

# Ship Hydrostatics and Stability

By Adrian Biran

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## Ship Hydrostatics and Stability By Adrian Biran


The hydrostatic approach to ship stability aims to balance idealized ship weight against buoyancy forces. This textbook is a complete guide to understanding ship hydrostatics in ship design and ship performance.

Adrian Biran guides readers from first principles through basic and applied hydrostatic and ship stability theory, and introduces contemporary mathematical techniques for hydrostatic modelling and analysis. Real life examples of the practical application of hydrostatics are used to explain the theory and calculations; and to illustrate the effect shifting weights and central gravity displacements have on overall ship stability.

*Ship Hydrostatics and Stability* covers recent developments in the field of naval architecture such as parametric resonance (also known as the Mathieu effect), the effects of non-linear motions on stability, the influence of ship lines, and new international stability regulations for small vessels. Extensive use of computer techniques is made throughout.

- Adheres to international standards and terminology
- Includes real life practical examples and calculations to illustrate the hydrostatic approach to ship stability

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## Ship Hydrostatics and Stability By Adrian Biran Bibliography

- Sales Rank: #3381942 in Books
- Brand: Brand: Butterworth-Heinemann
- Published on: 2003-12-17
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .82" w x 6.25" l, 1.23 pounds
- Binding: Paperback
- 368 pages

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## **Editorial Review**

### Review

"The hydrostatic approach to ship stability aims to balance idealized ship weight against buoyancy forces. This textbook is a complete guide to understanding ship hydrostatics in ship design and ship performance. Real life examples explain the theory and calculations." Offshore Engineer, October 2004

"I found the book to be a thorough, well-referenced treatment of those areas of naval architecture it set out to cover. The subject matter is developed in a logical way as the reader progresses through the book. It will be very useful to those taking a degree or practising in the field." Eric Tupper, Author of *Introduction to Naval Architecture*, The Naval Architect, Feb 04

"The book meets expectations of both academia and practice. This excellent textbook, which may also serve as reference throughout the professional career, deserves unrestricted recommendation and should soon be found on the bookshelf of any naval architect or mariner."

Volker Bertram - author of *Practical Ship Hydrodynamics* and *Ship Design for Efficiency and Economy*

"The author guides readers from first principles through basic and applied hydrostatic and ship stability theory, and introduced contemporary mathematical techniques for hydrostatic modeling and analysis" Sea Technology, Nov 03

### From the Back Cover

An essential resource for naval architects

Written for anyone taking a first course in naval architecture or ocean engineering at undergraduate or graduate level, 'Ship Hydrostatics and Stability' is a complete guide to understanding ship hydrostatics in ship design and ship performance.

The book guides readers from first principles through basic and applied hydrostatic and ship stability theory, and introduces contemporary mathematical techniques for hydrostatic modelling and analysis. Extensive use of computer techniques is made throughout, and the book is accompanied by a selection of downloadable MATLAB files.

While hydrostatic approaches to ship stability are essentially a matter of balancing idealized weight and buoyancy forces, these are complicated in practice by a wide range of factors. The book considers the practical application of hydrostatics and also covers recent developments in the field such as parametric resonance (also known as the Mathieu effect). Other key features:

- \* Adheres to international standards and terminology in the field
- \* Emphasis on computer-based techniques
- \* Downloadable MATLAB files for hydrostatic and stability calculations
- \* Examples of calculations with real-ship data

With its contemporary coverage and computer based approach, this book will be an essential resource for both students and practicing naval architects.

Dr. Adrian Biran is Adjunct Associate Professor at TECHNION, the Israel Institute of Technology, Israel

Also available from Butterworth-Heinemann:

Practical Ship Hydrodynamics, V. Betram,

0750648511

Ship Design for Efficiency and Economy, V. Betram and Schneekluth, 0750641339

Ship Stability for Masters and Mates, C. Barrass and D. Derrett, 0750641010

#### About the Author

Adrian Biran is Adjunct Associate Professor in the Faculty of Mechanical Engineering at Technion - Israel Institute of Technology. He has a Dipl. Ing. Degree from the Bucharest Polytechnic Institute and MSc and DSc degrees from the Technion. Adrian Biran worked as design engineer and project leader for IPRONAV in Bucharest, and Israel Shipyards and as research engineer in the Technion R&D Foundation in Haifa.

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