

Steam Turbines Design Application And Re Rating

Introductory technical guidance for mechanical engineers and other professional engineers and construction managers interested in steam turbines. Here is what is discussed: 1. TYPICAL PLANTS AND CYCLES 2. COGENERATION IN STEAM POWER PLANTS 3. TURBINE TYPES 4. TURBINE GENERATOR SIZES 5. TURBINE THROTTLE PRESSURE AND TEMPERATURE 6. TURBINE EXHAUST PRESSURE 7. LUBRICATING OIL SYSTEMS 8. GENERATOR TYPES 9. GENERATOR COOLING 10. TURBINE GENERATOR CONTROL 11. TURNING GEAR 12. TURBINE GENERATOR FOUNDATIONS 13. AUXILIARY EQUIPMENT 14. INSTALLATION 15. CLEANUP, STARTUP, AND TESTING 16. OPERATION.

Turbomachines, which comprise turbines, compressors and fans, are used in electricpower generation, aircraft propulsion and a wide variety of medium and heavy industries.The importance of this class of machines can be understood by the examples of2000 MW steam turbines, turbojet engines, etc.This book is a self-contained treatise in the theory, design and application of turbomachines. The book deals with the use of turbomachines in air handling, powergeneration, aircraft propulsion and several industrial applications. It covers the basictheory and working of all kinds of turbomachines. In addition, the book discusses:
* The role of individual turbomachines in a plant* Dimensional analysis and flow through cascades* Fans, blowers, high-temperature turbine stages and aerospace engineering* Problems on hydraulic turbines and pumps

Presenting the newest approaches to the design and operation of steam turbines, this book also explores modern techniques for refurbishment of aging units. It covers recent engineering breakthroughs and new approaches to transient operating conditions, as well as improved information support for operational personnel. An authoritative guide for power plant engineers, operators, owners and designers on all of these crucial developments, this book fully describes and evaluates the most important new design and operational improvement opportunities for the full spectrum of today's steam turbines – from the newest and most advanced to the more common existing systems.

Takes an operational approach to the turbine relative to its function as part of an overall power plant.

100 Years of Power Plant Development presents the evolution of power plant concepts. The author provides thermodynamic design concepts of a large variety of power plants, with comparisons, based on realistic performance levels. The historical overview extends to plant concepts for the future, and considers the latest advances with improved thermodynamic performance and emissions/carbon dioxide discharge. Key areas include: Fossil steam turbine power plants, Nuclear power plants, Co-generation plants, Gas turbine peaking power plants, Repowering steam turbines with gas turbines, and Coal gasification and other advanced combined-cycle plants. In addition, the author examines issues such as available fuel sources and developing/applying the best technology for converting the fuel into electric power with the lowest adverse effect on the environment.

These books are the most comprehensive technical treatments of the design and operation of large power steam turbines available today. Characteristic types produced in the United States, Europe, Japan, and the former Soviet Union are detailed, along with design decisions regarding all the major turbine elements. Operational problems are discussed with special attention to transients, reliability, efficiency, and flexibility. Optimizing technology, automated control, and diagnostic monitoring also are covered.

[A Handbook of Air, Land and Sea Applications](#)

[Steam Turbine Theory and Practice - a Textbook for Engineering Students](#)

[Evaluating and Improving Steam Turbine Performance](#)

[A Short Treatise on Theory, Design, and Field of Operation](#)

[Concepts, Applications, and Design](#)

[Design, Applications, and Troubleshooting](#)

[Gas Turbines](#)

[Design and Application of Modern Synchronous Generator Excitation Systems](#)

[Turbines Compressors and Fans](#)

[Theory and Design](#)

[An Overview of Operating Principles, Construction, Best Practices, and Troubleshooting](#)

[Flowpath Design and Performance Fundamentals, Third Edition](#)

Modern gas turbine power plants represent one of the most efficient and economic conventional power generation technologies suitable for large-scale and smaller scale applications. Alongside this, gas turbine systems operate with low emissions and are more flexible in their operational characteristics than other large-scale generation units such as steam cycle plants. Gas turbines are unrivalled in their superior power density (power-to-weight) and are thus the prime choice for industrial applications where size and weight matter the most. Developments in the field look to improve on this performance, aiming at higher efficiency generation, lower emission systems and more fuel-flexible operation to utilise lower-grade gases, liquid fuels, and gasified solid fuels/biomass. Modern gas turbine systems provides a comprehensive review of gas turbine science and engineering. The first part of the book provides an overview of gas turbine types, applications and cycles. Part two moves on to explore major components of modern gas turbine systems including compressors, combustors and turbogenerators. Finally, the operation and maintenance of modern gas turbine systems is discussed in part three. The section includes chapters on performance issues and modelling, the maintenance and repair of components and fuel flexibility. Modern gas turbine systems is a technical resource for power plant operators, industrial engineers working with gas turbine power plants and researchers, scientists and students interested in the field. Provides a comprehensive review of gas turbine systems and fundamentals of a cycle Examines the major components of modern systems, including compressors, combustors and turbines Discusses the operation and maintenance of component parts

Energy Production Systems Engineering presents IEEE, Electrical Apparatus Service Association (EASA), and International Electrotechnical Commission (IEC) standards of engineering systems and equipment in utility electric generation stations. Includes fundamental combustion reaction equations Provides methods for measuring radioactivity and exposure limits Includes IEEE, American Petroleum Institute (API), and National Electrical Manufacturers Association (NEMA) standards for motor applications Introduces the IEEE C37 series of standards, which describe the proper selections and applications of switchgear Describes how to use IEEE 80 to calculate the touch and step potential of a ground grid design This book enables engineers and students to acquire through study the pragmatic knowledge and skills in the field that could take years to acquire through experience alone.

Covering basic theory, components, installation, maintenance, manufacturing, regulation and industry developments, Gas Turbines: A Handbook of Air, Sea and Land Applications is a broad-based introductory reference designed to give you the knowledge needed to succeed in the gas turbine industry, land, sea and air applications. Providing the big picture view that other detailed, data-focused resources lack, this book has a strong focus on the information needed to effectively decision-make and plan gas turbine system use for particular applications, taking into consideration not only operational requirements but long-term life-cycle costs in upkeep, repair and future use. With concise, easily digestible overviews of all important theoretical bases and a practical focus throughout, Gas Turbines is an ideal handbook for those new to the field or in the early stages of their career, as well as more experienced engineers looking for a reliable, one-stop reference that covers the breadth of the field. Covers installation, maintenance, manufacturer's specifications, performance criteria and future trends, offering a rounded view of the area that takes in technical detail as well as well as industry economics and outlook Updated with the latest industry developments, including new emission and efficiency regulations and their impact on gas turbine technology Over 300 pages of new/revised content, including new sections on microturbines, non-conventional fuel sources for microturbines, emissions, major developments in aircraft engines, use of coal gas and superheated steam, and new case histories throughout highlighting component improvements in all systems and sub-systems.

This comprehensive text details the design, development, and operation of turbo-machinery. Starting with the fundamentals of thermodynamics and advancing to the latest trends in the development and production of turbo-machines, the author provides in-depth methods for analyzing new design procedures and maximizing their structural integrity and operating efficiency.

Uses real world case studies to present the key technologies of design and application of the synchronous generator excitation system This book systematically introduces the important technologies of design and application of the synchronous generator excitation system, including the three-phase bridge rectifier circuit, diode rectifier for separate excitation, brushless excitation system and the static self-stimulation excitation system. It fuses discussions on specific topics and basic theories, providing a detailed description of the theories essential for synchronous generators in the analysis of excitation systems. Design and Application of Modern Synchronous Generator Excitation Systems provides a cutting-edge examination of excitation system, addressing conventional hydro-turbines, pumped storage units, steam turbines, and nuclear power units. It looks at the features and performance of the excitation system of the 700MW hydro-turbine deployed at the Three Gorges Hydropower Plant spanning the Yangtze River in China, as well as the working principle and start-up procedure of the static frequency converter (SFC) of pumped storage units. It also expounds on the composition of the excitation transformer, power rectifier, de-excitation equipment, and automatic excitation regulator—in addition to the performance features of the excitation system of conventional 600/1000MW turbines and the excitation system of the 1000MW nuclear power unit. Presents cutting-edge technologies of the excitation system from a unique engineering perspective Offers broad appeal to power system engineers who require a better understanding of excitation systems Addresses hydro-turbines, pumped storage units, steam turbines, and nuclear power units Provides an interdisciplinary examination of a range of applications Written by a senior expert in the area of excitation systems Written by an author with over 50 years' experience, Design and Application of Modern Synchronous Generator Excitation Systems is an excellent text that offers an interdisciplinary exposition for professionals, researchers, and academics alike.

Filled with over 225 boiler/HRSG operation and design problems, this book covers steam generators and related systems used in process plants, refineries, chemical plants, electrical utilities, and other industrial settings. Emphasizing the thermal engineering aspects, the author provides information on the design and performance of steam generators

[Modern Instrumentation for the Greatest Economy of Power Plants](#)

[Combined-cycle Gas & Steam Turbine Power Plants](#)

[Focus on Steam and Gas Turbines as Prime Movers](#)

[Steam Plant Operation, 10th Edition](#)

[Cavitation](#)

[Industrial Boilers and Heat Recovery Steam Generators](#)

[A Convenient Reference Book for All Persons Interested in Steam Boilers, Steam Engines, Steam Turbines, and the Auxiliary Appliances and Machinery of Power Plants](#)

[Model Steam Turbines](#)

[100 Years of Power Plant Development](#)

[Steam Turbines and Their Cycles](#)

[Blade Design and Analysis for Steam Turbines](#)

Logan's Turbomachinery: Flowpath Design and Performance Fundamentals, Third Edition is the long-awaited revision of this classic textbook, thoroughly updated by Dr. Bijay Sultanian. While the basic concepts remain constant, turbomachinery design has advanced since the Second Edition was published in 1993. Airfoils in modern turbomachines feature three-dimensional geometries. Computational Fluid Mechanics (CFD) has become a standard design tool, and major advances have been made in the materials and manufacturing technologies that affect turbomachinery design. The new edition addresses these trends to best serve today's students, and design engineers working in turbomachinery industries.

To achieve the highest level of availability and cost-effectiveness the steam turbine generator set in power plants must be operated professionally at optimum thermodynamic performance. The modern I&C equipment (Instrumentation & Control) of Siemens Power Generation (KWU) and the on-line diagnostic system DIGEST help accomplish this by providing a comprehensive overview of the operating status and by analyzing the condition of the steam turbine generator set during operation. This equipment enables the early detection of incipient faults and lowers the burden of the operating crew. This book provides a broad overview of the state-of-the-art of I&C equipment and the use of diagnostic systems. The target group for this book are power plant operators, planning engineers and consultants.

THE LATEST STEAM TURBINE BLADE DESIGN AND ANALYTICAL TECHNIQUES Blade Design and Analysis for Steam Turbines provides a concise reference for practicing engineers involved in the design, specification, and evaluation of industrial steam turbines, particularly critical process compressor drivers. A unified view of blade design concepts and techniques is presented. The book covers advances in modal analysis, fatigue and creep analysis, and aerodynamic theories, along with an overview of commonly used materials and manufacturing processes. This authoritative guide will aid in the design of powerful, efficient, and reliable turbines. COVERAGE INCLUDES: Performance fundamentals and blade loading determination Turbine blade construction, materials, and manufacture System of stress and damage mechanisms Fundamentals of vibration Damping concepts applicable to turbine blades Bladed disk systems Reliability evaluation for blade design Blade life assessment aspects Estimation of risk

This book is an excellent example of the practical application of thermodynamics & fluid flow fundamentals to the solution of performance problems in power plants. Current design practices & methods for testing steam turbines & interpreting the test results are presented. This book concentrates on measuring turbine & cycle-component performance & on calculating the effects that measured deviations from design values (e.g., increased steam-path clearances, blade deposits, or solid particle erosion) have on turbine efficiency. In an impressive array of examples, measured performance & current design data are compared to quantify performance losses. Then, using these measurements & deductive reasoning, the book pinpoints problem areas that help identify the nature of the deficiency & proposes remedial action. This book develops a better appreciation for optimum turbine design which enables the evaluation of proposed efficiency improvements. It also quantifies the effect of power plant operation (abnormal conditions) on turbine efficiency, throttle flow & stage pressures. The revised edition includes chapters on co-generation & combinid cycles. This book was written for engineers responsible for the efficient operation of electric utilities, power plants & cogeneration plants. Review questions have been provided so that this material may be used as a textbook or reference book in colleges & universities. To order: Cotton Fact Inc., 346 Kingsley Rd., Burnt Hills, NY 12027. Phone: 518-384-7885.

www.cottonfact.com.

Effective methods for recovering gas energy using expanders Expanders for Oil and Gas Operations offers in-depth details on different types of expanders, addressing the background, mechanical design features, design and operating requirements, operational processes, and potential problems for each class of expander. The book also discusses rotor dynamics, vibration theory, material strength, life estimation, and probabilistic analysis. The information in this practical, illustrated resource will help you to maintain and improve existing expanders and implement design enhancements for increased expander capacity as well as lifespan and maximum energy reuse. Comprehensive coverage includes: CCU hot gas expanders Nitric acid expanders for chemical applications Turboexpanders/cryogenic turboexpanders Rotor dynamics Bladed disk vibration and reliability Damage in material and life analysis Probabilistic concept and risk assessment

The latest design and manufacturing details in mechanical drive steam turbines Steam Turbines shows how to select, improve, operate, and maintain high-quality mechanical drive steam turbines-with maximum efficiency and minimum downtime. This new Second Edition offers authoritative information on the operating characteristics, design features, reliability, and maintenance of all steam turbines. A complete sourcebook, Steam Turbines delivers the expertise required to capitalize on the latest steam turbine and intermediate transmission unit innovations--and improve a plant's efficiency, availability, and profitability. Steam Turbines, Second Edition covers: Variable speed drives and intermediate gearing used for major process machinery and cogeneration drives-- with completely updated content Arrangement, material composition, and basic physical laws governing design of steam turbines How to select optimum configurations, controls, and components Options and ways to upgrade existing steam turbines

[Steam Turbine Engines, Their Construction, Care and Operation ...](#)

[Selected Issues](#)

[Modern Gas Turbine Systems](#)

[Design and Operations](#)

[Steam Turbines in Combined Cycles](#)

[The Design of High-Efficiency Turbomachinery and Gas Turbines, second edition, with a new preface](#)

[The Steam Engineer's Handbook](#)

[Steam Turbines : Design, Application, and Re-Rating](#)

[Training Manual on Steam Turbines & Auxiliaries \(Non Reheat Type\)](#)

[Advances in Steam Turbines for Modern Power Plants](#)

[Design and Development](#)

[Full Instructions Regarding Correct Methods of Operating Steam Turbines, Adjusting Clearances, Etc., Etc](#)

This volume---originally published in the Soviet Union---is intended as a text-book for the students of technical colleges as well as engineers and designers specialising in turbine building. Basic theoretical concepts of the thermodynamic processes of stationary steam turbines have been dealt with in detail. Variable load operation of these turbines has also been considered. The reader will find here enough material concerning the basic concepts of gas dynamics as applied to steam turbines as well as design and construct ion of steam turbines and their details with regard to mechanical strength. Considerable space has been devoted to the description of turbines of various manufacture. The book contains profusion of tables, diagrams and illustrations which, it is hoped, would enable the reader to acquire a better understanding of the theory and design of steam turbines.

The second edition of a comprehensive textbook that introduces turbomachinery and gas turbines through design methods and examples. This comprehensive textbook is unique in its design-focused approach to turbomachinery and gas turbines. It offers students and practicing engineers methods for configuring these machines to perform with the highest possible efficiency. Examples and problems are based on the actual design of turbomachinery and turbines. After an introductory chapter that outlines the goals of the book and provides definitions of terms and parts, the book offers a brief review of the basic principles of thermodynamics and efficiency definitions. The rest of the book is devoted to the analysis and design of real turbomachinery configurations and gas turbines, based on a consistent application of thermodynamic theory and a more empirical treatment of fluid dynamics that relies on the extensive use of design charts.

Topics include turbine power cycles, diffusion and diffusers, the analysis and design of three-dimensional free-stream flow, and combustion systems and combustion calculations. The second edition updates every chapter, adding material on subjects that include flow correlations, energy transfer in turbomachines, and three-dimensional design. A solutions manual is available for instructors. This new MIT Press edition makes a popular text available again, with corrections and some updates, to a wide audience of students, professors, and professionals.

Cavitation erosion is one of the most popular phenomena of the destruction of engineering materials working in water conditions and various kinds of liquids. The cavitation effect is defined as a physical effect, induced by a variable field of liquid pressures, where bubbles or other voids (caverns) - containing steams of a given liquid, gas, or a steam-gas mixture - are formed, expanded, and disappear. A better understanding of all aspects related to cavitation wear will allow for more thoughtful analysis in the selection of innovative engineering materials additionally protected by various technologies or techniques in the field of surface engineering, and optimization of the design of constructional elements used in the cavitation environment. The novelty of this book is the presentation of extensive knowledge related to cavitation, erosion, and how to protect engineering materials against this phenomenon supported by the results of thorough research by the authors.

This title provides a reference on technical and economic factors of combined-cycle applications within the utility and cogeneration markets. Kehlhofer - and hos co-authors give the reader tips on system layout, details on controls and automation, and operating instructions.

When installed and operated properly, general purpose steam turbines are reliable and tend to be forgotten, i.e., out of sound and out of mind. But, they can be sleeping giants that can result in major headaches if ignored. Three real steam turbine undesirable consequences that immediately come to mind are: Injury and secondary damage due to an overspeed failure. An overspeed failure on a big steam or gas turbine is one of the most frightening of industrial accidents. The high cost of an extensive overhaul due to an undetected component failure. A major steam turbine repair can cost ten or more times that of a garden variety centrifugal pump repair. Costly production loses due an extended outage if the driven pump or compressor train is unspared. The value of lost production can quickly exceed repair costs. A major goal of this book is to provide readers with detailed operating procedure aimed at reducing these risks to minimal levels.

Start-ups are complicated by the fact that operators must deal with numerous start-up scenarios, such as: Commissioning a newly installed steam turbine Starting ups after a major steam turbine repair Starting up a proven steam turbine after an outage Overspeed trip testing It is not enough to simply have a set of procedures in the control room for reference. To be effective, operating procedures must be clearly written down, taught, and practiced—until they become ha

Advances in Steam Turbines for Modern Power Plants provides an authoritative review of steam turbine design optimization, analysis and measurement, the development of steam turbine blades, and other critical components, including turbine retrofitting and steam turbines for renewable power plants. As a very large proportion of the world's electricity is currently generated in systems driven by steam turbines, (and will most likely remain the case in the future) with steam turbines operating in fossil-fuel, cogeneration, combined cycle, integrated gasification combined cycle, geothermal, solar thermal, and nuclear plants across the world, this book provides a comprehensive assessment of the research and work that has been completed over the past decades. Presents an in-depth review on steam turbine design optimization, analysis, and measurement Written by a range of experts in the area Provides an overview of turbine retrofitting and advanced applications in power generation

[Design, Applications, and Calculations.](#)

[How to Design and Build Them](#)

[Performance Test Codes ASME PTC 6.2-2011](#)

[Steam Turbines for Modern Fossil-Fuel Power Plants](#)

[Comprehensive guide to all aspects of steam turbines](#)

[The Design and Construction of Steam Turbines](#)

[Large Power Steam Turbines: Design](#)

[Design, Application, and Re-Rating.](#)

[Expanders for Oil and Gas Operations](#)

[Turbo-Machinery Dynamics](#)

[An Introduction to Steam Turbine Design](#)

[Operator's Guide to General Purpose Steam Turbines](#)

Reproduction of the original: Steam Turbines by Hubert E. Collins

The definitive reference on the role of steam in the production and operation of power plants for electric generation and industrial process applications For more than 80 years, Steam Plant Operation has been an unmatched source of information on steam power plants, including design, operation, and maintenance. The Tenth Edition emphasizes the importance of devising a comprehensive energy plan utilizing all economical sources of energy, including fossil fuels, nuclear power, and renewable energy sources. This trusted classic discusses the important role that steam plays in our power production and identifies the associated risks and potential problems of other energy sources. You will find concise explanations of key concepts, from fundamentals through design and operation. For energy students, Steam Plant Operation provides a solid introduction to steam power plant technology. This practical guide includes common power plant calculations such as plant heat rate, boiler efficiency, pump performance, combustion processes, and explains the systems necessary to control plant emissions. Numerous illustrations and clear presentation of the material will prove invaluable for those preparing for an operator's license exam. Examples throughout show real-world application of the topics discussed. COVERAGE INCLUDES: • Steam and Its Importance • Boilers • Design and Construction of Boilers • Combustion of Fuels • Boiler Settings, Combustion Systems, and Auxiliary Equipment • Boiler Accessories • Operation and Maintenance of Boilers • Pumps • Steam Turbines, Condensers, and Cooling Towers • Operating and Maintaining Steam Turbines, Condensers, Cooling Towers, and Auxiliaries • Auxiliary Steam Plant Equipment • Environmental Control Systems • Waste-to-Energy Plants

This book is in communicable language which exposes the subject in a lucid manner. Theory is explained in a very simple language. Lots of illustrative examples are incorporated to enable the students to thoroughly master the subject. I am sure, they should be better equipped to face RTU examination with confidence.

Highly Recommended for : Power Plant Professionals seeking high growth in career Interview preparations for power plant jobs A comprehensive training manual on Steam Turbines & auxiliaries (Non Reheat Type) covering all aspects for thermal power plants. Its a 300 page Spiral bound manual must for every power plant professional. The manual contains text, images/drawings & illustrations. So far the books written on thermal plants describe mostly the reheat type units. These books are intended for technical personnel working in utility plants but, again, most of them deal predominantly with the theoretical aspects of turbines and their auxiliaries and lack in practical side of the subject. The aim is to give following benefits to the reader: To provide an in-depth knowledge of plant and equipment to the plant professionals associated with industrial boilers and turbines. It is to be noted that most of the industrial thermal units (like captive power plants attached to main technological units) are of non-reheat type. To cover the practical aspects of thermal power stations missing in most of the books available in the market. The book describes in details the constructional features of the plant and equipment, their operation and maintenance and overhauling procedures, performance monitoring as well as troubleshooting. To cover the theoretical aspects of a thermal unit necessary to be known to the professionals for thorough understanding of the systems involved. This knowledge would assist them: In selecting the plant and equipment suitable to their requirement In operating and maintaining the plant with best efficiency, availability and reliability The book is a must for those working professionals who aspire for a fast growth of their professional career. It will also be of immense help to the personnel preparing for boiler proficiency examinations. It contains following topics: Chapter - 1 Thermodynamics of a Steam Turbine Chapter - 2 Steam Turbine Fundamentals Chapter - 3 Constructional features of steam turbines Chapter - 4 The lubricating oil system Chapter - 5 Steam turbine governing system Chapter - 6 Steam turbine protection system Chapter - 7 Turbovisory system Chapter - 8 Turbine gland sealing system Chapter - 9 Turbine system and cycles Chapter - 10 Condensers, deaerators and closed feedwater heater Chapter - 11 Main and auxiliary cooling water systems and cooling towers Chapter - 12 Turbine Plant Pumps Chapter - 13 Condensate and feed water treatment Chapter - 14 Turbine Plant Operation Chapter - 15 Turbine Plant Maintenance Chapter - 16 Turbine performance and optimization Turbomachinery: Concepts, Applications, and Design is an introductory turbomachinery textbook aimed at seniors and first year graduate students, giving balanced treatment of both the concepts and design aspects of turbomachinery, based on sound analysis and a strong theoretical foundation. The text has three sections, Basic Concepts, Incompressible Fluid Machines; and Compressible Fluid Machines. Emphasis is on straightforward presentation of key concepts and applications, with numerous examples and problems that clearly link theory and practice over a wide range of engineering areas. Problem solutions and figure slides are available for instructors adopting the text for their classes.

Many of the earliest books, particularly those dating back to the 1900s and before, are now extremely scarce and increasingly expensive. We are republishing these classic works in affordable, high quality, modern editions, using the original text and artwork.

[Turbomachinery](#)

[Steam Turbine Generators Process Control and Diagnostics](#)

[High Efficiency, Low Emission, Fuel Flexible Power Generation](#)

[A Manual for the Engineer](#)

[Energy Production Systems Engineering](#)

[Logan's Turbomachinery](#)

[Steam Turbines and Steam Power Plant](#)

[Steam and Gas Turbines for Marine Propulsion](#)

[Steam Turbines](#)

[High Pressure Steam Turbines:](#)