

which I suggest should be read alongside CIRIA Note 130 for a comprehensive view. The final chapter touches upon cathodic protection which, at long last, appears to be becoming a serious contender for total structure treatment.

On balance, this guide serves as a pragmatic introduction to the topic of corrosion damaged concrete. It

complements the more detailed but less readily understood texts on the subject, and should be welcomed by its targetted audience.

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## From materials science to construction materials engineering

Proceedings of the First International RILEM Congress, Palais des Congrès, Versailles, France, 7–11 September 1987

Editor: J. C. Maso

London and New York, Chapman and Hall, 1987. 232 × 155 mm. pp. 1447. Reproduced typewriting, illustrated, hardback. ISBN 0412301407 (set). Price £100.00.

In 1987 RILEM held a major International Congress to celebrate its fortieth birthday. The Congress had three principal themes for each of which there is a Volume of the Proceedings. These are:

- Volume 1. Pore structure and materials properties (pp. 1–378)
- Volume 2. Combining materials: design, production and properties (pp. 379–910)
- Volume 3. Durability of construction materials (pp. 911–1447)

Over 200 papers are included in the three volumes and while the largest number of the papers are concerned with concrete, there are many on rocks, soils, clay bricks, plastics, timber and other construction materials. About 40% of the papers are in French, the rest are in English. The papers came from over 30 countries, from every Continent, but with a predominance from the host country, France (over 25%).

It has been very difficult to review such a diverse collection of papers and this problem is compounded by the absence of a subject index and by the somewhat haphazard sequence in which the papers have been grouped. The papers are published in either English or French and the absence of translations, even of the titles, makes it very difficult to identify papers of likely interest or on a chosen topic. This severely limits the value of the Proceedings, since it becomes virtually impossible to find papers of interest without a very detailed reading of the full text. It certainly reduces the value of the book as a source of reference. This is a pity since there are many original papers that deserve to be widely used. The books themselves have been printed from camera-ready copy and are of a very high quality but this has not overcome the problems related to the retrieval of the information.

The titles of the different volumes provide a clear indication of the subjects covered. The volume on pore structure and materials properties ranges from fundamental studies on and modelling of the mechanisms that control the pore structure of cement pastes, mortars or concretes, to the more practical aspects of the achievement of low permeabilities. Considerable emphasis is paid to the influence of fly ash or silica fume, in association with water reducers, on the pore structure of cement paste or concrete. Other factors like the packing of aggregate and sand particles and the efficiency of mixers are also given good coverage. While much of the work is concerned with the potential durability of concrete (or the other materials considered), some of the papers discuss aspects of strength development and particularly the effects of the temperature or humidity on the pore structure. The diverse subjects covered are very broad and this indication of the range ignores other work on insulating or aerated concrete, on the inclusion of polymers or on the fundamental considerations of porosity from a theoretical or philosophical standpoint. For those interested in pore structures, permeabilities or particle packing, there is much here of interest, but the casual reader is unlikely to gain much that is sufficiently new or easily applied.

The second volume is concerned with combinations of materials and in the concrete field, this means predominantly the inclusion of fibres or polymers in the mix. To a large extent, these papers confirm known knowledge, such as effects of fibres on flexural strength and toughness of concrete or the effects of polymers upon durability. No doubt there are examples of new findings which the expert will appreciate but the reviewer found it impossible to identify any outstanding advances amongst the large number of

papers. This, again, emphasises the need for indexing. Other topics are also covered, among the more interesting being the epoxy bonding of steel plates to concrete for strengthening and the covering of concrete by metal foil to improve durability.

The volume includes a number of examples of composite materials applied in practice, such as composite roofing and flooring systems or concrete columns cast into steel cylinders.

The final volume, which is concerned primarily with aspects of durability, brings together papers on a variety of materials, including building stones, timber and plastics, as well as concrete. The causes of deterioration include weathering and sustained or cyclic loading. There is a growing realisation that the durability or service life of a structure is complex and depends upon a number of distinct factors and this complexity is reflected in the variety of papers included in the volume.

The effects of the environment and the changes in temperature and humidity are considered in considerable detail and much can be learned from observations on the different building materials. Mathematical modelling is given prominence as a necessary prerequisite for the improvements in service life prediction that are being sought. Again, it should be emphasised that these models cover both environmental and service stresses including creep and fatigue components.

A number of papers propose methods that can extend the predicted service life of concrete, applying some of the results from the work on pore structure or on polymer treatments. The volume ends with a number of papers on real-life observations, an essential part of any evaluation of materials or techniques that could be recommended for the enhancement of structural performance.

There is obviously a wealth of information in these volumes. The difficulty is in finding the useful pearls. The conference organisers were forced to limit the length of individual papers, and this can be frustrating when supplementary information is needed to allow the data to be fully understood or applied. However, most papers are well referenced and the Proceedings deserve to become a standard source of information. Unfortunately, as already stated, the absence of any index and the lack of translations, even of the titles of the papers, has greatly reduced the usefulness of the publication. If this could be added as a supplement, I would have no hesitation in recommending the book to all concrete libraries, but otherwise, I fear it will be used only by the dedicated specialists.

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## **Structural assessment: the use of full and large scale testing**

**Editors: F. K. Garas, J. L. Clarke and G. S. T. Armer**

Sevenoaks, Butterworths, 1987. 234 × 165 mm. pp. xi, 391. Reproduced typewriting, illustrated, hardback, ISBN 0 408 00356 1. Price £39.00.

The three editors of this book are the driving force behind the Institution of Structural Engineers' Informal Study Group for 'Model Analysis as a Design Tool'. Most of the 49 papers contained in the book were presented at an international seminar, organised by the Group, which took place at the Building Research Establishment in April 1987. A total of 119 delegates participated from 15 different countries.

This volume represents the latest achievement by the three editors, who, in recent years, have been remarkably successful in organising similar events on different aspects of model analysis and testing, and have successfully (and quickly) published the Proceedings in each case\*. For the record, and to give a sense of perspective, details of the previous volumes are:

Reinforced and prestressed microconcrete models,

Edited by F. K. Garas and G. S. T. Armer, The Construction Press, 1980 (Conference 1978)

Offshore structures: the use of physical models in their design, Edited by G. S. T. Armer and F. K. Garas, The Construction Press, 1981 (Conference 1979)

Design for dynamic loading: the use of model analysis, Edited by G. S. T. Armer and F. K. Garas, Construction Press, 1982 (Conference 1981)

Design of concrete structures: the use of model analysis, Edited by J. L. Clarke, F. K. Garas and G. S. T. Armer, Elsevier Applied Science Publishers, 1985 (Conference 1984).

It may be seen that a range of materials and applications have been covered in some depth—from the common stand-point to the role of structural models. An examination of all the volumes reveals a thorough coverage of modelling technology, test

\*Editor's note: Details of the next seminar in the series are given elsewhere in this issue, under forthcoming conferences.