Book review

SUSTAINABLE DEVELOPMENT IN PRACTICE: CASE STUDIES FOR ENGINEERS AND SCIENTISTS

Adisa Azapagic, Slobodan Perdan, Roland Clift. John Wiley and Sons, 2004. ISBN 0 470 85609 2, £30, 446 pp.

Anyone wrestling with what it means to introduce sustainability considerations into engineering practice may come across this book and be excited that it will provide answers, developed out of real-life examples, to some difficult problems. However, the authors are careful to avoid such a simplistic and prescriptive approach. They prefer instead to stimulate careful reflection in the readership, seeing them as active participants in developing their own arguments, rather than as passive recipients of received wisdom.

An easy and accessible book demonstrating some key sustainable development principles, it throws technical evaluations (of which there are many provided) into a broader context by accepting the need to view decisions from the wider perspectives of a range of stakeholder views. The real value of this book lies in the many structured questions interspersed through the text in each chapter. These lead readers to draw their own conclusions about the nature of sustainable technologies, rather than attempting to provide authoritative answers. So, for example, readers are asked to imagine they are the managing director of an 'Energy from Waste' plant, receiving an early morning call from the plant manager to inform them that several members of Greenpeace have climbed the stack of the plant and chained themselves to it. The press have already arrived at the site—what actions should be taken?

Questions like this put the reader on the spot, and the authors are not afraid of raising uncomfortable and difficult issues of the kind which must be continually addressed if engineers are to have any significant impact on helping to achieve sustainable development. Many of these questions have no right or wrong answers, but rely on judgement and an ability to balance fairly between often competing, and sometimes confrontational, attitudes and interests. Thus, the authors believe that engineers should switch from being 'technology advocates' to the role of 'honest brokers' of technical information, in which 'sustainability asks engineers to step away from the role of "objective decision maker" and enter the complex, value-laden, didactic realm of social priorities, social acceptability and participatory processes'. The central theme recognises that the knowledge needed to reach an accepted decision no longer resides solely with technical experts, but that engineers need to present

technical information clearly and without bias or prejudice for a pre-judged solution. This book attempts to move the technical expert away from propounding 'the right' answer and towards offering a range of technological options.

The structure of the book helps to achieve this, with each chapter covering an easy and undemanding (though in the limited space available not always the most comprehensive) introduction to the basics of the issues under consideration. This provides a good starting-point for further debate, although information is mostly presented on a 'need-to-know' basis to illuminate the succeeding case study. Therefore the book must not be mistaken as a definitive text on environmental engineering. The case studies themselves are a mix of actual and hypothetical situations, and should perhaps be considered more as generic case scenarios rather than as specific real-life events; several may be based on unrealistic assumptions. Those coming to the book looking for well-documented accounts of real sustainability initiatives as implemented in various infrastructure and industrial sectors by actual companies will be disappointed. The critical thinking questions frequently ask the reader to reflect on the issues from the perspective of their own country, recognising the global differences in how many of these issues are addressed.

The book is divided into two sections, the first dealing with an introduction to sustainable development and the changing roles of engineering and scientific professionals. The second section offers case studies on the following topics

- wastewater management
- control of air pollution
- municipal solid waste management (by far the longest chapter)
- sustainable process design and chemical manufacture (two chapters)
- industrial ecology
- scenario building in relation to energy options
- fuel cell applications
- process contracting (in the chemical industry)
- multi-criteria decision analysis for power generation
- social and ethical dimensions of mining.

These contain lots of factual and statistical information and provide good examples of quantitative analysis as well as covering areas where complex circumstances require decisions based on more than simply the technical case for a project. In this regard the book presents rich opportunities for use as a

teaching text. Because of the multiplicity of authors involved there is some repetition of material, in some cases within the same chapter. The dominant tool used in most chapters is life cycle analysis (well explained in the book's appendix), reflecting the chemical engineering background in which the book is rooted. While the book is mostly able to rise above this subject-specific discipline base, it does present a rather more singular focus to the topic of sustainable development than perhaps the title suggests.

Those thinking the authors have solved the conundrums of sustainable development and have written a book offering definitive solutions, will be frustrated. For those who are prepared to be challenged, and willing to take an active role in reaching their own conclusions, the book will provide a rich experience.

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