Structure and performance of cement

Editor: P. Barnes

London and New York, Applied Science Publishers, 1983. 227 × 156 mm. pp. xiii, 563. Type-set, illustrated, hardback.
ISBN 0-85334-233-4. Price £60.00

In his preface, Dr Barnes declares that the purpose of this book is to present, to a wide audience, recent progress in our understanding of all aspects of cement, including production, variety and use. It was not the intention of the editor to produce a basic textbook.

The contributors to the 563 page book have provided chapters on the following topics:

1: Silicate structures and methods for their analysis (by K. Klinowski and A. L. Mackay)
2: Reactions occuring during cement making (by F. P. Glasser)
3: Crystal chemistry of Portland cement phases (by M. Regourd)
4: The microscopy of unhydrated Portland cement (by P. Barnes and A. Ghose)
5: Portland cement production (by C. P. Kerton and R. J. Murray)
6: Hydration of Portland cement (by I. Jawed, J. Skalny and J. F. Young)
7: Mechanical performance of cementitious systems (by S. Mindess)
8: Durability of cementitious systems (by R. E. Oberholster, J. H. P. Van Aardt and M. P. Brandt)
9: Industrial aluminous cements (by C. M. George)
10: Special cements (by W. Kurdowski and F. Sorrentino)

There is a nine-page subject index, but no author index is provided. About half of the book, mainly the first half, is concerned with anhydrous cements and the standard of this portion seems, to this reviewer, to be uniformly high. Chapter 1 on silicate structures is a little disappointing, since few applications of the methods to cements are described. However, this is offset by the broad range of topics covered and the comprehensive literature citations. Chapters 2, 3 and 5 are useful and competently written although they do not refer predominantly to recent papers, as might be expected from the preface. Chapter 5 on Portland cement production could, more usefully, have been placed at the front of the book. Chapter 4 on microscopy is a fairly long one and contains a wealth of recent information of anhydrous cement. It is unfortunate that there is no parallel chapter on microscopy of hydrated cement.

The later chapters, concerned with the performance of cements, are more variable in character than those already discussed. This is due in part to omissions and lack of balance. There is an excellent review of recent information on Portland cement hydration in Chapter 6, but this is not complemented by a chapter on the physical structure of hydrated cement. The following chapter on mechanical performance of cementitious systems provides a short section on physical structure, but this is not adequate to support a book that purports to improve our understanding of cement performance. The title of Chapter 8 is the "Durability of cementitious systems", but the introduction to the chapter specifically excludes any general review. Instead nearly half of the chapter is devoted to alkali–aggregate reactions, whilst corrosion of reinforcing steel and chloride penetration receive little more than one page. Problems of durability are often regional in nature and it is additionally disappointing that Chapter 8 is predominantly concerned with South Africa. The final Chapters, 9 and 10, give interesting reviews of aluminous and special cements, and a comprehensive literature list is provided for Chapter 10.

There are topics such as blended cements, diffusion, permeability, freezing-and-thawing behaviour and carbonation which should be treated in a book entitled "Structure and performance of cements"; unfortunately the appropriate material has not been included and these are serious omissions in a book costing £60. There are other books that give a more balanced coverage of cements and are far cheaper. It is recommended that a potential buyer should carefully scrutinize the chapters of particular interest to ensure that they justify the cost of the book.

L. J. PARROTT