*Journal of Hazardous Materials*, 19 (1988) 221–223
Elsevier Science Publishers B.V., Amsterdam — Printed in The Netherlands


## Book Reviews

*"Guidelines for Use of Vapor Cloud Dispersion Models"*, by S.R. Hanna and P.J. Drivas, Center for Chemical Process Safety, American Institute of Chemical Engineers, New York, 1987, NY 10017, 177 pages,$75.00

The book is written on a topic of current interest in an easy to read style. The material is directed for persons working in industry or a regulatory body. The book is useful as a starting point for heavy gas dispersion modeling from a chemical spill or other hazardous releases. The topics are covered in a straightforward manner and critical evaluations of existing work are included during discussion of theories related to the subject. Nomenclature, author index and subject index are included in the book. SI system as well as British system of units are used depending on the availability of information. The book is divided into seven chapters: 1) introduction, 2) overview of release scenarios and modeling procedures, 3) input data required for modeling, 4) source emission models, 5) transport and dispersion models, 6) model evaluation experience and uncertainties estimates and 7) research needs.

The introduction chapter sets the stage for reading the book. The authors clearly point out their approach in writing the book and mention the needs of a typical person working in the area. The contents follow two basic themes: a) an explanation of basic physical and chemical principles, and b) guidance for choosing the best available dispersion model for a particular situation. The second chapter describes various hazardous releases encountered in industry and provides an overview of model components of a generalized hazardous release model. A table outlining the differences in modeling of routine releases and accidental releases is included. The third chapter concentrates on input data requirements and explains the required source data, meteorological data, site data, receptor data, and other data. The discussion included problems associated with using routine data and the importance of sampling time and averaging time.

The fourth chapter is a good summary of available source models for vapor cloud modeling. The authors clearly explain physical and chemical principles involved with liquid and gas releases, single phase and two-phase releases and computation of evaporation rates for single component and multi-component releases. Emphasis is placed on the use of standard equations used by chemical engineers in their day-to-day work. A review of source term modeling used in available models is included. The readers may like to read a paper by Buist and Belore (1986) that includes more work on two-phase flow.

The fifth chapter discusses physical principles applicable to transport and dispersion of hazardous releases. Apart from discussing heavy gas models, the authors also explain the concept of concentration fluctuations, averaging time and sampling time.

The work done on model evaluations and uncertainties estimates is included in chapter 6. The authors review available field data and subsequent statistical work carried out by various authors on model predicted concentrations and observed values. They also point out the need to extend the range of experiments and to include a more complete set of evaluation statistics. The last chapter provides a summary of research needs in the area.

The book includes two appendices. The first appendix includes 32 questions which were used in the survey of modelers. The results from 33 models are also given in this appendix. The second appendix includes examples of hazardous release scenarios which may be encountered by a plant engineer. The book includes an extensive list of references which will be useful for those who want to do a detailed study of a model or its component. Additional reading sources are also included in the book.

The book is free from typographical errors, Minor editing work in the explanation of eq. (4-11) is needed. For eq. (4-12), $d$ is the diameter of the pool and the word "units" is not needed in the bracket explaining $D$ for eqn. (4-11).

Overall I enjoyed reading the book and I have no reservations in recommending the book for persons engaged in hazardous release-related activities.

Reference:

Buist, I.A., and R. Belore, "A computer model for predicting outflow rates from damaged chemical storage and transportation tanks", Proceedings of the Third Annual Technical Seminar on Chemical Spills, Feb. 5–7, 1986, Environment Canada, pp. 57–80.

ASHOK KUMAR