

Decay Heat Removal and Natural Convection in Fast Breeder Reactors

A. K. Agrawal and J. G. Guppy

As stated on the cover, this book is a collection of material presented at the Specialists Meeting devoted exclusively to shutdown heat removal from fast breeder reactors by buoyancy driven natural convection. Many aspects of the problem, including the experimental and analytical, are covered in considerable detail.

We would suggest, however, that the claim made that it provides a valuable reference to all reactor and heat transfer engineers and analysts is not justified. The book is largely concerned with sodium cooled systems and, although most technically advanced countries are working on fast reactor designs of this type, the effort is a small proportion of the total reactor effort and the unique physical properties of sodium give rise to problems that frequently require unique solutions.

Though containing a useful directory of contributors there is no critical review of the material presented at the meeting. Presumably the papers were discussed and it would have been valuable if some of the discussion had been included. Many of the papers themselves are in a form, probably for reasons of commercial confidence, in which they contain insufficient detail for the reader to be able to judge their value or to make comparisons, especially in the case of computer code studies. For example it would have been interesting to know whether the numerical diffusion inherent in the use of upwind differencing techniques was significant in the PTAR code calculations and whether other codes suffered from similar problems. Also more indication of the computer resources required for running the various codes would have been informa-

tive. Although there is a short report on a post-meeting discussion of future requirements, the book does not give the reader a feeling for whether the 'art' of decay heat removal analysis is flourishing or is in need of new inspiration.

The book is reasonably priced and well presented, although a minority of the figures are illegible either because too much information is given on too small a figure (pp 14, 18, 204) or because of the poor quality of the original (pp 163, 209). It cannot be justified by shortage of space because there are many instances of whole or half pages being used to present the minimum of information (pp 60, 61, 230, 232). We must assume that this is the price we pay for reducing editing to a minimum by accepting camera ready copy.

The index appears to be more detailed than is justified and shows signs of being produced by the non-specialist. Having a personal interest in insulation (particularly when under sodium) we referred to all eleven pages listed under insulation to learn only that experimental work is often difficult to carry out and interpret, facts with which we are all too familiar.

Nevertheless the book is a valuable contribution to the sparse literature in this very specialised but vital field, and we have no hesitation in recommending its purchase.

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National Nuclear Corporation Ltd

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Applied Heat Transfer

P. Todd and H. B. Ellis

The book establishes the basic general principles of thermal energy transfer and illustrates the application of these principles on selected technical problems. Starting from the elementary definitions of the terms specific to heat transfer, basic thermal phenomena are explained and engineering calculations with reference to such problems as building heat transfer, heat exchangers, fluid flow mechanical energy losses, the evaluation of solar radiation at the earth's surface etc., are given.

Only a basic knowledge of mathematics/simple algebra and some geometry is required for the reader to be able to understand the contents of the book. Nevertheless, this does not detract from the value of the book or prevent the authors from presenting a wealth of varied material while at the same time making it more accessible to a wider audience.

It is not, however, its thematic contents which ultimately make this book attractive; there are, after all, many texts which cover a similar field of interest. The reason why one may find this book of interest

is the large number of examples drawn from practice. These numerical examples constitute a significant proportion of the book, and each of them is accompanied by a full description in SI units, as is called for in every good engineering project.

The authors introduce SI units at the very outset where they explain the vocabulary of heat transfer and because of this the reader becomes acquainted with the physical meaning of these terms with reference to the SI system. The conversion factor appendix facilitates use of material presented in older publications in British units. In a period when the SI system is still in the process of entering into engineering and academic practice, this thorough approach to units is important and may also draw more advanced readers, for whom the book is not primarily intended.

Because of its lively style, clarity of expression, the large number of numerical examples and the simple mathematics involved, this is an excellent textbook for students. These qualities, together with the large number of tables containing thermo-dynamic and heat transfer data for a large number of gases, liquids and solid material which meet the needs of quite a wide area of engineering activity in free or forced convection, radiation, net

transfer between surfaces, heat exchangers, latent heat transfer or sensible heat transfer, may be useful for engineers in the field and in research.

Among the book's shortcomings is the failure to give answers to the practice problems presented at the end of each chapter, especially for those requiring numerical computation. More importantly, no bibliography is given to which the reader may refer for further study. The only references which are made appear at the bottom of respective pages, where the authors document the origin of tables and graphs.

In sum, the book successfully combines an elementary but comprehensive exposition of heat transfer and the style of a practising engineer's handbook. It is this, together with the serious treatment of SI units, which makes the book original and attractive to a wide range of readers.

R. W. Lewis
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Published, price £18.95, by Harper & Row Ltd, 28 Tavistock Street, London WC2E 7PN

Books received

Guide to Efficient Burner Operation: Gas, Oil and Dual Fuel, *E. A. Faulkner Jr.*, £30.60, Van Nostrand Reinhold

Content at level appropriate to technician/plant operator. Imperial units used throughout

Thermal Radiation Heat Transfer, Second Edition, *R. Siegel and R. Howell*, \$32.00, 862pp, Hemisphere Publishing Corporation

Power Condenser Heat Transfer Technology: Computer Modeling, Design, Fouling, *ed. P. J. Marto and R. H. Nunn*, \$47.50, pp 490, Hemisphere Publishing Corporation

Proceedings of a workshop 'Modern Developments in Marine Condensers' held in California in 1980. Each topic (computer modeling; non-condensable gasses; vapour shear and condensate inundation; enhancement; fouling) is treated in a keynote paper, prepared papers and recorded discussion and summaries.

Two-Phase Momentum, Heat and Mass Transfer in Chemical, Process, and Energy Engineering Systems, Volumes 1 and 2, *ed. F. Durst, G. V. Tsiklauri and N. H. Afgan* \$119.00, pp 1079, Hemisphere Publishing Corporation

Two Volume post conference proceedings of seminar (Belgrade, September 1978) containing 74 papers. Subjects covered include: two-phase flow fundamentals; two-phase flow of rigid and deformable particles; non equilibrium phenomena; interface transport in liquid films; numerical studies of two phase flows; heat transfer and pressure drop in the power generator; mist flows, sprays, and dispersal bubble flows; two-phase and reactor safety; isothermal two-phase flows in chemical systems; heat and mass transfer in two-phase flow chemical systems.

Heat and Mass Transfer in Metallurgical Systems, *D. B. Spalding and N. H. Afgan*, \$99.00, 758pp, Hemisphere Publishing Corporation

Heat Exchangers: Thermal-Hydraulic Fundamentals and Design, *S. Kakac, A. E. Bergles and F. Mayinger*, \$95.00, 1131pp, Hemisphere Publishing Corporation

Thermodynamics and Gas Dynamics of Internal-combustion Engines, *R. W. Benson*, £55.00, 500pp, Oxford University Press

Advances in Fluid Mechanics, *ed. E. Krause*, DM 43 (\$20.10), 361pp, Springer-Verlag

Advances in Heat Pipe Technology, *ed. D. A. Reay*, £42.00 (\$100.00) 818pp, Pergamon Press Ltd



**ASME International '83
Bermuda Winter Symposium
Modelling and Simulation**

1-3 March 1983
Bermuda

Association for the Advancement of Modelling and Simulation
Techniques in Enterprises, 16 Avenue de Grange Blanche,
69160 Tassin-la-Demi-Lune, France

**International Conference on
the Physical Modelling of
Multi-phase Flow**

19-21 March 1983
Coventry, UK

The Conference Organiser, BHRA Fluid Engineering,
Cranfield, Bedford, UK, MK43 0AJ

**ASME-JSME Thermal
Engineering Joint Conference**

20-24 March 1983
Honolulu, HI, USA

Professor W. J. Yang, Department of Mechanical Engineering
and Applied Mechanics, University of Michigan, Ann Arbor,
MI 48109, USA
ASME, 345 East 47th Street, New York, NY 10017, USA

**28th Annual International Gas
Turbine Conference**

27-31 March 1983
Phoenix, AZ, USA

3rd Multiphase Flow and Heat Transfer Symposium-
Workshop, Clean Energy Research Institute, University of
Miami, PO Box 248294, Coral Gables, FL 33124, USA

**3rd Multiphase Flow and Heat
Transfer Symposium-
Workshop**

18-20 April 1983
Miami Beach, FL, USA

**Flow Metering and Proving
Techniques in the Offshore Oil
Industry**

11-12 May 1983
Aberdeen, UK

Institute of Measurement and Control, 20 Peel Street, London,
UK, W8 7PD

**CANCAM '83-International
Conference of the Canadian
Congress of Applied
Mechanics**

30 May-3 June 1983
Saskatoon, Canada

Mr Boris Maduke, Conference Secretary—CANCAM '83,
College of Engineering, University of Saskatchewan,
Saskatoon, Canada S7N 0W0