Book review

Sustainability of Construction Materials

Jamal M Khatib (ed). Woodhead Publishing Limited, Cambridge, UK and CRC Press LLC, Boca Raton, FL, USA, 2009, ISBN: 978-1-84569-349-7 (book) and -2 (e-book), ISBN: 978-1-4398-0130-7 (CRC Press), **£130, 294 pp.**

'Sustainability' is the clarion call of the modern environmentalist lobby and a fashionable buzzword for scientists and engineers seeking popularity or credibility for their conferences, seminars, papers or books. Its use in the title of an edited book therefore invokes some initial suspicion as to motives or content, but this is quickly dispelled by opening the serious grey covers and perusing the wares within. In truth, sustainability is an increasingly important aspect of construction and its materials and this book 'does what it says on the tin' – readers will discover helpful guidance on life-cycle assessment, embodied energy, durability and recycling, to augment the data on engineering properties to be found in many other books.

The structure of this book is admirably straightforward: an introductory essay by the editor, Dr Jamal Khatib of Wolverhampton University, sets the scene and is followed by 11 chapters that each address a particular category or aspect of a construction material. There is an effective index at the end of the book, but otherwise, in the modern way to facilitate electronic publishing, each chapter is self-contained, with its own abstract, key words, acknowledgements (in some cases) and references. Overall, the informative text is well supported with tables, diagrams and valuable case studies, but images are regrettably limited in number and restricted to black and white.

Dr Khatib leads a truly international team of specialist chapter authors, including seven from the UK (chapters 2, 4, 6, 7 and 10), three each from Brazil (chapter 3) and Denmark (chapters 5 and 11), two from Greece (chapter 9) and one each from Australia (chapter 8) and the USA (chapter 1). The editor has successfully ensured a sensible, but not excessively regimented, consistency of style and technological level, with various topics – such as recycling and a forecast of future trends – being included within each material treatment.

Chapter 4 on masonry is the largest individual component (34 pages) and is largely concerned with clay bricks and concrete blocks, with

the absence of natural stone (from both chapter and book) appearing to be a glaring omission. A fascinating analysis of the contribution of various elements to environmental impact over a 60-year period shows that external and internal masonry walls of a typical building account for just 5 to 15%, whereas floors and their finishes contribute more than 50%.

Other major construction materials covered include aggregates (chapter 1), cement and concrete (chapters 5 and 10), metals and alloys (chapter 6) and timber and engineered wood (chapters 2 and 8). The contents of each chapter reflect the individual aspects of the material that affect sustainability, such as the preservation and repair of timber, the use of cement replacements in concrete, the prevention or control of metal corrosion and the crucial role of adhesives in wood products. Sustainability of some additional materials includes vegetable fibres (chapter 3), glass (chapter 7) and waste tyre rubber (chapter 9), but obviously there are some important further gaps in the coverage, including plastics and plaster products.

A final chapter (chapter 11) departs from the established pattern and considers the potential role for another developing topic, 'nanotechnology', on sustainable construction. Its authors start by rightly accepting that much hype, over-expectation and uncertainty have been associated with this subject, but then present a very helpful updating overview that offers a fascinating glimpse of a future in which 'nanoconstruction' may assist sustainability.

On balance, this book can be recommended to individuals at all levels who are involved with construction and the selection, assessment, use and maintenance of materials. There are some unfortunate omissions from the galaxy of materials used in construction, including natural stone (widely used for masonry, cladding, flooring and roofing), plastics and plaster products, but most other categories are covered. Also, as with any developing subject, it will not be long before 'the state-of-the-art' represented by this book needs updating, but much of the fundamental treatment will remain valid and continue to serve well as a specialist reference.

Ian Sims