

BOOK REVIEW

Fluid Transients in Pipeline Systems

A. R. D. Thorley

D & L George Ltd, 265 pp.

Texts on fluid transients are usually written for specialists, either analysts or designers. This one is not. It is written for engineers needing to design a pipeline system, of whatever type, without the necessary background knowledge to feel confident in their handling of unsteady flow phenomena. It enables them to assess likely problems, to propose remedies and approximately size the necessary components, and to decide what supplementary analyses should be undertaken by specialists. This seems a tall order, but it is achieved relatively painlessly and with very little recourse to mathematics.

In the process, the author has achieved something else that may be even more important. Part 1 of the book fills a yawning gap in undergraduate texts and thereby provides an important stepping stone to books that are mathematically more demanding, but are much less suitable for introductory teaching purposes. This is no small matter; I have written to several publishers seeking nonmathematical introductions to fluid flows as well as to other engineering topics. "There's no need/demand for such texts," I am told. Oh no? Try asking students.

But, back to David Thorley's text. Having eased the reader into a general understanding of fluid transients and the most common methods of alleviating them, he treats us in Part 2 to a succession of design examples and operational incidents. The examples cover a much wider range than is addressed in Part 1. They are mostly in the domain of the civil engineer (i.e., water supply and disposal) but they also include an oil line to an offshore terminal, a process system with a ram pump and a high pressure feed system. All major methods of surge suppression are illustrated. The case studies of accidents and incidents are carefully chosen to illustrate features not brought out earlier, notably vibrating pipework and thermodynamic considerations when gas pockets are pressurized. They also highlight factors such as maintenance and training, including the danger of bitumen-eating microbes!

Part 3 of the book is primarily a reference source of design charts summarizing the behavior of system components such as check valves and air valves. The charts also include data on wave speeds in common types of pipe and on moments of inertia of pumps and their motors; this is important when attempting to elongate transient events. Data from Part 3 are used in Part 2 when necessary, so the charts should not be too daunting for reasonably intrepid designers. In-

evitably, there is not enough room to cover all parameters in the design charts, so Thorley has found it necessary to include a few equations to enable the range of parameters to be extended. He describes the origins of some of these, but mostly states them without proof.

The book ends with two short but valuable summary sections. The first of these is a selection of the sorts of questions that should be asked by designers wondering whether any hidden hazards have been designed into their system. The second is a comprehensive set of guidelines to facilitate productive planning of computer simulations by a suitable expert. Both sections are well written, but they sit rather uneasily in Part 3. They complement the material in Part 2 more than that in Part 3.

All of this is supposed to convey the impression of a book written in a friendly style by an author who understands his subject extremely well and who clearly has extensive research and design experience. I have no doubt that any interested student or graduate will find Part 1 very revealing. Most should also be able to use Part 2 to assess the need for preventative measures and to deduce the most likely methods. It is less certain that many will have the confidence to undertake the preliminary designs proposed in Part 2, but that would only be icing on the cake.

Alan Vardy

Abridged Book Reviews

Frank W. Schmidt, Editor-in-Chief

Heat Transfer Reviews, 1976-1986

Edited by E. R. G. Eckert, R. J. Goldstein, T. F. Irvine, Jr., and J. P. Hartnett
John Wiley and Sons, Inc., 681 pp., \$135.95

This book is a collection of the Heat Transfer Reviews published annually in the *International Journal of Heat and Mass Transfer* for the years 1976 through 1986. The yearly reviews are organized by subject matter. A brief one or two sentence statement is presented for all references cited at the end of each yearly review article. The annual reviews are helpful in acquainting the reader with the

literature published during the year on a particular topic. This book conveniently covers the literature during an eleven year period and contains a comprehensive author and subject index.

Gasdynamic Functions of Real Gases

A. M. Shekhtman

Hemisphere Publishing Corp., 182 pp., \$85.00

New expressions for the isentropic index have been obtained making it possible to integrate the thermodynamic equations and to obtain the principle relationships of one-dimensional isentropic flow of nine common real gases. These isentropic indexes are based upon currently available experimental data.

Heat and Mass Transfer in Building Materials and Structures

Edited by J. B. Chaddock and B. Todorovic

Hemisphere Publishing Corp., 807 pp., \$130.00

This bound volume is a collection of author-prepared mats of papers presented at a symposium sponsored by the International Center for Heat and Mass Transfer in September 1989. General topics presented include instrumentation and measurement techniques; simulation and modelling of building thermal performance; moisture and heat transfer in building materials and spaces; solar energy transfer to buildings; and air quality and comfort in relation to building energy transfer.