

## Book reviews

*Process Safety Analysis: An Introduction.* By Bob Skelton, IChemE, Rugby, 1996, 213 pp., softback, £26, ISBN 0-85295-378-X.

There is little doubt in my mind that this book succeeds in its primary aim as an undergraduate textbook on safety analysis. This is a typical textbook, with clearly laid out equations occasionally sprinkled throughout the text to allow the setting of numerical problems for students. As an introduction to quantified risk assessment the deviation from the classic five stage process of hazard identification, consequence analyses, frequency estimation, risk evaluation and acceptance criteria is unhelpful. The link between frequency estimation and consequence analysis to calculate the risk is not clearly explained.

A considerable amount of space is dedicated to explaining the concept of risk although the definitions of risk are mixed with risk perception. For the hazard identification stage both HAZOP and FMEA are extensively covered with several work examples that enhance the clarity.

The frequency analysis solely concentrates on logic trees and I feel that more space could have been spent on how such techniques can provide an insight into the way things can go wrong. The mathematical treatment is very brief and while it provides sufficient detail to remind an engineer of how to carry out cut set analysis, students learning these techniques will need some assistance.

The chapter on consequence analysis is clearly set out but limited. The failure to define a BLEVE and the absence of semi-confined vapour cloud explosions reveals the chapter's limitations. The treatment of release rate and gas dispersion while simple, gives the reader a good feel for the topic without revealing the frightening complexity of this subject.

The penultimate chapter provides an excellent introduction into human factors, gently introducing the concepts and leading up to quantification of human error. The problems (and answers) in the last chapter concentrate on frequency analysis and would have been better replaced with a bibliography or suggested further reading on each topic.

The main strength of this book is its readability in a subject that often leave readers cold, if not asleep, it is refreshing to see a publication that considers its readers as well as embracing the technical content. As an introduction to the subject: its unique breadth

of content, readability and affordable price should ensure that copies will be found on many bookshelves.

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*PII* S0304-3894(97)00007-1

*Safety Performance Measurement*. Edited by Jacques van Steen for the European Process Safety Center. I Chem E 1996. ISBN 0 8595 382 8. £44.00.

The spate of disasters in the 1980's motivated more formal approaches to safety management. For example following the Bhopal disaster in 1984, the American Institution of Chemical Engineers set up the Center for Process Safety, CCPS. Subsequently CCPS published a number of books dealing with different aspects of process safety management. In 1992 the European Process Safety Centre (EPSC) was established and a number of Working Parties formed. One of these focused on safety management systems, and in 1994 EPSC published a booklet entitled Safety Management Systems.

The EPSC book on 'safety performance measurement' (SPM) is the sequel to the 1994 publication. The purpose of the books is to:

- clarify the meaning and potential of SPM; and
- show the breadth of techniques and approaches to SPM.

The emphasis is on current and developing practice. It is not a manual of techniques for SPM, but a collection of 'examples' from EPSC members covering different aspects of SPM. In essence the book is a series of short articles dovetailed together to provide a fairly coherent whole. The companies involved (e.g. Bayer, Hoechst, TUV, DNV, Borealis, ICI, Dow, Exxon, BP, BASF, AEA Technology, Shell, DuPont, Norsk Hydro) provide useful insights into how a company could tailor the various approaches which are outlined to meet their own particular needs.

Following the introductory chapter, Chapter 2 provides an outline of SPM and presents a framework for SPM. This is a three by three matrix defining the inputs (plant and equipment, systems and procedures, and people) to safety management and methods of monitoring them (Inspections and audits by local staff, Assessments of specific aspects by specialists, Overview assessments by independent assessors). Subsequent chapters contain specific examples or themes, suitably positioned within the overall framework. Chapter 3, 'Measuring plant and Equipment: Practical Examples' covers monitoring techniques such as inspections, audits, condition measurement, and incident recording. The differing roles of operators, experts and regulators are discussed. The importance of a well structured and comprehensive approach to auditing is stressed e.g. Hoechst use 18 audit modules. The contribution from TUV on audit programme design