

Naval Architecture

This textbook provides readers with an understanding of the basics of ship stability as it has been enacted in international law. The assessment of ship stability has evolved considerably since the first SOLAS convention after the sinking of the RMS Titanic, and this book enables readers to familiarise themselves with the most up-to-date modern day methodology, as well as looking ahead to the effects on ship design over the next fifty years. The author not only explains the methodology of probabilistic ship damage as required by the International Maritime Organisation (IMO), but also details the new requirements to assess certain sizes and classes of ships to the seven second-generation ship stability requirements. Many textbooks that are currently used by undergraduates focus on the geometric-centric deterministic approach to the assessment of ship stability, whereas this book also includes material on the classes of ships that are now required to have probabilistic ship damage assessment, as has only recently been agreed by the IMO. Basic Naval Architecture: Ship Stability contains up-to-date information, making it ideal for university students studying ocean or marine engineering, as well as being of interest to students on naval architecture and ship science courses. Highly illustrated and including chapter studies for ease of learning, the book is an ideal one-volume textbook for students.

First published in 1768, this remarkable collection of sophisticated line drawings documents merchant and naval ships from various countries. 70 illustrations chart vessel dimensions, crew size, storage capabilities, and rigging. This textbook covers the theoretical, fundamental aspects of naval architecture for students preparing for the Class 2 and Class 1 Marine Engineer Officer exams. It introduces the basic foundation themes within naval architecture, (hydrostatics, stability, resistance and powering), using worked examples to show how solutions should be presented for an exam. The topics are ordered in a manner of a typical taught module, to aid the use of the book by lecturers as a compliment to a course. Importantly, this updated edition contains updated text and figures in line with modern practice, including an update of many of the figures to three-dimensional diagrams, and a new section on computer software for naval architecture. The book also includes sample examination questions with worked examples answers to aid students in their learning.

Applied Naval Architecture is intended for undergraduate students of many of the disciplines in maritime affairs, including marine engineering, marine transportation, nautical science, shipbuilding or ship production (shipyard apprentice schools), marine electrical engineering, meteorology, and oceanography. It could be used as an introduction to naval architecture for technical personnel of all types already employed in shipyards, and for licensed officers as a general reference and as preparation for license upgrading examinations. In short, its purpose is to describe what a naval architect does, and how he or she does it, to all students and practitioners involved in the business of merchant ships and shipping, except for professional naval architects themselves. Students preparing for a degree in naval architecture would also find the book useful as an introduction to their profession.

By providing an understanding of the basic concepts of naval architecture, this book is the perfect companion for the maritime professional who is not a naval architect, but needs to be able to communicate effectively with naval architects. Written in engaging and easily understood terms, this book concentrates on two aspects of naval architecture : design and analysis. Technical discussions are almost entirely qualitative rather than quantitative and coverage focuses on conventional ship worthiness, structural integrity, powering requirements and functional capability. [Source : éditeur]. The design, construction and verification of complex two- and three-dimensional shapes in architecture and ship geometry have always been a particularly demanding part of the art of engineering. Before science-based structural design and analysis were applied in the construction industries, i.e., before 1800, the task of conceiving, documenting and fabricating such shapes constituted the most significant interface between practitioner's knowledge and learned knowledge, above all in geometry. The history of shape development in these two disciplines therefore promises especially valuable insights into the knowledge history of shape creation. This volume is a collection of contributions by outstanding scholars in their fields of study, archaeology, history of architecture and ship design, in classic antiquity, the Middle Ages and the early modern period. The volume presents a comparative knowledge history in these two distinct branches of construction engineering.

The book covers such topics as ship geometry, properties of shipbuilding materials, stability, submarine hydrostatics, propellers and propulsion systems, and maneuverability. Appendices include conversion tables, lists of fresh- and saltwater properties, and numerical integration techniques.

The fundamental characteristics of a ship's design, and how they affect its behaviour at sea are of crucial importance to many people involved in the design, construction, operation, and maintenance of all marine vessels. Naval architects and those working in ship design need to understand these principles in depth. Marine engineers must likewise recognise the degree to which their activities are influenced and bounded by these principles. Finally, senior crew – both Ship's Engineers and Commanders – need an understanding of the principles of naval architecture in order to properly fulfil their duties. This book offers a clear and concise introduction to the subject and is of great value to both students and practising professionals in all of the above fields. * Covers introductory level courses in Naval Architecture and Marine Engineering * Updated to cover key developments including double-hulled tankers * Fully revised fourth edition accompanied by exercises and worked solutions for the first time

Muckle's Naval Architecture, Second Edition is concerned with problems related to resistance, propulsion, and vibration in naval architecture. Topics include ship calculations, stability and trim, ship motions, and structural strength. This book also gives a brief reference to ship design. This text is comprised of 13 chapters; the first of which provides an overview of the function of the ship, its layout, and various types. The next chapter explains definitions, principal dimensions, and form coefficients, along with classification societies and governmental authorities that regulate ship design, construction, and safety. Various calculations that are performed to determine the form of a ship are the subject of the next chapter. Attention then turns to buoyancy, stability, and trim, along with sea and ship motions, the problem of structural strength,

vibration, and resistance. The influence of rudders and control on ship movement is also discussed. Finally, this book describes the methods for determining the amount of power required to propel a ship. This book is intended primarily for practicing naval architects, marine engineers, deck officers, and all students of naval architecture.

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Research is concerned with the scientific aspects of shipbuilding and, particularly, with certain fundamental physical concepts which play a major role in the scientific methods now in use. These concepts pertain chiefly to three branches of applied mechanics; namely, fluid dynamics, elasticity, and hydroelasticity, which deal chiefly with ideal physical systems. (Author).

How the introduction of steam, iron, and steel required new rules and new ways of thinking for the design and building of ships. In the 1800s, shipbuilding moved from sail and wood to steam, iron, and steel. The competitive pressure to achieve more predictable ocean transportation drove the industrialization of shipbuilding, as shipowners demanded ships that enabled tighter scheduling, improved performance, and safe delivery of cargoes. In *Bridging the Seas*, naval historian Larrie Ferreiro describes this transformation of shipbuilding, portraying the rise of a professionalized naval architecture as an integral part of the Industrial Age. Picking up where his earlier book, *Ships and Science*, left off, Ferreiro explains that the introduction of steam, iron, and steel required new rules and new ways of thinking for designing and building ships. The characteristics of performance had to be first measured, then theorized. Ship theory led to the development of quantifiable standards that would ensure the safety and quality required by industry and governments, and this in turn led to the professionalization of naval architecture as an engineering discipline. Ferreiro describes, among other things, the technologies that allowed greater predictability in ship performance; theoretical developments in naval architecture regarding motion, speed and power, propellers, maneuvering, and structural design; the integration of theory into ship design and construction; and the emergence of a laboratory infrastructure for research.

Naval Architecture for Marine Engineers focuses on resistance, propulsion, and vibration aspects of ships. The book first discusses the functions, layouts, and types of ships and terms used. The text looks at classification societies and governmental authorities influential on the design, construction, and safety of ships. Lloyd's Register of Shipping; governmental authorities; and Inter-governmental Maritime Consultative Organization (IMCO) are noted. The book also highlights ship calculations, including trapezoidal rule, Simpson's rule, and other rules for calculation. The text discusses as well the buoyancy, stability, and trim.

Conditions for equilibrium of body floating in still water; calculation of underwater volume; stability at large angle of inclination; and flooding and damaged stability are considered. The selection also underscores structural strength of ships. Static forces on a ship in still water; dynamic longitudinal strength problem; resistance of ship to buckling; and materials used in ships are noted. The text also looks at resistance, powering, vibration, and propulsion of ships. The book is a vital source of data for readers interested in naval architecture.

Geometry for Naval Architects is the essential guide to the principles of naval geometry. Formerly fragmented throughout various sources, the topic is now presented in this comprehensive book that explains the history and specific applications of modern naval architecture mathematics and techniques, including numerous examples, applications and references to further enhance understanding. With a natural four-section organization (Traditional Methods, Differential Geometry, Computer Methods, and Applications in Naval Architecture), users will quickly progress from basic fundamentals to specific applications. Careful instruction and a wealth of practical applications spare readers the extensive searches once necessary to understand the mathematical background of naval architecture and help them understand the meanings and uses of discipline-specific computer programs. Explains the basics of geometry as applied to naval architecture, with specific practical applications included throughout the book for real-life insights Presents traditional methods and computational techniques (including MATLAB) Provides a wealth of examples in MATLAB and MultiSurf (a computer-aided design package for naval architects and engineers) Includes supplemental MATLAB and MultiSurf code available on a companion site

The Maritime Engineering Reference Book is a one-stop source for engineers involved in marine engineering and naval architecture. In this essential reference, Anthony F. Molland has brought together the work of a number of the world's leading writers in the field to create an inclusive volume for a wide audience of marine engineers, naval architects and those involved in marine operations, insurance and other related fields. Coverage ranges from the basics to more advanced topics in ship design, construction and operation. All the key areas are covered, including ship flotation and stability, ship structures, propulsion, seakeeping and maneuvering. The marine environment and maritime safety are explored as well as new technologies, such as computer aided ship design and remotely operated vehicles (ROVs). Facts, figures and data from world-leading experts makes this an invaluable ready-reference for those involved in the field of maritime engineering. Professor A.F. Molland, BSc, MSc, PhD, CEng, FRINA. is Emeritus Professor of Ship Design at the University of Southampton, UK. He has lectured ship design and operation for many years. He has carried out extensive research and published widely on ship design and various aspects of ship hydrodynamics. * A comprehensive overview from best-selling authors including Bryan Barrass, Rawson and Tupper, and David Eyres * Covers basic and advanced material on marine engineering and Naval Architecture topics * Have key facts, figures and data to hand in one complete reference book

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The first book to portray the birth of naval architecture as an integral part of the Scientific Revolution, examining its development and application across the major shipbuilding nations of Europe. "Naval architecture was born in the mountains of Peru, in the mind of a French astronomer named Pierre Bouguer who never built a ship in his life." So writes Larrie Ferreiro at the beginning of this pioneering work on the science of naval architecture. Bouguer's monumental book *Traité du navire* (Treatise of the Ship) founded a discipline that defined not the rules for building a ship but the theories and tools to predict a ship's characteristics and performance before it was built. In *Ships and Science*, Ferreiro argues that the birth of naval architecture formed an integral part of the Scientific Revolution. Using Bouguer's work as a cornerstone, Ferreiro traces the intriguing and often unexpected development

of this new discipline and describes its practical application to ship design in the seventeenth and eighteenth centuries. Drawing on previously untapped primary-source and archival information, he places the development of naval architecture in the contexts of science, navy, and society, across the major shipbuilding nations of Britain, France, Spain, the Netherlands, Sweden, Denmark, and Italy. Ferreiro describes the formulation of the three major elements of ship theory (the science of explaining the physical behavior of a ship): maneuvering and sail theory, ship resistance and hydrodynamics, and stability theory. He considers the era's influential books on naval architecture and describes the professionalization of ship constructors that is the true legacy of this period. Finally, looking from the viewpoints of both the constructor and the naval administrator, he explains why the development of ship theory was encouraged, financed, and used in naval shipbuilding. A generous selection of rarely seen archival images accompanies the text.

Reprint of the original, first published in 1869.

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