

the diffusion of chloride ions has been briefly reviewed, the subject of carbonation has been sadly omitted. The final Chapter 12, entitled 'Summary' is just that and is very well composed. Important findings of this entire review work on fly ash and its use in concrete are stated, linking them to the engineering properties and durability of concrete. Some of the underlying prob-

lems in this respect have been raised and areas of future research identified, as well as suggestions to ensure good performance of concrete containing fly ash.

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Earthquake resistant design for engineers and architects

Second Edition

David J. Dowrick

Chichester, New York, Brisbane, Toronto, Singapore, John Wiley & Sons, Second Edition 1987. 227 × 149 mm. pp. xix, 519. Typeset, illustrated, hardback. ISBN 0 471 91503 3. Price £28.50.

The first edition of David Dowrick's book, published over ten years ago, has established itself as a standard reference for designers trying to come to terms with the multifarious problems of earthquake engineering. One of the attractions of the book, retained in this revised and expanded second edition, is that almost all aspects of the subject are touched on, from seismology and statistical hazard analysis to the mundane details of pipework supports. Between publication of the two editions, there have been many important developments in almost all these aspects, and this is reflected in the contents of the new edition.

The material specifically on reinforced concrete occupies 90 out of the 519 pages. The discussion covers in situ frame and shear wall structures, with special emphasis on the quantification of ductility. It describes the detailing of in situ superstructures, foundations and retaining walls, and includes a set of standard reinforcement detail drawings (not revised from the first edition). There is also a shorter section on precast concrete structures and cladding, including a useful discussion of connection details, and there is a brief section on prestressed concrete. Sixty three references are cited in the chapter on concrete, and there is an appendix on specifications for reinforcing steel in earthquake resistant structures.

At the start of his chapter on concrete structures, David Dowrick states: "In the mid-1980's an internationally valid state-of-the-art review for resistance of concrete was exceptionally difficult to write, partly because of large differences in attitude in different countries towards certain aspects of design". One can sympathise with the author's problem; the best current American approach, in ACI 318-83⁽¹⁾, is to some extent empirical and even illogical, while the theoretically far superior 'capacity design' approach of the New Zealand code, the author himself admits, as a native of those islands, "is impractical to apply in

all but the simplest cases" in the full rigour outlined by NZA 3101⁽²⁾. As a result, although the basic principles are covered clearly, a well defined practical strategy for the designer does not really emerge from the book. Perhaps the answer to the problem will come not from New Zealand or the States, but from Europe, where the recent CEB seismic code⁽³⁾ (published too late for reference in the book) represents a significant step forward, and where Eurocode 8⁽⁴⁾, for structures in seismic regions, which is still in unpublished draft, is expected to carry the process still further.

Other parts of the book cover basic seismology, seismic hazard assessment, seismic analysis, site response and soil-structure interaction, choice of earthquake resistant form, and material and foundation design. There are separate chapters on design of steel, concrete, timber and masonry structures as well as on equipment and services design and on architectural detailing. There are short sections in the appendix on bridges, chimneys and towers, low rise buildings and the repair and strengthening of existing buildings.

REFERENCES

1. AMERICAN CONCRETE INSTITUTE. *Building Code requirements for reinforced concrete*. ACI 318-83.
2. STANDARDS ASSOCIATION OF NEW ZEALAND. *Code of practice for the design of concrete structures*. NZS 3101, Parts 1 and 2, 1982.
3. COMITE EURO-INTERNATIONAL DU BETON (CEB). *Seismic design of concrete structures*. Aldershot, Gower Technical Press, 1987.
4. COMMISSION OF THE EUROPEAN COMMUNITIES. *Eurocode 8: Structures in seismic regions*. Brussels, Final draft due for publication winter 1988.

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