

PREFACE

This book is written in a textbook format such that students of hydrodynamics and vibration may receive a comprehensive understanding of the subject of vibration as it is generated by and related to hydrodynamics. The main objectives of this book are:

- ◆ To provide a broad review aimed at a clear understanding of the fundamental concepts underlying the associated fields of hydrodynamics and structural vibrations,
- ◆ To describe the basic theories of hydrodynamics and vibration,
- ◆ To focus on applications of structural vibrations to problems encountered in structural engineering, with particular emphasis on the response of structures to fluid flow,
- ◆ To provide an understanding of the modeling techniques used in the broad field of hydrodynamics and vibration,
- ◆ To illustrate practical problems with basic themes in structural vibration related particularly to fluid structure interaction.

Each of the subjects of hydrodynamics and vibration is by itself a broad topic and it is not possible to do a fair treatment of these subjects in their entirety in one single book. No attempt is made to cover them extensively. Instead the fundamentals of these subjects are covered such that their combined application in a structure is understood. The basic objective is to describe the application of vibration to the problems encountered in hydrodynamics. The first part of the book covers the basic development of hydrodynamics and vibration analysis. In the following few chapters, particular reference is made to their interactive effects. The final few chapters of the book are devoted to application of these principles to structures where their combined effects are important. Thus the main purpose of the book is to cover the application of these two subjects of hydrodynamic and vibration in structures. The book, however, is self-contained and the basic principles that are needed to understand their application to structures are included.

The book covers the basics of hydrodynamics and vibration of structures subjected to environmental loads with easy and simple explanations. The

vibration control is briefly covered. However, it does not cover shock or acoustics. Particular emphasis is placed in the application of the theory to practical problems. Examples are provided to show how the theory outlined in the book is applied in the design of structures. Examples are borrowed mainly from the novel structures of interest today including offshore structures and components.

The book is written as a textbook with the intention that it may be used as a teaching guide in the universities. The level of the book is expected to be suited for Advanced Engineering Undergraduate (senior and junior level) and First Year Graduate interested in vibrating structures and their design aspects. It should serve as a handy reference book for the design engineers and consultant involved with the design of structures subjected to dynamics and vibration. Such a subject does not appear to be covered in one single book.