BOOK REVIEWS

Heat and Fluid Flow in Nuclear and Process Plant Safety

This volume, the proceedings of a two-day conference held in London during May 1983, contains twenty papers encompassing process plant safety (including single-phase compressible flow, heat transfer and fluidics), contaminant dispersion and ventilation, and two-phase adiabatic and diabatic flows. The nuclear aspects apertain to the three topical systems, namely advanced gas cooled reactors (agr), pressurised water reactors (pwr) and liquid metal fast breeder reactors (lmfbr). I found the make-up of the proceedings a little disjointed because of the wide range of topics addressed at an event as limited as this one, but the book includes valuable contributions ranging from discussions of specialised phenomena to review articles such as the summary of Australian nuclear safety research.

Two theoretical papers by representatives of a British consultancy entering the light water reactor safety field deal with small loss-of-coolant accidents and core reflood; while the sensitivity studies they present reflect some years' lag behind the Americans, such work is an essential component of our own advisable efforts in parallel with those in the USA. A paper on transient dryout experiments attempts to answer some of the vexing questions over the use of steady-state correlations for transient predictions, and the Strathclyde team outline the incorporation of non-equilibrium phenomena in their continuing assessments of bypass and partial penetration in a pwr downcomer. A paper on mixed convection discusses enhancement and impairment of heat transfer by buoyancy, and one wonders whether the 'laminarisation' could be tackled by the surface-renewal approach which has been applied to fully-developed transitional turbulence.

The paper on the emissivity of fuel cladding of an agr during a temperature transient is a timely warning of the difficulty of defining the basic input data to any radiation calculation. For too long our knowledge in this field has been assumed to be adequate and the paper provides a useful corrective to this optimism.

The few papers which I have chosen are admittedly confined to some of the nuclear industry's interests, but they should convey the flavour and range of topics covered. The quality of figures and text is high but the binding is rather poor (I found some pages detaching after only one or two hours' use). Overall, however, I regard this book as a worthwhile purchase.

Y. Sinai
National Nuclear Corporation, UK

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Handbook of Fluids in Motion

N. P. Cheremisinoff and R. Gupta (eds)

Conditions necessary for life, and life itself, are dependent on fluids in motion. Fluids in motion are the life blood of many aspects of engineering. This book on applied fluid mechanics, with its all encompassing and misleading title, is directed to one area of engineering—the process industries—although its content has wide industrial application. Within the process industries, the scope of industrial fluid mechanics is enormous, and poorly served with publications that deal with a wide range of fluid and fluid–solids flows. For this reason alone this book is welcome.

Fifty authors have contributed forty-three chapters, divided into sections on: single-phase flows; gas–liquid flows; liquid–solid flows; and a final section on topics not readily placed in the four main sections. The standard of the contributions, their content and their appropriateness to a handbook is extremely variable. A few chapters are more appropriate to a mediocre textbook on fluid mechanics, rather than to a major handbook. Against this can be set many of the chapters dealing with specialist subjects, which are well thought out and presented. Most of the topics covered are relevant to the main interest area of the book, but a chapter on the 'History of Thermal Anemometry' is totally inappropriate, particularly since there is no chapter dealing with the measurement of fluid motions and of bulk fluid flow. A few of the contributors have misunderstood totally the purpose of a handbook and produced chapters more appropriate to an engineering journal.

Much of our understanding of fluid mechanics has come from flow visualisation and other studies, so I was disappointed by the lack of illustrations of 'fluids in motion'. A ratio of 1:1 of equations to figures would not seem out of place in some chapters, rather than the actual ratio of 10:1.

Although there is no consistent notation, each chapter's nomenclature is given at the end of the chapter. S.I. units are used, but there are lapses. A wealth of references is included, but those in chapter 2 are, on average, 30 years too old.

The cost of this book is not high when set against the saving in time when seeking information and references. I certainly will refer to this book and can recommend it to all involved with a wide range of process industry flow problems. Since the book is aimed at a continually developing area of technology, I look forward to future additions, in which I hope to see more contributions approach the high standard of the best in this edition.

D. S. Miller
BHRA, UK

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