

BOOK REVIEWS

Selection of books for review is based on the editor's opinions regarding possible reader interest and on the availability of the book to the editor. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.



Transient Phenomena in Multiphase Flow

Editor N. H. Afgan
Publisher Hemisphere Publishing Corporation (1988)
Pages 1052
Price \$195.00
Reviewer Milton S. Plesset

Three years ago, the International Center for Heat and Mass Transfer organized a symposium on transient phenomena in multiphase flow. Over 50 papers were presented at the symposium, which had worldwide participation. The papers were divided into the following categories: formulation of two-phase flow, turbulence phenomena in two-phase flow, wave phenomena in two-phase flow, modeling of transient two-phase flow, numerical methods of two-phase flow, and experimental studies.

Some papers do not fit into these categories very well, as might be expected. There was certainly a great variety of papers presented. The widespread nature of the topics and of the participation is remarkable. Questions naturally arise as to what has led to this growth of both the topic and the number of participants.

The very modest beginning of two-phase flow studies can be traced back to the work of Cook and Rayleigh, who were concerned with cavitation damage and noise. Rayleigh assumed that the phenomena were directly related to the formation and collapse of a single bubble. This kind of work continued at a very modest level until recently. Concerns about nuclear power plant safety has led to many experimental programs and related analyses of the results.

The U.S. Nuclear Regulatory Commission (NRC) has made large expenditures for both tests and analyses, which were justified because of the many questions regarding public safety. The experimental tests were far from trivial because of the scale of nuclear power plants, and the analyses led to very elaborate and complicated programs. The continued questions about these tests and their interpretations finally led to an NRC study regarding code scaling, applicability, and uncertainty (CSAU), under the guidance of Novak Zuber. The Advisory Committee on Reactor Safeguards (ACRS) stated that "the CSAU Program will provide a reasoned perspective on the accuracy of the existing codes . . . The CSAU method, or something similar, can be used in other areas of

safety analysis, that is, beyond the currently conceived purpose of assessing uncertainty associated with calculations by thermal-hydraulic codes. In particular, its application to severe accident studies and risk assessments could serve not only to provide an improved perspective on uncertainty, but also as a guide to allocation of research resources."

In December 1989, NUREG CR 5249, entitled "Quantifying Reactor Safety Margins," was issued. It gives a most reasonable summary of these very important questions. The report also contains a calculation for which Dr. Catton is responsible, which is called a physically based method of estimating pressurized water reactor large break loss-of-coolant accident peak cladding temperature. This analysis gives another reassurance regarding the large codes. It is unfortunate that the symposium was over before this work was completed. Perhaps there will be another symposium, and Zuber and Catton will be able to present results of their studies.

The symposium covered a wide range of topics and the large number of speakers indicates the many countries that have supported research in the field. The organizers of the conference should be complimented for their successful effort in leaving very few gaps in this diverse subject. The editor and publisher also deserve compliments for this well-organized volume.

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The Demise of Nuclear Energy?

Authors J. G. Morone and E. J. Woodhouse
Publisher Yale University Press (1990)
Pages 156
Price \$22.50
Reviewer Bernard I. Spinrad

The tone of this book is mildly pronuclear. The authors seem to want nuclear power to emerge again. This is a welcome event in the history of scholarly critiques of nuclear power and is in itself a recommendation to nuclear advocates