

Modern Gas Turbine Combined Cycle Bechtel

Industrial Gas Turbines Modern Gas Turbine Systems Gas Turbines Power Generation Technologies Combined-Cycle Gas & Steam Turbine Power Plants Power Generation, Operation, and Control Modern Gas Turbines Coatings for High-Temperature Structural Materials Combined Power Plants Progress in Gas Turbine Performance Gas Turbine Combined Cycle Power Plants Energy Audit Gas Turbines for Electric Power Generation Gas Turbine Engineering Handbook Process Plant Machinery Modern Gas Turbine Systems Advances in Steam Turbines for Modern Power Plants Gas-Turbine Regenerators Combined Cycle Systems for Near-Zero Emission Power Generation Modern Power Systems Advanced Gas Turbine Cycles The CRC Handbook of Mechanical Engineering, Second Edition Gas Turbine Performance Our Car as Power Plant Advances in Steam Turbines for Modern Power Plants Commercial Aircraft Propulsion and Energy Systems Research Desalination Updates Gas-Turbine Power Generation Challenges of Power Engineering and Environment Potential for Industrial Energy-Efficiency Improvement in the Long Term Handbook for Cogeneration and Combined Cycle Power Plants Managing in Construction Supply Chains and Markets Gas Turbine Combined Cycle Power Plants Combined-cycle Gas & Steam Turbine Power Plants Integrated Gasification Combined Cycle (IGCC) Technologies Proceedings of the 1999 International Joint Power Generation Conference: Fuels and combustion technologies Fossil Energy Program Report Principles of Solar Gas Turbines for Electricity Generation Advanced Technologies for Gas Turbines Introduction to Gas Turbine Theory

Industrial Gas Turbines

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

Modern Gas Turbine Systems

Leadership in gas turbine technologies is of continuing importance as the value of gas turbine production is projected to

grow substantially by 2030 and beyond. Power generation, aviation, and the oil and gas industries rely on advanced technologies for gas turbines. Market trends including world demographics, energy security and resilience, decarbonization, and customer profiles are rapidly changing and influencing the future of these industries and gas turbine technologies. Technology trends that define the technological environment in which gas turbine research and development will take place are also changing - including inexpensive, large scale computational capabilities, highly autonomous systems, additive manufacturing, and cybersecurity. It is important to evaluate how these changes influence the gas turbine industry and how to manage these changes moving forward. Advanced Technologies for Gas Turbines identifies high-priority opportunities for improving and creating advanced technologies that can be introduced into the design and manufacture of gas turbines to enhance their performance. The goals of this report are to assess the 2030 gas turbine global landscape via analysis of global leadership, market trends, and technology trends that impact gas turbine applications, develop a prioritization process, define high-priority research goals, identify high-priority research areas and topics to achieve the specified goals, and direct future research. Findings and recommendations from this report are important in guiding research within the gas turbine industry and advancing electrical power generation, commercial and military aviation, and oil and gas production.

Gas Turbines

This book covers the design, analysis, and optimization of the cleanest, most efficient fossil fuel-fired electric power generation technology at present and in the foreseeable future. The book contains a wealth of first principles-based calculation methods comprising key formulae, charts, rules of thumb, and other tools developed by the author over the course of 25+ years spent in the power generation industry. It is focused exclusively on actual power plant systems and actual field and/or rating data providing a comprehensive picture of the gas turbine combined cycle technology from performance and cost perspectives. Material presented in this book is applicable for research and development studies in academia and government/industry laboratories, as well as practical, day-to-day problems encountered in the industry (including OEMs, consulting engineers and plant operators).

Power Generation Technologies

Desalination Update illustrates the growing research and development activities in the field of desalination of water. The chapters in this book also show the close link in the supply of water and supply of power. Power is needed to desalinate water, and water is needed to produce power via steam and cooling water. As the world is becoming increasingly in need of water and power, the education of generations of new workers in these technologies makes the publications of these books of rising importance. Students and specialists alike will find branching strands in this field of development worthy of dedication of careers. Never has shrinking essential resources and exploding needs confront mankind as much as water.

Excellent reviews in this book provide keywords, concepts, and current knowledge and status of practice useful for teaching and continued evolution.

Combined-Cycle Gas & Steam Turbine Power Plants

Gas-Turbine Power Generation is a concise, up-to-date, and readable guide providing an introduction to gas turbine power generation technology. It includes detailed descriptions of gas fired generation systems, demystifies the functions of gas fired technology, and explores the economic and environmental risk factors Engineers, managers, policymakers and those involved in planning and delivering energy resources will find this reference a valuable guide that will help them establish a reliable power supply as they also account for both social and economic objectives. Provides a concise, up-to-date, and readable guide on gas turbine power generation technology Focuses on the evolution of gas-fired power generation using gas turbines Evaluates the economic and environmental viability of the system with concise diagrams and accessible explanations

Power Generation, Operation, and Control

Everything you wanted to know about industrial gas turbines for electric power generation in one source with hard-to-find, hands-on technical information.

Modern Gas Turbines

This text outlines the practical and theoretical basis for thinking analytically about the balance of power in construction supply chains. It presents the practical findings from EPSRC sponsored research, undertaken in conjunction with the construction industry.

Coatings for High-Temperature Structural Materials

The primary human activities that release carbon dioxide (CO₂) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO₂ emissions only make up approximately 2.0 to 2.5 percent of total global annual CO₂ emissions, research to reduce CO₂ emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO₂ emissions. Commercial Aircraft Propulsion and Energy Systems

Research develops a national research agenda for reducing CO₂ emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraft—single-aisle and twin-aisle aircraft that carry 100 or more passengers—because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO₂, they make only a minor contribution to global emissions, and many technologies that reduce CO₂ emissions for large aircraft also apply to smaller aircraft. As commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO₂ emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.

Combined Power Plants

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

Progress in Gas Turbine Performance

This book is the proceedings of the International Conference on Power Engineering-2007. The fields of this book include power engineering and relevant environmental issues. The recent technological advances in power engineering and related areas are introduced. This book is valuable for researchers, engineers and students majoring in power engineering.

Gas Turbine Combined Cycle Power Plants

Combined cycle power plants are one of the most promising ways of improving fossil-fuel and biomass energy production. The combination of a gas and steam turbine working in tandem to produce power makes this type of plant highly efficient and allows for CO₂ capture and sequestration before combustion. This book provides a comprehensive review of the design, engineering and operational issues of a range of advanced combined cycle plants. After introductory chapters on basic combined cycle power plant and advanced gas turbine design, the book reviews the main types of combined cycle system. Chapters discuss the technology, efficiency and emissions performance of natural gas-fired combined cycle (NGCC) and integrated gasification combined cycle (IGCC) as well as novel humid air cycle, oxy-combustion turbine cycle systems. The book also reviews pressurised fluidized bed combustion (PFBC), externally fired combined cycle (EFCC), hybrid fuel cell turbine (FC/GT), combined cycle and integrated solar combined cycle (ISCC) systems. The final chapter reviews techno-economic analysis of combined cycle systems. With its distinguished editor and international team of contributors, Combined cycle systems for near-zero emission power generation is a standard reference for both industry practitioners and academic researchers seeking to improve the efficiency and environmental impact of power plants. Provides a comprehensive review of the design, engineering and operational issues of a range of advanced combined cycle plants Introduces basic combined cycle power plant and advanced gas turbine design and reviews the main types of combined cycle systems Discusses the technology, efficiency and emissions performance of natural gas-fired combined cycle (NGCC) systems and integrated gasification combined cycle (IGCC) systems, as well as novel humid air cycle systems and oxy-combustion turbine cycle systems

Energy Audit

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

Gas Turbines for Electric Power Generation

Gas Turbine Engineering Handbook

This book does not give a prediction of what the efficiency will be of the energy use of industrial processes in the future. However, it does give an exploration of limits to the efficiency of current processes and an indication of what might be achieved if new technologies can be developed. At the Department of Science, Technology and Society of Utrecht University research had been done to the opportunities for improvement of the energy efficiency in the short term since the 1980's. This had resulted in a comprehensive database on energy efficient measures. This database and a possible application are described in Chapter 3 of this book. The use of the database induced new research themes around efficiency improvement, e.g. concerning barriers for implementation of measures. It was around 1993 that I did a preliminary study to the potential for efficiency improvement in the long term. Historical analysis had shown us that the short term potential stayed constant over the years. It seemed to be replenished by the introduction of new technologies. This led to the question whether there are limits to the efficiency, taking into account both thermodynamic considerations and ideas on the development and dissemination of new technologies.

Process Plant Machinery

Primarily this book describes the thermodynamics of gas turbine cycles. The search for high gas turbine efficiency has produced many variations on the simple "open circuit" plant, involving the use of heat exchangers, reheating and intercooling, water and steam injection, cogeneration and combined cycle plants. These are described fully in the text. A review of recent proposals for a number of novel gas turbine cycles is also included. In the past few years work has been directed towards developing gas turbines which produce less carbon dioxide, or plants from which the CO₂ can be disposed of; the implications of a carbon tax on electricity pricing are considered. In presenting this wide survey of gas turbine cycles for power generation the author calls on both his academic experience (at Cambridge and Liverpool Universities, the Gas Turbine Laboratory at MIT and Penn State University) and his industrial work (primarily with Rolls Royce, plc.) The book will be essential reading for final year and masters students in mechanical engineering, and for practising engineers.

Modern Gas Turbine Systems

A significant addition to the literature on gas turbine technology, the second edition of Gas Turbine Performance is a lengthy text covering product advances and technological developments. Including extensive figures, charts, tables and formulae, this book will interest everyone concerned with gas turbine technology, whether they are designers, marketing staff or users.

Advances in Steam Turbines for Modern Power Plants

The availability of fossil fuels required for power plants is reducing and their costs increasing rapidly. This gives rise to increase in the cost of generation of electricity. But electricity regulators have to control the price of electricity so that consumers are not stressed with high costs. In addition, environmental considerations are forcing power plants to reduce CO₂ emissions. Under these circumstances, power plants are constantly under pressure to improve the efficiency of operating plants, and to reduce fuel consumption. In order to progress in this direction, it is important that power plants regularly audit their energy use in terms of the operating plant heat rate and auxiliary power consumption. Energy Audit of Thermal Power, Combined Cycle, and Cogeneration Plants attempts to refresh the fundamentals of the science and engineering of thermal power plants, and establishes its link with the real power plant performance data through case studies, and further developing techno-economics of the energy efficiency improvement measures. This book will rekindle interest in energy audits and analysis of the data for designing and implementation of energy conservation measures on a continuous basis.

Gas-Turbine Regenerators

This book was developed directly from a series of Solar Turbines Incorporated internal short courses that were presented to an audience with a wide range of technical backgrounds, not necessarily related to turbomachinery. Thus, functional principles and physical understanding are emphasized, rather than the derivation of complicated mathematical equations. While the focus of this book is gas turbine theory, it is not intended to provide an in-depth knowledge of gas turbine aerodynamics or thermodynamics, nor is it intended to make the reader an expert in the field of turbomachinery. Readers will benefit from the many topics and theories that pertain to the subject matter. The text emphasizes simplified explanations of complex physical theories. Hopefully, readers will utilize this book to develop an appreciation of the many engineering disciplines that are involved in the design and analysis of gas turbines. Readers are also encouraged to further investigate a wide range of topics by studying more specific, subject-matter literature.

Combined Cycle Systems for Near-Zero Emission Power Generation

This is the first book dedicated to solar gas turbines, providing fundamental knowledge and state-of-the-art developments in the field. A gas turbine is a heat engine in which a mixture of fuel and air is burned in a chamber that is an integral part of the flow circuit of the working fluid. The burnt gas mixture expands and turns the turbine, which can be connected to a generator for electricity production. Solar gas turbines offer an important alternative to conventional gas turbines driven by non-renewable, polluting fossil fuels such as diesel or natural gas. The book provides a comprehensive overview of the topic

as well as numerous illustrations.

Modern Power Systems

This comprehensive Handbook has been fully updated and expanded for the second edition. It covers all major aspects of power plant design, operation, and maintenance. The second edition includes not only an updating of the technology, which has taken great leaps forward in the last decade, but also introduces new subjects such as Carbon Sequestration Technology, Chemical Treatment of Water used in Combined Cycle Power Plants, and extended treatments on Steam Turbines and Heat Recovery Steam Generators. A new Chapter has been introduced entitled, "Case Histories of Problems Encountered in Cogeneration and Combined Cycle Power Plants." This is an extensive treatise with 145 figures and photographs illustrating the many problems associated with Combined Cycle Power Plants and some of the solutions that have enabled plants to achieved higher efficiencies and reliability. This new edition assimilates subject matter of various papers, and sometimes diverse views, into a comprehensive, unified treatment of Combined Cycle Power Plants. Illustrations, with curves and tables are extensively employed to broaden the understanding of the descriptive text. The book has many special features which include comparison of various energy systems, latest cycles and power augmentation and improved efficiency techniques. All the major plant equipment used in Combined Cycle and Cogeneration Power Plants has been addressed.

Advanced Gas Turbine Cycles

Process Plant Machinery provides the mechanical, chemical or plant engineer with the information needed to choose equipment best suited for a particular process, to determine optimum efficiency, and to conduct basic troubleshooting and maintenance procedures. Process Plant Machinery is a unique single-source reference for engineers, managers and technical personnel who need to acquire an understanding of the machinery used in modern process plants: prime movers and power transmission machines; pumping equipment; gas compression machinery; and mixing, conveying, and separation equipment. Starting with an overview of each class, the book quickly leads the reader through practical applications and size considerations into profusely illustrated component descriptions. Where necessary, standard theory is expertly explained in shortcut formulas and graphs. Maintainability and vulnerability concerns are dealt with as well. Fully updated with all new equipment available Comprehensive Coverage Multi-industry relevance

The CRC Handbook of Mechanical Engineering, Second Edition

This book makes intelligible the wide range of electricity generating technologies available today, as well as some closely

allied technologies such as energy storage. The book opens by setting the many power generation technologies in the context of global energy consumption, the development of the electricity generation industry and the economics involved in this sector. A series of chapters are each devoted to assessing the environmental and economic impact of a single technology, including conventional technologies, nuclear and renewable (such as solar, wind and hydropower). The technologies are presented in an easily digestible form. Different power generation technologies have different greenhouse gas emissions and the link between greenhouse gases and global warming is a highly topical environmental and political issue. With developed nations worldwide looking to reduce their emissions of carbon dioxide, it is becoming increasingly important to explore the effectiveness of a mix of energy generation technologies. Power Generation Technologies gives a clear, unbiased review and comparison of the different types of power generation technologies available. In the light of the Kyoto protocol and OSPAR updates, Power Generation Technologies will provide an invaluable reference text for power generation planners, facility managers, consultants, policy makers and economists, as well as students and lecturers of related Engineering courses.

- Provides a unique comparison of a wide range of power generation technologies - conventional, nuclear and renewable
- Describes the workings and environmental impact of each technology
- Evaluates the economic viability of each different power generation system

Gas Turbine Performance

Our Car as Power Plant

Regenerative gas turbines are attractive alternatives to diesel engines and spark ignition engines for automobiles and to diesel engines and combined-cycle engines for power generation. Theory indicates regenerative gas turbines should achieve higher thermal efficiencies than those of diesel engines and combined cycle engines. Further, regenerative gas turbines are potentially lower in cost, require less maintenance, require less space, and pollute less than competitive systems. Regenerators can be used for exhaust-gas heat exchange or for intercooling in gas-turbine systems. As an exhaust-gas heat exchanger, a regenerator recovers heat from the exhaust and uses it to preheat the compressed air before the compressed air enters the combustor. Preheating of the compressed air permits a small heat input to the combustor for a given power output of the engine. As an intercooler, a regenerator cools the gas between compressor stages. Less work is required to compress cool gas than is required to compress warm gas. Therefore, a regenerator intercooler can reduce the required work input to the compressor. Thus, regenerators can be used to increase the thermal efficiencies and power outputs of gas turbines. the backbones of high-performance re High-performance regenerators are generative gas turbines. In the past, lack of understanding of regenerator performance has led to sub-optimal engine designs. Now this book gives comprehensive regenerator information. With this book, the designer can design regenerators

that will yield gas turbines with maximum thermal efficiencies.

Advances in Steam Turbines for Modern Power Plants

Industrial Gas Turbines: Performance and Operability explains important aspects of gas turbine performance such as performance deterioration, service life and engine emissions. Traditionally, gas turbine performance has been taught from a design perspective with insufficient attention paid to the operational issues of a specific site. Operators are not always sufficiently familiar with engine performance issues to resolve operational problems and optimise performance. Industrial Gas Turbines: Performance and Operability discusses the key factors determining the performance of compressors, turbines, combustion and engine controls. An accompanying engine simulator CD illustrates gas turbine performance from the perspective of the operator, building on the concepts discussed in the text. The simulator is effectively a virtual engine and can be subjected to operating conditions that would be dangerous and damaging to an engine in real-life conditions. It also deals with issues of engine deterioration, emissions and turbine life. The combined use of text and simulators is designed to allow the reader to better understand and optimise gas turbine operation. Discusses the key factors in determining the performance of compressors, turbines, combustion and engine controls Explains important aspects of gas and turbine performance such as service life and engine emissions Accompanied by CD illustrating gas turbine performance, building on the concepts discussed in the text

Commercial Aircraft Propulsion and Energy Systems Research

With this third edition, international expert Rolf Kehlhofer leads a team of eminent engineers for the long-awaited update of the 'bible' for combined-cycle plants. Recognized as the foremost technical and economic reference for these complex facilities, ""Combined-Cycle for Gas & Steam Turbine Power Plants, 3rd Edition"", still offers the backbone of basics in system layout, details on controls and automation, and operating instructions. New information includes a chapter devoted to the integrated gasification combined cycle (IGCC), in-depth technical information on heat recovery steam generator, and a diverse group of real-world combined-cycle plant case studies.

Desalination Updates

Combined Power Plants

Gas-Turbine Power Generation

This book covers the design, analysis, and optimization of the cleanest, most efficient fossil fuel-fired electric power generation technology at present and in the foreseeable future. The book contains a wealth of first principles-based calculation methods comprising key formulae, charts, rules of thumb, and other tools developed by the author over the course of 25+ years spent in the power generation industry. It is focused exclusively on actual power plant systems and actual field and/or rating data providing a comprehensive picture of the gas turbine combined cycle technology from performance and cost perspectives. Material presented in this book is applicable for research and development studies in academia and government/industry laboratories, as well as practical, day-to-day problems encountered in the industry (including OEMs, consulting engineers and plant operators).

Challenges of Power Engineering and Environment

Fuel cell cars can provide more efficient and cleaner transportation. However, we use our cars for transportation only 5% of the time. When parked, the fuel cell in the car can produce electricity from hydrogen, which is cleaner and more efficient than the current electricity system, generating useful 'waste' products in the form of heat and fresh water. The produced electricity, heat and fresh water can be fed into the respective grids or be used directly in our house, office or the school of our kids. The required hydrogen can be produced from gas (natural gas, biogas) or electricity (hydro, wind, solar, etc.). In the end, these fuel cell cars can replace all power plants worldwide. As a result, the 'car as power plant' can create an integrated, efficient, reliable, flexible, clean, smart and personalized transport, energy and water system: a real paradigm shift. The 'Car as Power Plant' is developed at Delft Technical University, in The Green Village: a sustainable, lively and entrepreneurial environment where we discover, learn and show how to solve society's urgent challenges. The Green Village unifies clever, imaginative strengths of scientists and entrepreneurs and turns ideas and visions into experiences and commercially viable products and services. Innovative power that sets horizons for a new, sustainable, green and circular economy.

Potential for Industrial Energy-Efficiency Improvement in the Long Term

Integrated Gasification Combined Cycle (IGCC) Technologies discusses this innovative power generation technology that combines modern coal gasification technology with both gas turbine and steam turbine power generation, an important emerging technology which has the potential to significantly improve the efficiencies and emissions of coal power plants. The advantages of this technology over conventional pulverized coal power plants include fuel flexibility, greater efficiencies, and very low pollutant emissions. The book reviews the current status and future developments of key technologies involved in IGCC plants and how they can be integrated to maximize efficiency and reduce the cost of electricity generation in a carbon-constrained world. The first part of this book introduces the principles of IGCC systems

and the fuel types for use in IGCC systems. The second part covers syngas production within IGCC systems. The third part looks at syngas cleaning, the separation of CO₂ and hydrogen enrichment, with final sections describing the gas turbine combined cycle and presenting several case studies of existing IGCC plants. Provides an in-depth, multi-contributor overview of integrated gasification combined cycle technologies Reviews the current status and future developments of key technologies involved in IGCC plants Provides several case studies of existing IGCC plants around the world

Handbook for Cogeneration and Combined Cycle Power Plants

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

Managing in Construction Supply Chains and Markets

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

Gas Turbine Combined Cycle Power Plants

During the past 20 years, the field of mechanical engineering has undergone enormous changes. These changes have been

driven by many factors, including: the development of computer technology worldwide competition in industry improvements in the flow of information satellite communication real time monitoring increased energy efficiency robotics automatic control increased sensitivity to environmental impacts of human activities advances in design and manufacturing methods These developments have put more stress on mechanical engineering education, making it increasingly difficult to cover all the topics that a professional engineer will need in his or her career. As a result of these developments, there has been a growing need for a handbook that can serve the professional community by providing relevant background and current information in the field of mechanical engineering. The CRC Handbook of Mechanical Engineering serves the needs of the professional engineer as a resource of information into the next century.

Combined-cycle Gas & Steam Turbine Power Plants

The Gas Turbine Engineering Handbook has been the standard for engineers involved in the design, selection, and operation of gas turbines. This revision includes new case histories, the latest techniques, and new designs to comply with recently passed legislation. By keeping the book up to date with new, emerging topics, Boyce ensures that this book will remain the standard and most widely used book in this field. The new Third Edition of the Gas Turbine Engineering Handbook updates the book to cover the new generation of Advanced gas Turbines. It examines the benefit and some of the major problems that have been encountered by these new turbines. The book keeps abreast of the environmental changes and the industries answer to these new regulations. A new chapter on case histories has been added to enable the engineer in the field to keep abreast of problems that are being encountered and the solutions that have resulted in solving them. Comprehensive treatment of Gas Turbines from Design to Operation and Maintenance. In depth treatment of Compressors with emphasis on surge, rotating stall, and choke; Combustors with emphasis on Dry Low NOx Combustors; and Turbines with emphasis on Metallurgy and new cooling schemes. An excellent introductory book for the student and field engineers A special maintenance section dealing with the advanced gas turbines, and special diagnostic charts have been provided that will enable the reader to troubleshoot problems he encounters in the field The third edition consists of many Case Histories of Gas Turbine problems. This should enable the field engineer to avoid some of these same generic problems

Integrated Gasification Combined Cycle (IGCC) Technologies

This book assesses the state of the art of coatings materials and processes for gas-turbine blades and vanes, determines potential applications of coatings in high-temperature environments, identifies needs for improved coatings in terms of performance enhancements, design considerations, and fabrication processes, assesses durability of advanced coating systems in expected service environments, and discusses the required inspection, repair, and maintenance methods. The promising areas for research and development of materials and processes for improved coating systems and the

approaches to increased coating standardization are identified, with an emphasis on materials and processes with the potential for improved performance, quality, reproducibility, or manufacturing cost reduction.

Proceedings of the 1999 International Joint Power Generation Conference: Fuels and combustion technologies

This book presents current research in the area of gas turbines for different applications. It is a highly useful book providing a variety of topics ranging from basic understanding about the materials and coatings selection, designing and modeling of gas turbines to advanced technologies for their ever increasing efficiency, which is the need of the hour for modern gas turbine industries. The target audience for this book is material scientists, gas turbine engine design and maintenance engineers, manufacturers, mechanical engineers, undergraduate, post graduate students and academic researchers. The design and maintenance engineers in aerospace and gas turbine industry will benefit from the contents and discussions in this book. This book presents current research in the area of gas turbines for different applications. It is a highly useful book providing a variety of topics ranging from basic understanding about the materials and coatings selection, designing and modeling of gas turbines to advanced technologies for their ever increasing efficiency, which is the need of the hour for modern gas turbine industries. The target audience for this book is material scientists, gas turbine engine design and maintenance engineers, manufacturers, mechanical engineers, undergraduate, post graduate students and academic researchers. The design and maintenance engineers in aerospace and gas turbine industry will benefit from the contents and discussions in this book.

Fossil Energy Program Report

A thoroughly revised new edition of the definitive work on power systems best practices In this eagerly awaited new edition, Power Generation, Operation, and Control continues to provide engineers and academics with a complete picture of the techniques used in modern power system operation. Long recognized as the standard reference in the field, the book has been thoroughly updated to reflect the enormous changes that have taken place in the electric power industry since the Second Edition was published seventeen years ago. With an emphasis on both the engineering and economic aspects of energy management, the Third Edition introduces central "terminal" characteristics for thermal and hydroelectric power generation systems, along with new optimization techniques for tackling real-world operating problems. Readers will find a range of algorithms and methods for performing integrated economic, network, and generating system analysis, as well as modern methods for power system analysis, operation, and control. Special features include: State-of-the-art topics such as market simulation, multiple market analysis, contract and market bidding, and other business topics Chapters on generation with limited energy supply, power flow control, power system security, and more An introduction to regulatory

issues, renewable energy, and other evolving topics New worked examples and end-of-chapter problems A companion website with additional materials, including MATLAB programs and power system sample data sets

Principles of Solar Gas Turbines for Electricity Generation

Advanced Technologies for Gas Turbines

Introduction to Gas Turbine Theory

There has been a remarkable difference in the research and development regarding gas turbine technology for transportation and power generation. The former remains substantially florid and unaltered with respect to the past as the superiority of air-breathing engines compared to other technologies is by far immense. On the other hand, the world of gas turbines (GTs) for power generation is indeed characterized by completely different scenarios in so far as new challenges are coming up in the latest energy trends, where both a reduction in the use of carbon-based fuels and the raising up of renewables are becoming more and more important factors. While being considered a key technology for base-load operations for many years, modern stationary gas turbines are in fact facing the challenge to balance electricity from variable renewables with that from flexible conventional power plants. The book intends in fact to provide an updated picture as well as a perspective view of some of the abovementioned issues that characterize GT technology in the two different applications: aircraft propulsion and stationary power generation. Therefore, the target audience for it involves design, analyst, materials and maintenance engineers. Also manufacturers, researchers and scientists will benefit from the timely and accurate information provided in this volume. The book is organized into three main sections including 10 chapters overall: (i) Gas Turbine and Component Performance, (ii) Gas Turbine Combustion and (iii) Fault Detection in Systems and Materials.

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