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Book reviews

Testing of concrete in structures

J. H. Bungey

Blackie, Glasgow, 1989. 229 mm × 152 mm. 250 pp. Illustrated, hardback. ISBN 090 3384 612. £39·00.

The first edition of this book filled a significant gap in the range of reference books covering concrete. The second edition ensures that the gap, associated with fast changing needs and solutions, remains adequately filled. The author, Dr John Bungey, is probably better suited to the task than many other specialists in the field in his position as Chairman of the BSI Committee responsible for revising BS 4408 within the Part 200 series of BS 1881 covering non-destructive testing of concrete.

The scope of the book is very wide, indeed even wider than the title suggests because it covers load testing of structural elements as well as testing of concrete in the elements. There is a good balance between destructive and non-destructive tests, tests for strength and for other characteristics, and tests for checking compliance and for diagnosis.

Dr Bungey avoids the trap of merely filling space through providing the petty detail expected in a British Standard. A nice balance is achieved by providing just sufficient detail necessary to explain principles and to enable comparisons to be made between different methods. A number of case studies is provided to illustrate practical application. The book is well illustrated with photographs, diagrams and graphs, it lists over 200 references and contains an adequate index. Indeed, the number of references has increased by 70 since the first edition, which is some measure of the significant effort made to update the book.

It is worth listing the chapter headings, so that the overall scope can be seen:

1. Planning and interpretation of in-situ testing
2. Surface hardness methods
3. Ultrasonic methods
4. Partially destructive strength tests
5. Cores
6. Load testing
7. Durability tests
8. Performance and integrity tests
9. Chemical testing and allied techniques

In the world of concrete at large, there has been a change of emphasis away from strength towards durability and performance generally. This is reflected in the fact that the most significant changes to the book are the creation of separate chapters on durability tests and on performance and integrity tests. It was particularly pleasing to find dynamic response testing for elements, and even complete structures, included as a sub-section in this edition, and if I have any criticism it would be that it does not receive more extensive treatment, but perhaps I should not anticipate a future edition.

In the chapter on cores, account has been taken of the addendum to Concrete Society Report No. 11. In the section dealing with chemical analysis, the myth and mystique are cleared away by showing just how inaccurate the estimations of cement content can be.

If I were to identify an area requiring expansion, it would be the greater use of that underrated scientific instrument, the naked eye, for the assessment of

concrete and the diagnosis of faults. Having recently had the pleasure of getting off my 'butt' and visiting a site to look at a wall demonstrating almost all the possible malpractices in site placing and compaction, the following truism came to my mind: the visible surface of concrete is but the mirror image of the formwork and the frozen imprint of the process of concrete making, placing, compacting, finishing and curing.

But even here the author has to some extent forestalled my criticism by including reference to visual inspection throughout the text.

Who is the book aimed at? Dr Bungey targets it at non-specialist engineers who are responsible for the planning of test programmes. I suggest that, even for most specialists, the scope of testing of structures is now so wide that the book is a must. Indeed, the dust jacket blurb recommends it also for civil and structural engineers in general together with designers, concrete technologists and advanced students. I must agree.

The day seems long gone when the choice seemed to be rebound hammer, UPV or core. We are spoilt for choice now. More importantly we can chose more appropriate tools for our needs. Life does get more complex but a guide such as that provided by Dr Bungey steers us through the complexity and for that we should thank him.

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Proceedings of the international symposium on fibre reinforced concrete, Madras, 1987

General Editors: V. S. Parameswaran and T. S. Krishnamoorthy

A.A. Balkema, Rotterdam, 1988–89. 238 mm × 177 mm. 3 volumes, 1626 pp. Typescripts, illustrated, hardback. ISBN 90 6191 796 4 (for the set). £170·00, $90·00.

This is a three volume work comprising over 1000 pages, the third volume being devoted to discussion and indexing.

The science and laboratory testing of cement-based composites containing fibres is now a relatively mature discipline which has been the subject of numerous international conferences and at least 25 years of intensive laboratory investigations around the world. The theoretical and experimental studies described in Volume 1 are therefore mainly reviews, state-of-the-art comment or in some cases experimental confirmation of work carried out elsewhere. There is little which could be described as outstandingly original, although a number of papers contribute additional insight into specific aspects of the field.

The three sections in Volume 1 are entitled 'Theory of fibre reinforced concrete composites', 'Properties and behaviour of steel fibre reinforced concrete' and 'Properties of fibre reinforced concrete using fibres other than steel'.

Volume 2 is probably of more use to industry than Volume 1 because it concentrates on production methods, specifications, durability and applications of fibre reinforced concrete to in-situ and pre-cast construction. Of particular value are comments from users of fibre cement and concrete products in Chapter 6, such as those related to roofing materials by H. E. Gram and the repair of aircraft pavements with steel fibre concrete by M. Grondziel.

The last chapter in Volume 2 describes a number of relatively new techniques, such as the impregnation of pre-packed steel fibre concrete which contains up to 20% by volume of fibre (C. Josifek, D. R. Lankard and P. Balaguru). A speculative technique for growing fibres within the concrete by the use of yeast in the mixing water is also described. (R. Ramanathan *et al.*) The volume concludes with a bibliography by Hoff.

The publication of the complete work was somewhat delayed by the publication of Volume 3 containing some invited speeches and the discussion. Some valuable comments are provided in this volume by the delegates.

As with most conferences of this type the proceedings contain a certain amount of material which is already available from other sources. However, there is always something new presented and a keen student of fibre reinforced concrete will undoubtedly find papers of interest. However, at £170 for a set of volumes this is not a work which I would recommend individuals to purchase, and particularly it is not for those new to the subject as there is little continuity to be found between the different papers.

To summarize, this is a work to be held in the reference section of the library to be considered as representing the state of the art in 1987.

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