

# Marine Engineering Lecture Notes

*This book comprises select proceedings of the International Conference on Innovations in Mechanical Engineering (ICIME 2021). It presents innovative ideas and new findings in the field of mechanical engineering. Various topics covered in this book are aerospace engineering, automobile engineering, thermal engineering, renewable energy sources, bio-mechanics, fluid mechanics, MEMS, mechatronics, robotics, CAD/CAM, CAE, CFD, design and optimization, tribology, materials engineering and metallurgy, mimics, surface engineering, nanotechnology, polymer science, manufacturing, production management, industrial engineering and rapid prototyping. This book will be useful for the students, researchers and professionals working in the various areas of mechanical engineering. This book provides readers with modern computational techniques for solving variety of problems from electrical, mechanical, civil and chemical engineering. Mathematical methods are presented in a unified manner, so they can be applied consistently to problems in applied electromagnetics, strength of materials, fluid mechanics, heat and mass transfer, environmental engineering, biomedical engineering, signal processing, automatic control and more.*

*The Maritime Engineering Reference Book*

*IMAM 2013*

*Sea Grant Publications Index, 1968-71*

### *Annapolis, Md*

#### *High Speed Catamarans and Multihulls*

This book comprises select peer-reviewed proceedings from the International Conference on Innovations in Mechanical Engineering (ICIME 2019). The volume covers current research in almost all major areas of mechanical engineering, and is divided into six parts: (i) automobile and thermal engineering, (ii) design and optimization, (iii) production and industrial engineering, (iv) material science and metallurgy, (v) nanoscience and nanotechnology, and (vi) renewable energy sources and CAD/CAM/CFD. The topics provide insights into different aspects of designing, modeling, manufacturing, optimizing, and processing with wide ranging applications. The contents of this book can be of interest to researchers and professionals alike. The previous edition of *Ship Design for Efficiency and Economy* was published as a Butterworth's marine engineering title. It has now been completely revised and updated by Schneekluth and Bertram. This book gives advice to students and naval architects on how to design ships - in particular with regard to hull design. The previous edition of this book was published in 1987. Since then, there have been numerous important developments in this area and the new additions to this book reflect these changes. Chapter 3 has been completely rewritten with added information on methodology of optimization, optimization shells and concept exploration methods. There is also a new sub-chapter on Computational Fluid Dynamics (CFD) for ship-hull design. Plus, a new method to predict ship resistance based on the evaluation of modern ship hull design will be detailed. The emphasis of

the this book is on design for operational economy. The material is directly usable not only in practice, in the design office and by shipowners, but also by students at both undergraduate and postgraduate levels.

BMT Abstracts

Ship Hydrostatics and Stability

Corrosion Science: Modern Trends and Applications

Twenty-First Symposium on Naval Hydrodynamics

Buckling of Ship Structures

*This book highlights recent findings in industrial, manufacturing and mechanical engineering, and provides an overview of the state of the art in these fields, mainly in Russia and Eastern Europe. A broad range of topics and issues in modern engineering is discussed, including the dynamics of machines and working processes, friction, wear and lubrication in machines, surface transport and technological machines, manufacturing engineering of industrial facilities, materials engineering, metallurgy, control systems and their industrial applications, industrial mechatronics, automation and robotics. The book gathers selected papers presented at the 7th International Conference on Industrial Engineering (ICIE), held in Sochi, Russia, in May 2021. The authors are experts in various fields of engineering, and all papers have been carefully reviewed. Given its scope, the book will be of interest to a wide readership, including mechanical and production engineers, lecturers in engineering disciplines, and engineering graduates.*

*Ship Hydrostatics and Stability is a complete guide to understanding ship hydrostatics in ship design and ship performance, taking you from first principles through basic and applied theory to contemporary mathematical techniques for hydrostatic modeling and analysis. Real life examples of the practical application of hydrostatics are used to explain the theory and calculations using MATLAB and Excel. The new edition of this established resource takes in recent developments in naval architecture, such as parametric roll, the effects of non-linear motions on stability and the influence of ship lines, along with new international stability regulations. Extensive reference to computational techniques is made throughout and downloadable MATLAB files accompany the book to support your own hydrostatic and stability calculations. The book also includes definitions and indexes in French, German, Italian and Spanish to make the material as accessible as possible for international readers. Equips naval architects with the theory and context to understand and manage ship stability from the first stages of design through to construction and use. Covers the prerequisite foundational theory, including ship dimensions and geometry, numerical integration and the calculation of heeling and righting moments. Outlines a clear approach to stability modeling and analysis using computational methods, and covers the international standards and regulations that must be kept in mind throughout design work. Includes definitions and indexes in French, German, Italian and Spanish to make the material as accessible as possible for international readers.*

*Select Proceedings of ICIME 2019*

*Developments in Maritime Transportation and Exploitation of Sea Resources  
Ship Vibrations*

*Plate Stability by Boundary Element Method*

*Fundamentals of Ship Design Economics*

*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*

*This volume contains selected and reviewed manuscripts from the 2nd Regional Conference on Mechanical and Marine Engineering (ReMME 2018), 'Sustainable Through Engineering,' which was held from November 7 to 9, 2018, at the Ipoh, Perak, Malaysia. This conference was organized by the Center of Refrigeration and Air Conditioning (CARE) and Center of Marine Engineering (CTME) Politeknik Ungku Omar, Jalan Raja Musa Mahadi, 31400 Ipoh, Perak. It discusses the expertise, skills, and techniques needed for the development of energy and renewable energy system, new materials and biomaterials, and marine technology. It focuses on finite element analysis, computational fluids dynamics, programming and mathematical methods that are used for engineering simulations, and present many state-of-the-art applications. For example, modern joining technologies can be used to fabricate new compound or composite materials, even those formed from dissimilar component materials. These composite materials are often exposed to harsh environments, must deliver*

*specific characteristics, and are primarily used in automotive and marine technologies, i.e., ships, amphibious vehicles, docks, offshore structures, and even robots. An energy efficient methods such cogeneration, thermal energy storage and solar desalination also being highlighted as sustainable engineering in this book chapter. The committee members can be listed as follows: Patron:Dr. Hj. Zairon Mustapha (Director). Advisor: Muhmmad Zubir Mohd Hanifah (Deputy Director Academic), Dr. Azhar Abdullah (Head of Innovation, Research & Commercialization). Chairman 1: Dr. Adzuiéen Nordin. Chairman 2: Hairi Haizri Che Amat. Secretariat 1: Dr. Woo Tze Keong. Secretariat 2: Dr. Saw Chun Lin. Secretary: Mahani Mohd Zamberi, Maslinda Rahmad. Floor Manager: Dr. Adzuiéen Nordin, Marzuki Mohammad Treasurer: Shahrul Nahar Omar Kamal. Webmaster: Mohamad Asyraf Othoman, Mohd Assidiq Che Ahmad, Mohd Hashim Abd. Razak. Proceeding & Editorial: Didi Asmara Salim, Khairil Ashraf Ahmad Maliki, Khirwizam Md Hkhir. Publicity: Nur Azrina Zainal Ariff, Norsheila Buyamin, Rawaida Muhammad, Noor Khairunnisa Kamaruddin. Reviewer: Zakiman Zali, Shahril Jalil. Technical Manager: Mohd Faisol Saad. Springer Publication Editorial: Dr. Saw Chun Lin, Dr. Woo Tze Keong, Didi Asmara Salim, Dr. Salvinder Singh Karam Singh. Protocol & Opening Ceremony: Mohd Rizan Abdul, Yeoh Poh See. Souvenir: Sharifah Zainhuda Syed Tajul Ariffin.*

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*Sustainable Energy and Marine Planning*

*Advancement in Emerging Technologies and Engineering Applications*

*Hydrodynamics of High-Speed Marine Vehicles*

*Select Proceedings of ICIME 2021*

*Computational Problems in Engineering*

Developments in Maritime Transportation and Exploitation of Sea Resources covers recent developments in maritime transportation and exploitation of sea resources encompassing ocean and coastal areas. The book brings together a selection of reflecting fundamental areas of recent research and development in the fields of Hydrodynamics-

List of members in vols. 1-24, 38-54, 57.

Volume II

Marine Hydrodynamics

Sea Grant Publications Index, 1968-72

For Coastal and Ocean Engineers

Ship Design for Efficiency and Economy

Hydrodynamics of High-Speed Marine Vehicles, first published in 2006, discusses the three main categories of high-speed marine vehicles - vessels supported by submerged hulls, air cushions or foils. The wave environment, resistance, propulsion, seakeeping, sea loads and manoeuvring are extensively covered based on rational and simplified methods. Links to automatic control and structural mechanics are emphasized. A detailed description of waterjet propulsion is given and the effect of water depth on wash, resistance, sinkage and trim is discussed. Chapter topics include resistance and wash; slamming; air cushion-supported vessels, including a detailed discussion of wave-excited resonant oscillations in air cushion; and hydrofoil vessels. The book contains numerous illustrations, examples and exercises.

This book aims to discredit the myth that has the 'unique cultural traits' of the Japanese as the key to the country's success, arguing that the more realisable foundation of long-term investment in training and research is responsible. The book looks at the development of Japan in the pre-War period. Yukiko Fukusaku sees the achievements of this period as central to the present competitiveness of the country's industrial technology. She uses the Mitsubishi Nagasaki shipyard as a case study, looking at technological innovation and training as the keys to long-term stability and economic success. The book has implications for industrial development worldwide. Japan's starting point over a century ago was similar to the present conditions of many developing countries and the

book's emphasis on the acquisition of better skills as a key to development is as relevant to Europe and America as it is to the Third World.

Annual Register of the United States Naval Academy

Technology and Industrial Growth in Pre-War Japan: The Mitsubishi-Nagasaki Shipyard 1884-1934

A Guide to Ship Design, Construction and Operation

Transactions - The Society of Naval Architects and Marine Engineers

AETA 2013: Recent Advances in Electrical Engineering and Related Sciences

Intended for coastal engineers and marine scientists who desire to develop a fundamental understanding of ocean waves and be able to apply this knowledge to ocean and coastal analysis and design. Provides an introduction to the physical processes of ocean wave mechanics, an understanding of the basic techniques for wave analysis, techniques for practical calculation and prediction, and applied wave forecasting.

The advent of Industry 4.0 has opened a data-rich avenue of predicting and controlling premature degradation of industrial materials. For any industrial construction or manufacturing projects, performing analysis on the structural integrity of materials is crucial for their sustainability. Corrosion Science: Modern Trends and Applications gives scholars a snapshot of recent contributions and development in the field of material corrosion. The book presents 12 chapters that cover top corrosion testing methods, anti-corrosive coating mechanisms, corrosion in different types of materials (electronics, polymers), industrial systems (power plants, concrete constructions, and hydraulic systems), and corrosion as a result of environmental characteristics (such as marine surroundings). The breadth of topics covered coupled with the reader-friendly presentation of the book make it

beneficial for students, research scholars, faculty members, and R&D specialists working in the corrosion science, material science, solid-state science, chemical engineering, and nanotechnology. Readers will be equipped with the knowledge to understand and plan industrial processes that measure the reliability and integrity of material structures which are impacted by corrosive environments. Annual Register of the United States Naval Academy, Annapolis, Md  
Proceedings of the 2nd Vietnam Symposium on Advances in Offshore Engineering  
Marine Engineering/Log International  
Lecture Notes

### Computational Ship Design

1. 1 Historical Background Thin plates and shells are widely used structural elements in numerous civil, mechanical, aeronautical and marine engineering design applications. Floor slabs, bridge decks, concrete pavements, sheet pile retaining walls are all, under normal lateral loading circumstances, instances of plate bending in civil engineering. The problem of elastic instability of plates occurs when load is applied in a direction parallel to the plane of the plate. The deck of a bridge subjected to a strong wind loading, the web of a girder under the action of shear forces transmitted by the flanges, the turbine blade

of a machinery undergoing longitudinal temperature differentials, would all eventually buckle when the applied load, or its temperature equivalent in the last case, exceeds a certain limit, that is the buckling load. Although the plate may exhibit a considerable post-buckling strength, the buckling load is considered in many design instances, especially in aeronautical and marine engineering, as a serviceability limit because of the abrupt and substantial change in the dimensions and shape of the buckled plate. Nevertheless, the post-buckling region retains its importance either as an essential safety margin or as a stage of loading actually reached under normal loading conditions. The design engineer will therefore need rigorous tools of analysis to predict, in addition to the buckling load, the deflections and stresses at both buckling and initial post-buckling stages.

High speed catamaran and multihull high speed marine vessel have become very popular in the last two decades. The catamaran has become the vessel of choice for the majority

of high speed ferry operators worldwide. There have been significant advances in structural materials, and structural design has been combined with higher power density and fuel efficient engines to deliver ferries of increasing size. The multihull has proven itself to be a suitable configuration for active power projection across oceans as well as for coastal patrol and protection, operating at high speedd for insertion or retrieval with a low energy capability. At present there is no easily accessible material covering the combination of hydrodynamics, aerodynamics, and design issues including structures, powering and propulsion for these vehicles. Coverage in High Speed Catamarans and Multihulls includes an introduction to the history, evolution, and development of catamarans, followed by a theoretical calculation of wave resistance in shallow and deep water, as well as the drag components of the multihull. A discussion of vessel concept design describing design characteristics, empirical regression for determination of principal dimensions in preliminary design, general

arrangement, and methods is also included. The book concludes with a discussion of experimental future vehicles currently in development including the small waterplane twin hull vessels, wave piercing catamarans, planing catamarans, tunnel planing catamarans and other multihull vessels.

Recent Trends in Mechanical Engineering

Proceedings of the 7th International Conference on Industrial Engineering (ICIE 2021)

NOAA Technical Memorandum EDS ESIC.

Hearings

Catalog of Course of Instruction at the United States Naval Academy

***Over the past decades, fault diagnosis (FDI) and fault tolerant control strategies (FTC) have been proposed based on different techniques for linear and nonlinear systems. Indeed a considerable attention is deployed in order to cope with diverse damages resulting in faults occurrence.***

***This book gathers a selection of refereed papers presented at the 2nd Vietnam Symposium on Advances in Offshore Engineering (VSOE 2021), held in 2022 in Ho Chi Minh City, Vietnam. The book consists of articles written by researchers, practitioners, policymakers, and entrepreneurs addressing the important topic of technological and***

***policy changes intended to promote renewable energies and to generate business opportunities in oil and gas and offshore renewable energy. With a special focus on sustainable energy and marine planning, the book brings together the latest lessons learned in offshore engineering, technological innovations, cost-effective and safer foundations and structural solutions, environmental protection, hazards, vulnerability, and risk management. Its content caters to graduate students, researchers, and industrial practitioners working in the fields of offshore engineering and renewable energies.***

***Marine Engineer and Naval Architect***

***Annual Register of the U.S. Naval Academy***

***Basic Wave Mechanics***

***Mp4720***

***Technology, Performance, and Applications***

***This book offers an introduction to the fundamental principles and systematic methodologies employed in computational approaches to ship design. It takes a detailed approach to the description of the problem definition, related theories, mathematical formulation, algorithm selection, and other core design information. Over eight chapters and appendices the book covers the complete process of ship design, from a detailed description of design theories through to cutting-edge applications. Following an introduction to***

*relevant terminology, the first chapters consider ship design equations and models, freeboard calculations, resistance prediction and power estimation. Subsequent chapters cover topics including propeller deign, engine selection, hull form design, structural design and outfitting. The book concludes with two chapters considering operating design and economic factors including construction costs and fuel consumption. The book reflects first-hand experiences in ship design and R&D activities, and incorporates improvements based on feedback received from many industry experts. Examples provided are based on genuine case studies in the field. The comprehensive description of each design stage presented in this book offers guidelines for academics, researchers, students, and industrial manufactures from diverse fields, including ocean engineering and mechanical engineering. From a commercial point of view the book will be of great value to those involved in designing a new vessel or improving an existing ship. Buckling of Ship Structures presents a comprehensive analysis of the buckling problem of ship structural members. A full analysis of the various types of loadings and stresses imposed on ship plating and primary and secondary structural members is given. The main causes and consequences of the buckling mode of failure of ship structure and the methods commonly used to*

*control buckling failure are clarified. This book contains the main equations required to determine the critical buckling stresses for both ship plating and the primary and secondary stiffening structural members. The critical buckling stresses are given for ship plating subjected to the induced various types of loadings and having the most common boundary conditions encountered in ship structures. The text bridges the gap existing in most books covering the subject of buckling of ship structures in the classical analytical format, by putting the emphasis on the practical methods required to ensure safety against buckling of ship structural members. It is very useful to ship designers, shipyard engineers, naval architects, international classification societies and also to students studying naval architecture, marine engineering and offshore structures. It is a valuable source for practicing naval architects to quickly check the possibility of buckling of ship structure members without reverting to the complex and costly analysis using advanced FEM software.*

*Innovations in Mechanical Engineering*

*Marine Engineering Geology. Vol. 2 and 3. Lecture Notes and Practical Inventory of Federal Archives in the States*