

Book reviews

Repair, protection and waterproofing of concrete structures

Philip H. Perkins

London and New York, Elsevier Applied Science Publishers, 1986. 227 × 145 mm. pp. xiv, 302. Typeset, illustrated, hardback. ISBN 1 85166 008 9. Price £35.00.

The first edition of Mr Perkins' book, which was published in 1976, provided a useful but rather limited review of the subject of concrete repair. The second edition is greatly improved and will be useful to engineers who require an overview of the subject. Clearly the range of subjects included in the book cannot all be dealt with in depth in 287 pages but the author has taken care to cover many of them, with only a few notable omissions.

The reviewer considers that insufficient attention has been paid to the design of concrete repair mixes for durability. For example, the beneficial use of plasticizing additives in the reduction of water content and so of water/cement ratio is not mentioned although it can result in greatly improved durability.

Recent research has shown that the partial replacement of cement by pfa, silica fume and ground granulated blastfurnace slag can be beneficial in reducing chloride permeability, reducing the risk of alkali-silica reaction and improving durability. No mention is made of GGBFS although its use in blastfurnace slag cement is extremely common in parts of the UK and it could well be used with advantage in some repair specifications.

The factors controlling the deterioration of concrete and the symptoms of failure have been discussed in some detail and sections in chapter three on chemical attack and the effects of distilled water are interesting as is a useful list of aggressive agents.

The investigation and diagnosis of defects is considered in relation to a hypothetical 1960's structure. Unfortunately this section is superficial and, whilst the techniques in frequent use are indicated, it is clearly impossible to deal with a subject of such complexity in a little over 25 pages. The brevity of this chapter is to be regretted because, unless the causes of deterioration are clearly identified, it is unlikely that the correct repair regime will be used.

Structural and non-structural repairs are well considered and much useful advice is given on the preparation and execution of repair works. In general, the author recommends the use of SBR/OPC grout to provide a bond coat between new and old work. This procedure has been widely adopted but requires considerable care to ensure that the grouted surfaces do not dry out before repair materials are applied. Reference is made to cathodic protection and in particular to two proprietary systems.

In a chapter on repairs to concrete bridges the author says "chloride contamination of bridge decks has not so far occurred very often in the UK but corrosion of parapets and kerbs is not uncommon". In the reviewer's experience this is a gross understatement since chloride attack of bridge decks associated with leaking joints and drains is commonplace, as is damage to supporting structures.

Reference is made to ASR and typical 'Isle of Man' cracking is illustrated. A photomicrograph showing

the mineralogical basis of ASR deterioration would have been most valuable.

The final chapter, which covers repairs to water-retaining and excluding structures and marine structures, provides much useful information.

This is a book worth having as long as it is not considered to be an encyclopedia of concrete repair

techniques and its relatively few shortcomings are appreciated.

J. GLANVILLE

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Alkalies in concrete

Editor: Vance H. Dodson

Philadelphia, American Society for Testing and Materials, 1986. 228 × 148 mm. pp. vii, 92. Typset, illustrated, paperback. ISBN 0 8031 0498 7. ASTM Special Technical Publication 930. Price \$24.00, £22.50.

The importance of alkalies as components of cement and concrete has been recognised for many years but is of current concern because of the occurrence of alkali-silica reaction in regions not previously thought to be at risk. The introduction of alternative cementitious materials, such as fly ash, and the need to improve standard procedures for assessing alkali reactivity of aggregates, have also raised questions, which are receiving much attention among researchers and engineers.

This booklet presents the proceedings of a symposium sponsored by the ASTM Committees on Concrete and concrete aggregates, and on Cement, and held in Los Angeles on 25 June 1985. It includes a short overview by the Editor and six papers:

Opportunities with alkalies in concrete testing, research, and engineering practice, by G. M. Idorn and D. M. Roy

Alkali-silica reactivity: effect of alkali in aggregate on expansion, by D. Stark and M. S. Y. Bhattu

Influence of cement alkali distribution on expansion due to alkali-silica reaction, by L. Struble and S. Diamond

Correlating water-soluble alkalies to total alkalies in cement—considerations for preventing alkali-silica popouts on slabs, by T. R. Dobic

Recent developments in the use of fly ash to reduce alkali aggregate reaction, by R. L. Smith and C. F. Raba Jr.

Influence of alkali-silica reaction on the engineering properties of concrete, by R. N. Swamy and M. M. Al-Asali.

There is a superfluous author index containing 12 names and a useful 3½ page subject index.

In his overview, the Editor suggests that the publication illustrates a 'pyramidal' effect in that the answer to one question gives rise to at least two more. While obviously not presenting all the answers to questions on alkalies in concrete, this booklet is a clearly produced and useful compilation.

J. N. CLARKE

Materials Research Centres

A world directory of organizations and programmes

Harlow, Longman Group UK Limited, Second edition 1986. 246 × 189 mm. pp. xiii, 814. Typeset, hardback. ISBN 0 582 90031 X. Price £165.00.

If first impressions count, then this directory makes a very good one: about 5000 industrial, official and academic laboratories in 76 countries active in all fields of materials science are listed. Each entry gives title and address, telephone and telex numbers, status: 'official research centre', 'research centre within an industrial company', 'educational establishment with r & d capability' (which is very useful), affiliation or parent body, names of director and department heads,

number of graduate research staff, annual expenditure, activities and publications. The description of 'activities' varies but is the largest part of most of the entries, with 50 to 100 words on each establishment (and in some cases much more). There are indexes of titles of establishments and subjects.

This is the second edition of the directory which is in Longman's Reference on Research Series.

The two tests that might be applied to a directory of