covering grillage, finite-element, folded-plate and finite-strip methods. The latter has been a particular favourite in the authors' own research but is not given undue attention in this section of the book.

Each chapter finishes with references giving sources of original material as well as more detailed discussions of some particular points.

The majority of the pictures and diagrams are pleasingly clear, as is the presentation of the (fairly substantial amount of) mathematics. It is, therefore, surprising and disappointing to find that the ortho-

tropic plate theory design charts are so poorly reproduced that many of the annotations are unreadable.

It seems possible that the development of bridges may now have reached something of a plateau, so that this is an appropriate time to collect together the various threads and present the possibilities both to the present practitioner and to the newcomer. This book can be confidently recommended as doing just that, as well as providing interesting fare for the more general structural analyst.

B. C. BEST

Reinforced concrete engineering

Volume 1: Materials, structural elements, safety

Edited by Boris Bresler

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This book forms the first part of a projected three-volume treatment of reinforced concrete; the subsequent volumes are to deal with frames, slabs and shells, and design, performance and special problems, respectively. In his preface, the editor, Professor Bresler, cites two main categories of problem facing structural engineers in the light of current technological progress. These are problems relating to the fundamental behaviour of concrete (e.g. the effects of age, environment, stress, bond cracking etc.) and problems involving the analysis of structural behaviour. In general, the present volume only covers topics in the first category.

Since the need for specialized expertise in widely diverse subject areas was apparent, "contributions were invited from recognized authorities both in the US and abroad". However, of the twelve contributors to the seven specialized sections, only one (Professor Neville of Leeds) is not resident in the Americas, five being staff of the Civil Engineering Department of California University and a further four being at the Mexico National University.

Professor Bresler also states that, in recent years, much new knowledge has been acquired concerning the behaviour of concrete structures which is not adequately reflected in conventional codes and specifications, and that the aim of the present work is to summarize this new knowledge authoritatively. In the light of this goal, it is disappointing to find that much of the first four sections, dealing respectively with fresh concrete (P. K. Mehta and M. Polivka), reinforcement (J. F. McDermott), hardened concrete (A. M. Neville) and bond and cracking (D. Watstein and B. Bresler), so closely linked to the requirements

and regulations of current US codes. It also seems surprising to find so little reference to research and developments outside the USA.

The first four sections are followed by two that are more interesting and useful, dealing respectively with the strength and deformation of reinforced (O. M. Gonzalez, F. Robles and R. Diaz de Cossio) and prestressed (T. Y. Lin and P. Zia) elements. Here, however, the authors appear to have encountered a little difficulty in demarcating between the material to be covered in this volume and in later ones. Whilst the section on reinforced concrete is restricted to a strict theoretical treatment of each chief topic (e.g. shear, torsion, deformation, etc.), Lin and Zia illustrate their analysis (which, as those who know Professor Lin's work would expect, is the most effectively presented section in the book) with a series of eight well chosen worked examples.

The final section, on safety and structural design (E. Rosenblueth) is potentially the most interesting of all and it is unfortunate that the author's approach, combining abstruse professorial analysis with basic advice on detailing, seems likely to discourage many readers who would otherwise find the material of value.

All in all, it is difficult to recommend this book, so heavily oriented towards US practice, to European readers. In most contributions, American units are employed (i.e. imperial units but with the emphasis on kips etc.) but the final section is in technical metric values with some imperial equivalents. Perhaps Volumes 2 and 3 will prove to be more rewarding to readers on this side of the Atlantic.

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