Book reviews

THE TECHNOLOGY OF CEMENT AND CONCRETE

Volume I: Concrete Materials

by Robert F. Blanks and Henry L. Kennedy

Published by John Wiley & Sons Inc., New York; Chapman & Hall Ltd, London. 1st edition. 1955. Price 88s. pp. ix, 422.

The book deals very fully with the known facts about cement, admixtures and aggregates and their concrete-making qualities. It is based on material prepared for a course of lectures in cement and concrete technology for advanced students, but one would imagine that only a few would be able to absorb most of the fund of authentic information in the book; there is plenty for the specialist to study. It is a pity that, when the whole text (including Volume II: Concrete) had to be split, the work was not further sub-divided by publishing the chapters on cement and admixtures and on aggregates in separate volumes: many working in one or other field might then have wanted a copy to keep for reference although they will feel that the price for the book as it stands is rather high.

The authors have achieved their aim in making the book " interesting as well as informative " and of presenting their subject in a plain style which is easy to read. Perhaps the reader could have been given more help in finding the information he wanted if the index had included more page numbers where some valuable, although subsidiary, references to a subject could be found. In a book which is so free from printing errors one is surprised to find that a few of the page numbers in the index do not tie up with those in the text.

It is natural that the authors should deal at length with a number of techniques and problems which have received much attention in the U.S.A. in recent years although, at present, some may seem to be of little importance to British engineers. A larger number of types of Portland and other hydraulic cements are in regular use and all are described in some detail. Of necessity, precise instructions for carrying out the various processes in the manufacture of cement will not be found because the techniques depend so much on local conditions; but the factors to be considered and the principles to be followed are discussed at some length, and there is constant reference to the effect of different characteristics of cements on their concrete-making properties. Chapters are devoted to pozzolanic activity and to air-entraining and other admixtures and they should prove to be of great value to any who have a growing concern for the durability of their concrete. The problems of alkali-aggregate reaction (which does not appear to occur in Great Britain) and of ensuring that the physical properties of the aggregates are compatible with those of the cement paste are examined thoroughly. In fact, the authors take exception to the idea that aggregate is an inert material and state that " most aggregates when bound into concrete by a cementing medium are highly reactive ". One is almost driven to the conclusion that the New World is composed of rocks so new and virile that there is small chance of any concrete being durable! However, such an impression is only due to the thoroughness with which they deal with the characteristics of aggregates. They show how careful processing can result in uniformly good aggregates, and American producers find that the extra expense involved can be more than offset by the saving in the cost of the concrete produced.

Das Hängende Dach

(The catenary roof)

Dr.-Ing. Frei Otto

Published by Bauwelt Verlag, Berlin. 1st edition. 1954. Price DM 35.00. pp. 160.

The progressive-minded architect and the structural engineer will, each from his own point of view, find this a stimulating and highly interesting book.

The catenary roof in its present form is an ultra-modern and in many respects revolutionary method of construction. Yet it traces its descent from what is perhaps one of the earliest and humblest forms of artificial structure, namely, the tent. It also has points in common with the suspension bridge. It consists essentially of a skin suspended between fixed supports. This skin, which is subject only to tensile stresses, may consist of a continuous membrane or, which is more often the case, of

a network of cables or similar members performing the actual load-bearing function.

The author describes the evolution of the modern catenary roof from the first major structure to be built in accordance with this principle: a steel roof at Albany, U.S.A., in 1932. He goes on to discuss other well-known structures, such as Lafaille's exhibition building at Zagreb (1937) and, in particular, the great arena at Raleigh, U.S.A., the design of which was based on an original scheme produced by Nowicki in 1950. Further outstanding examples of this method of construction are the Swiss Pavilion at the Berlin Industrial Exhibition (1952) and the Schwarzwald Hall at Karlsruhe, Germany (1954).

The behaviour of suspended membranes and network systems is explained in simple language. Numerous highly informative diagrams, sketches and photographs of models help the reader to gain a clear understanding of the principles involved. A good deal of information is given on structural details and methods applied in actual buildings. Possible future developments, some of them daring and fantastic, are indicated.

Although the theory of catenary roofs and similar structures is explained and design methods are discussed, this book lays no claim to giving anything like a full treatment of the subject from the structural engineering point of view. Its chief merit lies in its being a summary of progress achieved and in its clear and attractive presentation of principles and possibilities. Its value is enhanced by the many illustrations it contains, including a number of photographs of completed structures.

Der Einfluss des Kriechens und Schwindens in Spannbeton-Konstruktionen

(The influence of creep and shrinkage in prestressed concrete structures)

by Dr.-Ing. W. Säger

Published by Werner-Verlag GMBH, Düsseldorf. 1st edition. 1955. Price DM 15.00. pp. 175.

This book presents a rigorous and fairly exhaustive treatment of the mathematical theory of creep and shrinkage as applied to prestressed concrete structures. The author bases himself on Professor Dischinger's well-known mathematical formulation of the phenomena in question.

The seven chapters of this volume deal with basic theory, bonded statically determinate systems, unbonded statically determinate systems, systems in which continuity is subsequently established, unbonded statically indeterminate systems, bonded statically indeterminate systems, deformation of prestressed concrete structures due to creep and shrinkage. For reasons not stated, the author confines himself to post-tensioned systems. His object in dealing with unbonded prestressed concrete in some detail, despite its limited practical significance, is to present the treatment of his subject in a generalized form, proceeding from the analysis of relatively simple problems to that of more complex ones.

The application of the formulae derived is illustrated by means of worked examples. Towards the end of the book these formulae become long and involved, so that the solution and numerical evaluation of the relevant equations tends to be a rather formidable task, in spite of the introduction of certain approximations.

This book is certainly not everyone's meat. Even a cursory inspection of its pages shows that it can hardly have been written with the requirements of the average practising designer in mind. Its presentation of the subject will appeal only to readers with a pronounced mathematical bias. The more practical-minded engineer, while fully realizing the importance of creep and shrinkage in their effect upon prestressed concrete structures, will tend to look askance at this " exact " mathematical analysis of phenomena which are inherently inexact in the sense that it is not possible accurately to describe the behaviour of an essentially variable and unpredictable material like concrete in terms of a few rigidly defined physical constants. For his practical needs he will almost certainly turn to simpler and probably quite adequate methods of computation. On the other hand, this logically developed and well set-out treatise may commend itself to the research engineer engaged in the investigation of special problems in structural theory. Moreover, in fairness to the author, it should be mentioned that in his introductory section he points out that his book is meant only for " those who are desirous of being introduced to this sphere of problems ".