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Book review
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Book review

Sustainable Materials With Both Eyes Open

Julian M. Allwood and Jonathan M. Cullen. UIT, Cambridge, UK, 2012, ISBN 978-1-906860-05-9, **£24·95 (paperback), 384 pp.**

This book is unusual, if not unique. First and notwithstanding its 376 pages, many diagrams, pictures and tables, it is available free from www.withbotheyesopen.com.

Second, it is written by eight individuals from the Low Carbon Materials Processing research group at the University of Cambridge as part of the WellMet 2050 project. Six of the individuals are PhD students.

The authors have amassed a very substantial store of quantitative data together with viewpoints and opinions aimed at taking stock of where the world is currently regarding sustainability issues and where it needs to be. It is written in a conversational style that is persuasive and should appeal to a wide cross-section of the population and not just professionals doing 'environment' for a living.

The book is structured in five main parts with various sub-sections followed by detailed explanatory notes.

Having identified concerns, the authors then try to find solutions. However, there is considerable uncertainty about how the environment works and the risks associated with it. The European Commission in 1995 started the Eco-Management and Audit Scheme (EMAS) aimed at monitoring and reporting environmental performances. It is then a matter of record as to whether sustainability targets are being met or not.

The book is weighted towards steel and aluminium but part iv covers cement, albeit in only 14 pages. However, there is a construction emphasis throughout the book, bearing in mind construction is the largest user of steel and aluminium with 50% of the world's steel being used, with the largest single usage for rebar.

In seeking solutions the authors question attitudes to both design and usage issues, with less used often resulting in more performance. Meeting demand with less production is a repeated message. Energy use and capture is also a recurring theme with very detailed flow diagrams, in particular Figures 8.11 and 8.12 for steel and aluminium, respectively. The amount of information given in such diagrams could result in a book on its own.

On the matter of carbon sequestration it would appear better not to produce the carbon to begin with. All solutions have a price tag that could be reduced by solving the problem further up the production/usage sequence.

All manner of economies can be made in particular on the issue of scrap metal and wastage. For instance the Olympic Stadium in London used 2500 tonnes of 'non-prime' steel tube without forfeiting performance.

Other energy-using and emission-producing industries can take regard of what is being achieved with steel and aluminium. Attitudes can become established together with ongoing routines, and these have to change if the 50% cut in emissions by 2050 is to be met, taking regard of industrial growth projections over the same period. This is a serious challenge but the initiative that all new commercial buildings should have zero carbon footprint by 2019 sets the trend and exemplifies the commitment to change.

As far as readers of *Magazine of Concrete Research* are concerned, part iv, section 20, dealing with cement has a clear message. Cement and steel drive approximately 50% of all industrial emissions. Some 2·8 billion tonnes of cement are produced a year with China being by far the greatest consumer/producer. By 2050 the production estimate is set at 4·5–5·5 billion tonnes. There is little room to improve production efficiencies for the cement manufacturer with those companies already using best practice (currently 2·9 GJ/t represents current practice but 1·8 GJ/t could be achieved). However, China and India have scope for improving energy use and production, and as large providers their potential contribution could be significant. At the moment the 50% reduction in emissions target by 2050 is currently more like 18%, so something has to be done.

Again the message is use less but provide the same performance and develop the means of extending the useful lifespan of buildings.

The book is of current and future relevance, representing what we currently do and what needs to be done. The message is serious and the presentation factual and persuasive.

The book will appeal to all who take sustainability seriously across a wide range of individuals involved in any aspect of materials production, use and disposal. This is an adult read and those involved in compiling the information presented should be praised.

Professor Peter C. Hewlett