

Fluid Structure Interaction and Moving Boundary Problems

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CONFERENCE ON COMPUTATIONAL MODELLING AND EXPERIMENTAL
MEASUREMENTS OF FREE AND MOVING BOUNDARIES

**FLUID STRUCTURE INTERACTION AND
MOVING BOUNDARY PROBLEMS**

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Preface

This book contains the edited papers presented at the 3rd International Conference on Fluid Structure Interaction and the 8th International Conference on Computational Modelling and Experimental Measurements of Free and Moving Boundary Problems, which took place in La Coruna, Spain. The meetings were organized by the Wessex Institute of Technology, UK and the University of La Coruna in Galicia, Spain.

The book is divided into two parts, the first dealing with Fluid Structure Interaction problems, the other with Moving Boundary studies.

The first includes specialized areas of interaction of fluids with a variety of structures encountered by the flow ranging from wind, current, biofluids and ocean waves to tall buildings, ocean structures, cables, towers, bridges, risers and biological structures. It emphasizes new research in the specialized field of fluid structure interaction. It also presents new applications of these developments to the real world problems. The readers should be particularly interested in the new ideas and latest work on the subject. The contributors include experts from different application fields providing valuable cross breeding of ideas and techniques in their contributions.

The basic mathematical formulations of fluid structure interaction and their numerical (as well as physical) modeling are discussed in this book. The contents cover the following fields:

- Advances in interaction problems in CFD
- Cavitation effects in turbo machines and pumps
- Computational methods
- Fluid and biological tissue interaction
- Fluid pipeline interactions
- Hydrodynamic forces
- Mechanics of cables, risers and moorings
- Offshore structure and ship dynamics
- Response of structures including fluid dynamics
- Wind effects on bridges and towers

The second part deals with problems where the position of the border or interphase boundaries have to be determined as part of the solution. The transient case leads to the so-called moving boundary problem, and the steady case to the free boundary problem. The studies encompass a wide variety of cases, such as

physical and mathematical systems of phase change phenomena between solids, liquids and gases; phase distribution in multiple systems, and wave problems. It also discusses numerical methods for free and moving boundary problems such as finite differences, finite elements, finite volumes and boundary elements. The contents cover the following topics:

- Free surface flow
- Computational fluid mechanics
- Phase change
- Advanced computational simulation

The Editors are grateful to all the authors for their contributions and most specially indebted to the members of the International Scientific Advisory Committee of the conferences and other colleagues for their help in reviewing the material published in this volume.

The Editors
La Coruna, Spain 2005

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