

In the second part of the directory the companies are indexed by the services offered. There are five major headings: analysis and measurement equipment; control and treatment equipment; recovery and miscellaneous equipment; pollution control and consultancy services; and associations and institutes of pollution control. There are 51 subheadings listing individual items of equipment and services.

The title of the directory is misleading since it covers equipment manufacturers and consultancy service firms. The information on this latter category is not comprehensive since it is based mostly on the private sector but does include a few Government sponsored institutions. There is for example no information on any of the Water Authorities, the Water Council or any central government departments. Details are given however on the U.K. Water Research Centre, Warren Spring Laboratory, Shirley Institute and some Universities.

The guide is generally free from mistakes but is already unfortunately out of date. Some of the firms listed have stopped trading and there are a number of new but very active companies missing. Nevertheless the directory caters for an area not adequately covered by other handbooks and will be a valuable reference book for people seeking pollution control equipment, pollution control advice or information on firms providing pollution control services.

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History of Accidents in the Explosives Industry, by G.S. Biasutti, obtainable from the author at Case Postale 312, 1800 VEVEY, Switzerland, price Swiss francs 62.00, including postage.

Dr. Biasutti has performed a useful service in collecting together in this book brief notes on all known explosions that have occurred during the manufacture of condensed phase explosives. A few incidents of particular interest occurring during storage, transport or use are included, as are some incidents involving materials such as peroxides which, though explosive, are not intended for use as explosives. The book covers the period from 1769 to June 1980. Naturally data on the earlier years are sparse but coverage seems thorough from 1870 onwards. About six hundred explosions are listed, the notes varying in length from a single line to half a page.

The book is an updated version of the French edition published in 1978. Unfortunately no references are given, apart from a mention of the classical work of Dunn and Robinson, so that readers who wish to know more do not know where to turn. Much of the information has been obtained from private communications, but references to published reports would have been useful.

The book is essentially a collection of information rather than a study of causes and the accounts are rather brief for the reader to make any analysis

of causes or effects* but in the Introduction Dr. Biasutti draws attention to the great reduction in the number and severity of explosions in recent years and attributes this to the substantial reductions in plant inventory that have been brought about by the introduction of new, continuous processes. There is a message here for the rest of the chemical industry. Cannot we find ways of reducing the massive inventories in plants such as the original plant at Flixborough? More knowledge of what has been achieved in the explosives industry may encourage chemical engineers elsewhere to follow their example.

Another factor contributing to increased safety has been the increase in remote control. In some of the individual accounts there is a tendency to blame "human error" without querying whether the opportunity for error could be designed out. For example the last incident but one in the book probably occurred, in France in April 1980, because an operator forgot to close a valve. Plants should be designed so that such simple errors — inevitable from time to time — do not produce such serious consequences.

The book is full of fascinating snippets of information. For example, we learn that Pierre S. du Pont, the founder of the Company, was killed in an explosion in 1817 and that another member of the family, Alexis I. du Pont, was killed in 1857. Alfred Nobel's brother was killed in 1864. Clearly the owners took the same risks as their men.

Perhaps the publication of this book will inspire someone to do the same for vapour cloud explosions. Lists have been published by J.A. Davenport [1] and K. Guban [2], but these contain little or no descriptive matter. The level of detail required is provided by D.J. Lewis [3], but he describes only 13 incidents. If anyone does produce such a book, let us hope he includes references.

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References

- 1 J.A. Davenport, *Chem. Eng. Progress*, 73 (9) (1977) 54.
- 2 K. Guban, *Unconfined vapour cloud explosions*, *Inst. Chem. Eng.*, 1979.
- 3 D.J. Lewis, *Progr. Engrgy Comb. Sci.*, 6 (1980) 151.

Heavy Gas and Risk Assessment, by Silvius Hartwig (Ed.), D. Reidel Publishing Company, P.O. Box 17, 3300 AA, Dordrecht, Holland, 1980. ISBN 90-277-1108-9, LC 80-14810, viii + 306 pp., cloth back, \$37.00.

This book is a collection of papers presented at the Symposium on Heavy Gas held September 3–4, 1979, in Frankfurt, Germany.

*I understand that statistical surveys by the author were reported at the 19th Safety Explosives Seminar, Los Angeles, CA, 10 Sept. 1980 and at the 7th Congress of the International Exchange of Experience on Industry Connected Accidents of the Explosives Industry in Athens, May 1981.