

Book review

Concrete Durability

Thomas Dyer. CRC Press, Boca Raton, FL, USA, ISBN 978-0-4155-6475-5, £60, 431 pp.

Concrete is regarded as a permanent material and is used to make structures that are meant to last. As a result, the durability of concrete is an important issue and the subject of this book.

The book is well structured, comprising an introductory chapter followed by six other chapters with associated subsections covering, initially, the physical and chemical degradation mechanisms together with the specifics of steel corrosion in concrete. Having dealt with the science, the author covers the pragmatics of specification, means of construction and serviceability, repair and maintenance. In all, this is a comprehensive and focused treatment of durability.

Ironically, water is required to make a concrete and yet the processes of decay and degradation are both dependent upon it. Without water and the consequences of fire, concrete would last for an indefinitely long time.

After the introduction, Chapter 2 covers the causes and consequences of cracking, and these are dealt with in detail together with freeze-thaw behaviour and its alleviation along with abrasion and erosion issues (153 references).

Chapter 3 covers chemical degradation, which in some ways can be insidious in its complexity. However, the author deals with the range of interactions from sulfate attack in its various guises to alkali-silica/carbonate reactions with both informative and visual presentations. Acid attack, both mineral and organic, is also dealt with in detail (211 references).

Structural concrete is invariably reinforced with steel, and the steel wellbeing tends to govern the lasting durability of the concrete. In this regard, Chapter 4 is important, covering both mechanisms and protective measures (94 references).

Chapter 5 brings many elements together and deals with putting much knowledge into practice by way of specification. Issues such as quality, absorption, the nature of Portland cements, ground granulated blast-furnace slag, fly ash, silica fume and other material components, together with recycled materials and admixtures, are dealt with concisely. How concrete may be specified depending on the exposure conditions is dealt with diagrammatically, and in a most useful manner (55 references).

It is not enough to know what criteria control performance – it is necessary to achieve such performance in real structures. To do so requires techniques that can assist the achievement of durability. Chapter 6 deals with techniques such as controlled permeability formwork, curing, surface coatings, sealers, cathodic protection and sacrificial anodes (29 references).

Despite best endeavours, concrete structures do degrade and thus require maintenance and repair. The final chapter is concerned with serviceability, covering useful guidance for the appraisal and prognosis of future deterioration (62 references).

The book is very wide-ranging, touching many aspects of durability and giving the reader a comprehensive overview. Each specific issue can be taken further using the extensive references (608 in all). The book is complemented by a most useful index giving ready access to the book's contents. At a price of £60, this book is a treasure trove of information, and will appeal to all with a genuine interest in the use and versatility of this amazing material we call concrete.

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