Various techniques are described; for instance, galvanostatic pulse resistivity, reflected electrical impulses (the electric analogue of ultrasonic pulse reflection), and embedded sensors yielding natural potential, polarization and electrolyte resistance. The means of monitoring expensive and/or critical structures may well become an integral part of new construction rather than an adjunct to a structure already showing signs of distress. The remedial method of cathodic protection is becoming increasingly used and the nine papers in this section represent an up to date review of the technique.

In recent times, two new methods have been brought into play, namely, electrochemical chloride removal and realkalization of concrete. Both have been used on real structures with apparently beneficial effects. However, it is likely that the provision of both laboratory and field data will continue in order to underwrite their more widespread use. Both represent major remedial prospects.

The consequences of repair, the formation of macro cells, effectiveness of coatings in controlling the water

content of concrete and the development of standardized performance tests for repair systems are commented upon.

Chapter 9 deals with admixtures and high performance concrete. In particular, methods for assessing the potential corrosivity of admixtures. Further research is required in this area.

A most interesting prospect, namely that of 'super-cover concrete', is described. This uses glass fibre reinforced plastic at nominal cover depths together with normal steel reinforcement at deeper cover depth.

The book ends with a chapter on supplementary corrosion protection, covering such items as welded stainless steel reinforcement, galvanizing and epoxy coated rebars.

Finally, the book contains contributor and subject indexes, making this a most interesting and useful volume, bringing the reader up to date on current thinking and practical developments. A desirable addition to the bookshelves of the scientist and engineer working in the important area of structure corrosion.

P. C. HEWLETT

High performance fiber reinforced cement composites 2 (HPFRCC 2), Rilem proceedings 31

A. E. Naaman and H. W. Reinhardt

Spon, London, 1996. 605 pp. ISBN 0 41 921180 2. £85.00

This book provides a record of 13 preselected discussion topics at the 2nd International RILEM workshop on high-performance fibre-reinforced cement composites. The chapter writers were researchers at the leading edge of their fields and hence the book provides an up-to-date reference base for future research.

The basis of the selection of materials for inclusion under the definition of 'high performance' is that the included fibre volume should be sufficient to ensure that the post-cracking strength in tension should be greater than the cracking strength so that multiple cracking or quasi-strain hardening occurs in the composite. Thus the composites concerned are 'tough' rather than 'brittle'. Most of the materials described comply with this definition although flexural tension is sometimes substituted for uniaxial tension.

There are 14 chapters which cover all aspects of fibre-reinforced cement composites including characterization, production, mathematical and computer modelling, testing and structural applications. Most types of metallic and non-metallic fibres are included. Each chapter is essentially a review of existing

knowledge, and there is little in the way of new information.

Chapter 12 on practical structural applications is somewhat disappointing, and demonstrates the lack of confidence of the structural designer in relying on random short-fibre composites to sustain structural loads, apart from slabs supported on the ground. It is clear from this chapter that fibre-reinforced cements are still far from replacing conventional reinforcement in any but very specialized systems.

Chapter 13, on future research needs, summarizes the views of its 17 authors. It is clear that high-performance fibre-reinforced cements are still in the area of exotic materials, and a multidisciplinary approach is needed before their full potential can be realized as structural materials.

The main use of the book, therefore, is to provide a base or state-of-the-art compilation on which future researchers can build. In this context, it will have a limited interest span of, possibly, up to the year 2000 at the latest.

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