

## BOOK REVIEWS

RAO, NAGAR S LAKSHMANA AND KOBUS, HELMUT, Editors:  
Characteristics of Self-aerated Free-surface Flows. Pp. 224, Erich  
Schmidt, Verlag, Berlin, 1976. Price: DM. 42. (Water and Waste  
Water: Current Research and Practice, Vol. 10.)

Adopting the skeptical premise that an empirical finding is not to be trusted until experimented time and time again, the editors of this book conduct a vigorous search for robust conclusions on the characteristics of self-aerated free-surface flows. In designing hydraulic or industrial structures, involving high velocity open channel flows, a systematic knowledge of the air entrainment phenomenon is essential. In recent years, this subject has experienced a great progress. A number of important achievements have been made about air entrainment and various phases of these developments have already been well presented through a variety of publications. The present compilation is one such compendia to the already existing publications in the field.

This monograph deals with air entrainment in free-surface flows and the behaviour of self-generated air-water mixtures. The Introductory Part contains a classification of air entrainment processes, a description of measurement techniques for experimental research on gas-liquid mixtures and basic information on the behaviour of air bubbles in water and on similarity of air-water mixture flows. Ambient air entrainment in high-velocity open channel flows is treated in detail and local air entrainment in hydraulic jumps and jets striking rigid or liquid surfaces is described. The application of research results to the design of spillways, stilling basins, dissipation chambers, enclosed drop structures and siphons is illustrated and the results of field measurements are given.

In compiling the text, the editors have carefully chosen the contributors who were themselves the pioneers responsible for some of the most recent significant advances in the area. Particular mention may be made of Drs. B. Barczewski, T. Gangadhariah and J. Renner whose contributions form an essential part of this book. While Barczewski discusses most research results in optical techniques in Chapter 2, Gangadhariah presents

in Chapters 4, 5 and 6 material on inception characteristics of self-aeration, air-entrainment characteristics and distribution characteristics of flows, etc.

Although the individual chapters are to a large extent independent of each other, the work as a whole is well integrated by frequent cross referencing where interaction of subject matter does occur. The book is perhaps most likely to appeal to specialists who wish to extend their knowledge of other aspects of self-aerated free-surface flows and for that purpose, it is of considerable value in view of its logical presentation and proper referencing.

The absence of a subject index has reduced the value of book to some extent, but the reviewers feel that whatever is lost in the subject index is perhaps well compensated for by an extensive contents page so that the reader will have no difficulty in retrieving any particular aspect of the subject.

One of the important and unique features of the monograph is a chapter-wise summary in German. There are numerous helpful illustrations and adequate tables. The text has been carefully typeset with special clarity in the mathematical symbols and numerical examples. The proof reading has been done with exceptional care as hardly any printing errors were seen. The book is highly recommended for the research workers and design engineers who are confronted with problems of self-aerated free surface flows. This book should find a place in all academic, technical and scientific organizations.

Library  
Indian Institute of Science  
Bangalore-560 012 (India)

T. K. S. IYENGAR, *Executive Editor*  
G. S. R. RAO

NAGARAJA (N. S.): Elements of Electronic Navigation, Pp. 139. Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1975. Price: Rs. 15.

The total subject is of considerable scope and even with the definition set by the author in this selection of topics, this book ranges more widely than any of the previous ones of the Indian publications. For the same reason, the reviewers hope, the book should attract a wider readership.

The book describes the electronic navigational aids currently in use or under development, both in India and abroad. This book is divided into 9 chapters. Chapter 1 gives introduction to the subject and also presents a brief account of other methods of navigation to place the main topic in the proper perspective.

Chapter 2 describes some methods of direction finding and their application/use on ships and aircraft.

Radio Ranges, which are navigational aids, mostly used in aircraft, and different types of radio ranges in use, etc., are considered in the third chapter. A few paragraphs have also been devoted to the description of recent developments in this field.

Hyperbolic Systems of Navigation are dealt with in Chapter 4. Two systems currently in use, namely, LORAN and DECCA are described.

Chapter 5 explains two important secondary Radar Systems, *i.e.*, D.M.E. (Distance Measuring Equipment) and TACAN (Tactical Air Navigation). While both these work on certain principles, a number of refinements have been introduced to overcome some of the limitations of the basic system.

Speed aids have been provided at airports to enable the aircraft to execute landings under bad visibility. Two types of such aids, *i.e.*, the Instrument Landing System (ILS) and the Ground Controlled Approach (GCA) have been dealt with in Chapter 6 briefly.

A Description of Doppler Navigation Equipment is the subject of Chapter 7. It is described in 8 paragraphs, important ones being, the doppler effect, doppler radar equipment, doppler range equation, etc.

Inertial Navigation is a self-contained method of navigation, which requires no external references and is passive, *i.e.*, non-radiating. The principles of operation, components of the system, accuracy of the system, etc., have well been explained in Chapter 8.

The last chapter deals briefly with some of the recent developments such as the Omega System, Satellite System, etc. Additional matter of relevance, like Maps, and Charts, Multi-channel crystal controlled receivers, synchros and resolvers, etc., has been given in the four appendices. To facilitate further reading on the various topics dealt with in the text, a short list of references including text books given at the end has enhanced the value of the book.

To avoid obscurity as well as the tedium of an over-simplified approach, the author has assumed in the graduating engineer, a modest knowledge of basic communication engineering of entrance level. It is hoped, this will not only suit the student of electronics, but also be acceptable to professional technicians and engineers in the civil and military fields, whose training involves the same subjects.

A highlight of the book is the inclusion of a set of question and exercises with a view to help the reader to increase his appreciation of the subject and to encourage further reading.

From the standpoint of a text for graduating engineers, it is well written with a clean presentation and convenient notation. It fulfils the author's intent at giving an introductory treatment of the vast and expanding field of electronic navigation. The cost of the book is also moderate in view of the size and quality of the paper used.

As a whole, this book is highly recommended as a text for one semester for any course on Communication Engineering.

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T. K. S. IYENGAR, *Executive Editor*  
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## Calendar of events: Conferences/Symposia at the Indian Institute of Science Campus

Sl. No.	Name of the School	Period	Sponsoring Department of the Institute
1.	QIP—"Design and Performance Estimation of Heat Exchangers"	1-14 February 1976	Mechanical Engineering
2.	"Design and Technology of Digital Equipment"	9-21 February 1976	Electrical Communication Engineering
3.	"Dynamics and Control of Industrial Organisers"	12-25 February 1976	Chemical Engineering
4.	QIP—"Public Water Supply/Systems"	16-29 February 1976	Civil Engineering
5.	QIP—"Dynamics of Engineering Systems"	1-15 March 1976	School of Automation and Mechanical Engineering
6.	QIP—"Limit State Design of Concrete Structures"	8-20 March 1976	Civil Engineering
7.	"Applications of Computers for Load Despatch"	17-23 March 1976	School of Automation and Aeronautical Engineering
8.	"An Intensive Course on Active and Digital Filters"	19 April to 2 May 1976	Metallurgy
9.	"Recent Developments in Physical Metallurgy--Techniques"	6-12 May 1976	Metallurgy
10.	QIP- "Insulation Problems in High Voltage Engineering"	9-25 May 1976	High Voltage Engineering
11.	"Particle Size Analysis and Separation"	14-29 May 1976	Metallurgy
12.	"Refresher Course, Short Term Institute"	14 June to 13 July 1976	Microbiology and Cell Biology Laboratory
13.	"Advanced Institute on Reaction Mechanisms, All India University and College Teachers"	16 June to 13 July 1976	Organic Chemistry
14.	"Advanced Summer Institute in Theoretical Plasma Physics"	June-July 1976	Physics

On the basis of the information received by the Editorial Office on 30th January 1976.