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Book review

Testing of concrete in structures, 4th edn

J. H. Bungey, S. G. Millard and M. G. Grantham

Taylor & Francis, 2006, ISBN 978 0415263 01 6, £89·59, 352pp.

The previous three editions of this book, written by John Bungey of the University of Liverpool and first published in 1982, have been widely consulted by numerous engineers who do not themselves have expert knowledge of the full gamut of techniques for evaluating the condition of concrete in structures but often need to decide which of a number of such methods might be appropriate for use in a particular investigation. Nowadays it is fair to say that almost all engineers would fall into the category of being non-experts in at least some of the methods of in situ testing that are available. It is therefore pleasing that the latest edition of this book, although significantly longer than former versions, remains true to its principal aim of providing an overview of the subject at a level suitable for non-specialist engineers who are generally responsible for the planning or commissioning of test programmes that are applied to concrete structures when, for example, questions of durability may arise. The new edition has two additional co-authors—Steven Millard and Michael Grantham: the former is an academic colleague of John Bungey and the latter a consultant chemist with extensive industrial experience of many of the techniques currently used in concrete investigations.

The early chapters of the book, which deal with planning and interpretation of in situ testing, surface hardness methods and ultrasonic pulse velocity methods, follow generally similar lines to those of previous editions although there is a significant amount of updating in areas where innovations have been made, as with the recent use of ultrasonic echo imaging of air voids in post-tensioned ducts within concrete. The fourth chapter covers the different types of test that may be used to assess in situ concrete strength by partially destructive methods that are applied to the surface zone and this is followed by others dealing with the well-established approaches of core testing, load testing and structural monitoring, all of which are familiar territory to most civil and structural engineers.

The seventh chapter moves into areas of durability testing that are less readily understandable by those who have little knowledge of chemistry. Nonetheless the discussion of techniques that are used for investigation of corrosion of reinforcing and prestressing steels is clear and informative, covering not only well-established procedures (such as covermeters, half-cell potential measurements etc.) but also mentioning a number of electrochemical methods (linear polarisation resistance and related techniques) that have moved relatively recently from the research laboratory to the field. The later sections of the chapter on durability tests cover a miscellany of topics related to moisture measurements, transport property assessments and a number of other tests concerned with specific forms of deterioration.

The penultimate chapter on performance and integrity tests is one of the most interesting in the book as it covers a number of instrumental methods that have undergone rapid development in recent years. The topics covered include: infra-red thermography; radar; dynamic response testing; radiographic techniques; photoelastic methods; and holographic and acoustic emission measurements. There are also brief discussions of several other topics that have been of research interest in recent years. The concluding chapter of the book gives a brief account of some of the more widely used chemical and microscopy techniques that may be applied to concrete, mainly in investigations of durability problems and there are a number of appendices setting out illustrative examples of relevant calculation procedures.

Overall, the book is very well presented and contains over 400 references to relevant literature. It will be a most welcome addition to the bookshelves of both academics with related teaching and research interests and to practising engineers and others working in relevant areas of the concrete industry.

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