

# BOOK REVIEWS

## **Standard methods of hydraulic design for power boilers**

*V. A. Lokshin, D. F. Peterson and A. L. Schwarz*

New York, Hemisphere Publishing Corp., 1987, 345 pp., \$52.50

The title of this book does not belie its content. The beautifully designed and excellently presented material comprises hardly more and certainly no less, than a set of formulae and associated graphs, charts, tables and nomograms of associated empirical data and experiential standard-practice assumptions, presented in a logical sequence. Fore-knowledge of the overall arrangement and of the detailed geometry of the plant under consideration is taken for granted. Accordingly, this is certainly not a book for the student seeking to enhance this understanding of the fundamentals of two-phase flow. Rather, it is a very well-presented set of design procedures of the sort that should reside in all design offices. As such, it will clearly be unacceptable *in toto* to established businesses, who themselves must already have their own comprehensive techniques and procedures. However, such is the wealth of detail in this book, that they might find data of interest and, moreover, find some topics that give "food for thought" with respect to aspects of design for which it is feasible to attempt to establish design rules.

The presentation of formulae, some of bewildering comprehensiveness, but nevertheless always clear, occupies about half the book. Topics include calculation of pressure drops, safety of steam boilers, design of natural-circulation boiler units, design of once-through boiler units, design of multiple forced-circulation boiler units, calculation of feedwater economizers, design of steam superheaters, design of controls for steam superheaters (that title is misleading; little more is covered than the determination of the ranges over which parameters must be controlled), and design of pipelines.

Thermal aspects are but briefly touched upon, in a short appendix entitled "Determination of absorbed heat fluxes for boiler elements and tubes" and with the qualification, "In the case of discrepancies between the recommendations provided in the present Appendix and the generally-accepted standard heat transfer calculation techniques, the latter should be followed." A second short appendix provides general recommendations for

the design of hydraulic circuits but again with qualifications, "... the recommendations cannot provide a solution to any particular problem, or save the designer the trouble of looking for individual solutions to a series of problems in every specific instance." The final appendix (some 74 pages long) presents very complete calculations illustrating the practical application of some of the material presented in the body of the book. The book is rounded off by a comprehensive set of steam tables and allied data, and a collection of nomograms which assist in the application of some of the formulae.

There's no denying that this is an impressive and attractive book. If accepted for what it is, namely a source of totally unreferenced information concerning the calculation of the hydraulic aspects of boilers and their components, then it could provide a sometimes very useful source of reference. In addition, the very items for which formulae are provided can serve to remind the designer of considerations which may be important to him when he applies his own techniques and procedures. Notably, each chapter contains a section on safety.

*R. D. Tyler*

## **Flow induced vibration of circular cylindrical structures**

*Sho-eh-Sheng (S. S.) Chen*

Hemisphere Publishing Corp., Washington D.C., 1987, 464 pp.

This is the most authoritative, complete and well-written book on the general subject of flow-induced vibration of single tubular elements as well as tubular clusters and structures in single phase fluids. A virtual "must" for the serious student, researcher, as well as designer of system components subject to flow-induced vibration, it represents the summary of an extensive research program at the Argonne National Laboratories since 1967.

The prime merit of this book is that it summarizes the results of extensive research of the past two decades, which are otherwise scattered in individual papers and symposia (some of which are hard to obtain) and organizes this material in a uniform entity. The material is presented in 11 Chapters and three Appendixes. A brief Introduction (Chapter 1, 17 pages) covers typical examples

and basic mechanisms of flow-induced vibrations.

Chapters 2, 3 and 4 deal with the vibration phenomena in "quiescent fluids" for single cylinders multiple cylinders and circular shells respectively. Fluid inertia and fluid damping are discussed in great detail. Chapter 5 and 6 deal with "axial flow" effects inside and on the outside of single tubes and tubular clusters.

Tube vibration in "crossflow" is probably of the most general importance. It is also the most difficult one to predict due to the variety of excitation mechanisms, which include turbulent buffeting, vortex shedding, dynamic instability and acoustic resonance. These subjects are covered in Chapter 7 (single cylinder), Chapter 8 (cylindrical arrays) and Chapter 9 (two cylinders). Fluid elastic instability, the prime cause of tube vibration in baffled flow (shell and tube heat exchangers and similar flow systems), is covered in great detail in Chapter 10. The prediction methods for the critical flow velocity and the respective "stability maps" presented in this chapter are now recognized as standard best practice.

Chapter 11 offers brief instructions to apply the methods in practical design. Appendixes A, B and C contain the mathematics which would have otherwise disrupted the text. In conclusion, this book will remain a classic reference for a long time.

*J. Taborek*

## **Heat transfer of finned tube bundles in crossflow**

*J. Stasiulevicius and A. Skrinska, edited by A. Zukauskas and G. Hewitt*  
Hemisphere Publishing Corp., New York, 1988, 224 pp.

The book is published within the series *Experimental and Applied Heat Transfer Guide Books*. It is the translation of a book with the same title in Russian, sixth in the series "Thermophysics of the Academy of Sciences of the Lithuanian SSR, Mintis, Vilnius, 1974.

This book is concerned with heat transfer and drag for tubes with high circular and continuous spiral fins only. It is more than a report on experiments but it is not actually a guide book on the whole field as suggested by its title.

The authors carefully collected and reproduced everything they could find from the literature on circular fins,