

Book review

Sustainable Concrete Solutions

C. Georgopoulos and A. Minson. Wiley Blackwell, Chichester, 2014, ISBN 978-1-119-96864-1, £49.95, 216 pp.

Although the materials that make concrete are global and plentiful, there is a duty to deploy them in a socially responsible manner and in such a way as to minimise environmental impact. Georgopoulos and Minson in *Sustainable Concrete Solutions* deal with the subject in a logical manner, setting out the challenges then considering the conceptual design, before dealing with the necessary detail of material specification. The work ends with an all too brief consideration of construction, operation and end of life.

The challenges are well covered and suitably concise, as there is a common understanding of the most significant issues. In response, conceptual design takes the reader to look beyond the twin weaknesses of heavyweight construction, where environmental impact is measured by emissions of carbon dioxide and the mass of material used. Among the now almost natural consideration of thermal mass to minimise energy use to maintain a stable working environment in buildings, there are also ground-breaking pointers to the use of in situ soil stabilisation to minimise otherwise resource-expensive concrete pile or mass foundations. The summary of current environmental assessment schemes for both building and infrastructure works demonstrates that there is still a lot of work required to develop a robust and uncomplicated protocol to ensure such assessments are not open to scientific criticism.

Extensive coverage of material specification is dutifully included. The authors necessarily deal with cement and additions in some detail so that it is possible to balance the inherent embodied carbon cost with the need to

ensure that concrete meets early- and later-age strength expectations, as well as durability requirements. The use of novel cements is covered, but the subject suffers from a dearth of quantitative information on their suitability, performance and the environmental impacts for such prototype materials. There is some consideration with respect to the use of natural aggregates and the potential to substitute them with manufactured aggregates, recycled concrete aggregate or recycled aggregate. Somewhat courageously, an example of a standard environmental product declaration (EPD) for a generic tonne of concrete cradle to grave is included.

The text concerning construction is disconcertingly minimal but may be a reflection of where contractors stand with respect to sustainability; that is, they may consider it the responsibility of the designer to ensure the environmental impacts and the mostly in-use social performance criteria are met whilst they ensure the economic impacts in terms of material and construction cost are minimised. The appendices include a detailed consideration of thermal mass and choice of concrete slab types for those wishing to develop these concepts into construction details for a project design.

In summary, the authors have usefully put together much of The Concrete Centre guidance on concrete sustainability issues, as well as adding a wealth of extra material in a suitably concise manner. As its own foreword suggests, the book is written with the designer in mind, and the material is also readily accessible for academics, students and engineering practitioners.

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