University, UK and has been at the cutting edge of concrete mix design and quality control since the early 1950s. He has held positions as a university lecturer in concrete technology, as a structural designer, as an associate partner with a major UK consulting engineer, and has been employed in the Airfield Construction Branch of the Australian Government and in production, R&D and management in the precast and ready-mixed concrete industries. He ran his own consultancy for 28 years, providing services to many major clients with projects in several countries. As a result, Ken Day has a wealth of experience of concrete in UK, Australia and Asia to call upon. He is a member of the Institution of Civil Engineers, UK, a Fellow of the American Concrete Institute, Fellow of the Institute of Concrete Technologists, UK, and an honorary member of the Concrete Institute of Australia. He is a well-known lecturer on concrete at conventions and conferences worldwide.

The first edition of Day's book was published in 1995 and a second edition, with associated software, was published in 1999.

The third edition is a major revision and provides comprehensive, readily understandable assistance to concrete producers in the design and control of their products and providing background information for users and specifiers of concrete. Day identifies in his book how to apply the essential principles with or without elaborate systems for small and large producers on construction projects of all sizes taking into account both safety and economy. A website, www.kenday.id.au, offers free, simple on-line programs and access to full software and updated advice.

Day's book includes the following main sections: Advice to specifiers; Properties of concrete; Mix design; Quality control; Specification production control; Concrete in the 22nd century; Specification of concrete quality; Aggregates for concrete; Cementitious and pozzolanic materials; Chemical admixtures; Statistical analysis; Testing; Unchanging concepts; and Troubleshooting.

With regard to materials generally for concrete, Day refers to the most recent innovations—for example superfine fly-ash, colloidal silica, metakaolin and superfine limestone—as well as to the normal range of cementitious materials, aggregates and admixtures, taking into account the possible interactions when several active materials are used in combination

With regard to concrete mix design, Day provides a simple system, based on materials test data, as an alternative to the familiar Department of the Environment method in the UK and the American Concrete Institute method in the USA. He recognises that this system is limited in its accuracy but this problem can be overcome in his more sophisticated version by use of feedback from test data from the quality control system.

With regard to quality control, Day advocates a comprehensive control system that integrates mix design data, materials test data, concrete test data, production records and inspection records into a single system providing continuous feedback and adjustment. Day describes his approach to concrete control as Multigrade, Multivariable, Cusum quality control. The degree of complexity to adopt is for the producer to decide, based on selection from a massive array of possible factors.

With regard to concrete specification, Day recommends adopting performance requirements rather than prescription wherever possible and requiring the producer, normally under ISO 9001 certification for all major projects, to be responsible for assessing conformity.

A new section, Concrete in the 22nd century, includes: integration of mix design with quality control; relational mix maintenance; high-performance self-compacting concretes; novel cements incorporating magnesium oxide; inorganic polymer concretes. (This last item is also extended by a 30 page appendix.) For some of these topics and others elsewhere in the book, Day calls upon specialists as co-authors.

Thus, for most experienced practitioners, aspects of the book will be seen to tread familiar ground while introducing a range of more sophisticated and hopefully economically beneficial solutions to consider. For the less experienced, quick and simple solutions are provided for immediate use. In all, a welcome book for concrete producer, user and specifier.

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