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Book Reviews

Shock and Vibration Handbook, 3rd ed., edited by C. M. Harris. McGraw-Hill Book Co., New York, 1988. 1312 Pages. Price: $76.50.

REVIEWED BY C. W. BERT[1]

Since the appearance of the first edition, edited by C. M. Harris and C. E. Crede, in 1961, this handbook has become well established as "the" handbook of the whole field of shock and vibration. The present edition contains the same number of chapters (44) as did the second edition (1976). Of these, thirteen are completely new, seven are completely rewritten versions, six are minor revisions, and nineteen are essentially the same as in the second edition. In a sense, the appearance of whole new chapters (and vanishing of old ones) is a measure of the dynamicism of the field. New topics to which whole new chapters are devoted include modal analysis, ground motion-induced vibration, vibration induced by fluid flow and by wind, piezoelectric/piezoresistive transducers, signal analyzers, special purpose transducers, condition monitoring of machinery, and seismic qualification of equipment.

This book ranges the gamut from fundamental theory to analysis, design, application, standardization, instrumentation, and data reduction. It is intended primarily as a working reference book for engineers and scientists in the acoustic, aerospace, chemical, civil, electrical/electronic, and manufacturing fields. This reviewer believes that it fulfills this objective very well, especially for those just entering the shock and vibration field. It also may be useful as a supplemental reference for advanced courses in shock and/or vibration.

Nonlinear Water Waves, edited by K. Horikawa and H. Maruo. (Proceedings of IUTAM Symposium, Tokyo, Japan, August 25–28, 1987), Springer-Verlag, New York, 1987. 466 Pages.

REVIEWED BY A. D. D. CRAIK[2]

This volume records the proceedings of a IUTAM Symposium on *Nonlinear Water Waves*, comprising three "keynote lectures", 33 contributed papers, and 15 posters. Authors' camera-ready contributions, in the usual variety of typefaces, are acceptably reproduced; there is a brief editors' introduction and a full list of participants. The wide international representation included many leading water-wave researchers: The number of Japanese participants was naturally large, but numbers from the U.S.A. (8) and U.K. (2) were surprisingly small.

In the editors' words: "The Symposium has intended to provide a wide scope of analytical and numerical methods as well as experimental studies for the analysis of the nonlinear phenomena related to water waves . . . . . the scope of the presented papers includes the following topics: (1) Theoretical and experimental studies of nonlinear water waves, (2) Nonlinear instability and deformation of water waves, (3) Wave breaking, (4) Nonlinear wave-current interaction, (5) Nonlinear water waves around structures and ships, (6) Wave-body interaction, and (7) Nonlinear internal waves."

The keynote lectures were by C. C. Mei on nonlinear diffraction effects, D. H. Peregrine on modeling of unsteady and breaking waves, and O. M. Faltinsen on nonlinear interactions between waves and bodies. The emphasis on nonlinear effects reflects recent theoretical and computational advances. These, in turn, are mainly motivated by the need to understand and predict the complex interactions of waves with ships, moored structures, and underwater topography.

As a whole, the contributions are an interesting sample of current research, including such topics as shallow-water solutions, standing waves in closed basins, breaking and spilling waves, resonant interactions, wave propagation over bodies and varying topography, second-order wave-induced forces on bodies, nonlinear ship waves, and simulation of wave spectra. With few exceptions, each paper is restricted in length to eight pages: Inevitably, some are tantalizingly brief and others are mercifully so. Equally inevitably, many have been, or will be, published in greater detail in referred journals. One paper contains the first recorded occurrence (and hopefully the last!) of the word "serendipiditiously."

The usefulness of this collection is transient: For a few years it will provide a convenient, though incomplete and disconnected, survey of current strands of water-wave research, of use to specialists in this and related areas. It would be a worthwhile, but not indispensible, addition to research libraries. I, for one, have learned something from reading it.

Micromechanics of Defects in Solids, Second Rev. Ed., by T. Mura, Martinus Nijhoff Publishers, Boston, MA, 1987. 587 Pages.

REVIEWED BY T. C. T. TING[3]

This is a very well written book. The central theme of the book is the concept of eigenstrain, originally due to Eshelby, which has been systematically employed by Professor Mura in

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solving a wide range of problems such as dislocations, cracks, inclusions, thermal expansions, phase transformation, inhomogeneous inclusions, and misfit strains. There are seven chapters in the book. The general theory of eigenstrains is introduced in Chapter 1, which serves as a basis for the entire book. Isotropic inclusions and anisotropic inclusions are discussed in Chapters 2 and 3. Inclusions here do not mean that the materials in the inclusions are different from the surrounding medium. The material is homogeneous, but the region occupied by the inclusion has a prescribed eigenstrain. The term "inhomogeneities" is reserved for the case when the region where the eigenstrains are prescribed has a different material from the surrounding region. Chapter 4 studies the ellipsoidal inhomogeneities where Eshelby's celebrated result is put in use. The problem of a crack in a homogeneous medium is treated in Chapter 5 and that of dislocations in Chapter 6. The last chapter deals with material properties and related topics. This is the only chapter which is not closely related to the eigenstrains concept but it is not less important. The last few sections of this chapter, in particular the section on sliding inclusions, are new additions in this second revised edition.

Most solutions obtained in the book are for three-dimensional problems. Solutions for two-dimensional problems are specialized from that for three-dimensional problems. Recent advances in the Stroh formalism for two-dimensional anisotropic elasticity would have produced much simpler and elegant results. It should be emphasized that the book's main objective is for three-dimensional problems. Therefore, occasional specializations to two-dimensional solutions occupy only a small fraction of the book and do not in any way diminish the overall scholarly quality of the book.

The book also contains four appendices where certain aspects of mathematics, which are essential for the subject, are summarized. It compiles a rather exhaustive list of references, over one thousand in number. The book is very suitable for a textbook for advanced graduate students. It is also a valuable reference book for those researchers who are already established on the subject.