Heating Cooling Of Buildings Design For Efficiency Solution

Heating and Cooling of Buildings
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Passive Low Energy Cooling of Buildings
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Heating, Cooling, Lighting
Heating and Cooling of Buildings

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Heating and Cooling of Buildings

Routledge

Natural heating and cooling of buildings helps to improve energy efficiency in the built environment. This book considers the principles of roof design and specific systems and cooling techniques. The authors explain the fundamental principles of roof cooling and describe in detail the relevant components, applications, built precedents, recent experimental work and key design considerations. Specific systems and techniques are examined, including the main advantages and disadvantages of each strategy. Environmental functions are considered in terms of protective strategies and selective strategies. Protective strategies include solar control, thermal insulation, heat storage and thermal inertia. Selective strategies include radiative, evaporative and convective cooling and planting of roofs. Traditional and current roof construction practices are described, exemplified by case studies from across Europe. Including a free CD-ROM with software that enables readers to evaluate their own designs, this book will be invaluable for architects and engineers who wish to create buildings that are more energy-efficient.

Thermal Design of Buildings Springer

The way we heat, cool and ventilate our buildings is central to many of today's concerns, including providing comfortable, healthy and productive environments, using energy and materials efficiently, and reducing greenhouse gas emissions. As we drive towards a zero-carbon society, design solutions that combine architecture, engineering and the needs of the individual are increasingly being sought. Thermal Design of Buildings aims to provide an understanding from which such solutions can be developed, placing technological developments within the context of a wider world view of the built environment and energy systems, and an historical perspective of how buildings have responded to climate and sustainable development.

Energy Efficient Buildings Butterworth-Heinemann

This book explains how energy demand and energy consumption in new buildings can be predicted and how these aspects and the resulting CO2 emissions can be reduced. It is based upon the authors' extensive research into the design and energy optimization of office buildings in Chile. The authors first introduce a calculation procedure that can be used for the optimization of energy parameters in office buildings, and to predict how a changing climate may affect energy demand. The prediction of energy demand, consumption and CO2 emissions is demonstrated by solving simple equations using the example of Chilean buildings, and the findings are subsequently applied to buildings around the globe. An optimization process based on Artificial Neural Networks is discussed in detail, which predicts heating and cooling energy demands, energy consumption and CO2 emissions. Taken together, these processes will show readers how to reduce energy demand, consumption and CO2 emissions associated with office buildings in the future. Readers will gain an advanced understanding of energy use in buildings and how it can be reduced.

Heating, Cooling, Lighting John Wiley & Sons

Heating Ventilation and Air Conditioning by J. W. Mitchell and J. E. Braun provides foundational knowledge for the behavior and analysis of HVAC systems and related devices. The emphasis of this text is on the application of engineering principles that features tight integration of physical descriptions with a software program that allows performance to be directly calculated, with results that provide insight into actual behavior. Furthermore, the text offers more examples, end-of-chapter problems, and design projects that represent situations an engineer might face in practice and are selected to illustrate the complex and integrated nature of an HVAC system or piece of equipment.

Energy Conservation in New Building Design Routledge

Presents technical information on passive energy design and application, using illustrations and text, and includes 27 design patterns for use in designing a passive energy system.

Thermal Design of Buildings Chelsea Green Publishing

Heating and Cooling of Buildings, Second Edition by Kreider and Rable covers technologies-from materials to computers-that are exerting a profound effect on the design and operation of buildings. Numerous examples are presented and solved to reinforce important concepts and software applications are integrated throughout.The contents of this edition have been expanded to include a chapter on economic analysis and optimization, new heating and cooling load procedures, more than 200 new homework problems, and new and simplified procedures for ground coupling heat transfer calculations.One of the most notable difference in the second edition of this book is that many of the appendices from the first edition of this book have been moved to the accompanying CD-ROM. The CD-ROM amounts to a searchable database of tables, charts, and information on building codes. For example, there are more than 1,000 tables in the electronic appendices that can be searched by major categories, a table list, or an index of topics. The CD also directs students to the central web site where several hundred links are maintained to hep students find manufacturer and government data, browse in newsgroups, and find any corrections and updates to t e text and date tables. Students have come to expect this kind interaction through Internet searches.

Passive Cooling of Buildings Routledge

This book describes the detailed process behind the development of a comprehensive thermo-bio-architectural framework (the ThBA). This framework systematically connects the thermal performance requirements of a building to relevant solutions found in the natural world. This is the first time that architecture has been connected to biology in this manner. The book provides an in-depth understanding of thermoregulatory strategies in animals and plants and links these to equivalent solutions in architectural design. The inclusion of this fundamental knowledge, along with the systematic process of accessing it, should open up new avenues for the generation of energy efficient and sustainable buildings.

Heating, Ventilating, and Air Conditioning Elsevier Science Limited

Overheating in buildings is commonplace. This book describes how we can keep cool without conventional air-conditioning: improving comfort and productivity while reducing energy costs and carbon emissions. It provides architects, engineers and policy makers with a 'how-to' guide to the application of natural cooling in new and existing buildings. It demonstrates, through reference to numerous examples, that natural cooling is viable in most climates around the world. This completely revised and expanded second edition includes: An overview of natural cooling past and present. Guidance on the principles and strategies that can be adopted. A review of the applicability of different strategies. Explanation of simplified tools for performance assessment. A review of components and controls. A detailed evaluation of case studies from the USA, Europe, India and China. This book is not just for the technical specialist, as it also provides a general grounding in how to avoid or minimise air-conditioning. Importantly, it demonstrates that understanding our environment, rather than fighting it, will help us to live sustainably in our rapidly warming world.

Solar Heating and Cooling of Residential Buildings Routledge

Energy Efficient Buildings A complete and authoritative discussion of the fundamentals of designing and engineering energy efficient buildings In Energy Efficient Buildings: Fundamentals of Building Science and Thermal Systems, distinguished engineer and architect Dr. John Zhai delivers a comprehensive exploration of the design and engineering fundamentals of energy efficient buildings. The book introduces the fundamental knowledge, calculations, analyses, and principles used by designers of energy efficient buildings and addresses all essential elements of the discipline. An essential guide for students studying civil, architectural, mechanical, and electrical engineering with a focus on energy, building systems, and building science, the book provides practical in-class materials, examples, and actual design practices, as well as end-of-chapter questions (with solutions) and sample group projects. Readers will find: A thorough introduction to the cross-disciplinary approach to the design of energy efficient buildings Comprehensive explorations of all critical elements of energy efficient building design, including standards and codes, psychometrics, microclimate, thermal comfort, indoor air quality, HVAC systems, and more In-depth discussions of the foundational knowledge, calculations, analysis, and principles needed to design energy efficient buildings Practical in-class examples and end-of-chapter questions with solutions for students, and design guidance and sample group projects for use in course lectures and actual design practices. Perfect for graduate and advanced undergraduate students studying building environmental systems, building systems in construction, and mechanical and electrical systems in construction, Energy Efficient Buildings: Fundamentals of Building Science and Thermal Systems will also earn a place in

the libraries of practicing civil, architectural, and mechanical engineers.
Heating and Cooling of Buildings CRC Press
Heating and Cooling of Buildings: Principles and Practice of Energy Efficient Design, Third Edition is structured to provide a rigorous and comprehensive technical foundation and coverage to all the various elements inherent in the design of energy efficient and green buildings. Along with numerous new and revised examples, design case studies, and homework problems, the third edition includes the HCB software along with its extensive website material, which contains a wealth of data to support design analysis and planning. Based around current codes and standards, the Third Edition explores the latest technologies that are central to design and operation of today's buildings. It serves as an up-to-date technical resource for future designers, practitioners, and researchers wishing to acquire a firm scientific foundation for improving the design and performance of buildings and the comfort of their occupants. For engineering and architecture students in undergraduate/graduate classes, this comprehensive textbook:
Solar Heating and Cooling CRC Press
The definitive guide to the design of environmental control systems for buildings—now updated in its 13th Edition Mechanical and Electrical Equipment for Buildings is the most widely used text on the design of environmental control systems for buildings—helping students of architecture, architectural engineering, and construction understand what they need to know about building systems and controlling a building's environment. With over 2,200 drawings and photographs, this 13th Edition covers basic theory, preliminary building design guidelines, and detailed design procedure for buildings of all sizes. It also provides information on the latest technologies, emerging design trends, and updated codes. Presented in nine parts, Mechanical and Electrical Equipment for Buildings, Thirteenth Edition offers readers comprehensive coverage of: environmental resources; air quality; thermal, visual, and acoustic comfort; passive heating and cooling; water design and supply; daylighting and electric lighting; liquid and solid waste; and building noise control. This book also presents the latest information on fire protection, electrical systems; and elevator and escalator systems. This Thirteenth Edition features: Over 2,200 illustrations, with 200 new photographs and illustrations All-new coverage of high-performance building design Thoroughly revised references to codes and standards: ASHRAE, IES, USGBC (LEED), Living Building Challenge, WELL Building Standard, and more Updated offering of best-in-class ancillary materials for students and instructors available via the book's companion website Architect Registration Examination® (ARE®) style study questions available in the instructor's manual and student guide Mechanical and Electrical Equipment for Buildings, has been the industry standard reference that comprehensively covers all aspects of building systems for over 80 years. This Thirteenth Edition has evolved to reflect the ever-growing complexities of building design, and has maintained its relevance by allowing for the conversation to include "why" as well as "how to."
Solutions Manual -- Heating and Cooling of Buildings John Wiley & Sons
The art and the science of building systems design evolve continuously as designers, practitioners, and researchers all endeavor to improve the performance of buildings and the comfort and productivity of their occupants. Retaining coverage from the original second edition while updating the information in electronic form, Heating and Cooling of Buildings: Design for Efficiency, Revised Second Edition presents the technical basis for designing the lighting and mechanical systems of buildings. Along with numerous homework problems, the revised second edition offers a full chapter on economic analysis and optimization, new heating and cooling load procedures and databases, and simplified procedures for ground coupled heat transfer calculations. The accompanying CD-ROM contains an updated version of the Heating and Cooling of Buildings (HCB) software program as well as electronic appendices that include over 1,000 tables in HTML format that can be searched by major categories, a table list, or an index of topics. Ancillary information is available on the book's website www.hcbcentral.com From materials to computers, this edition explores the latest technologies exerting a profound effect on the design and operation of buildings. Emphasizing design optimization and critical thinking, the book continues to be the ultimate resource for understanding energy use in buildings.
Modeling, Design, and Optimization of Net-Zero Energy Buildings Heating and Cooling of Buildings
Energy use in buildings in the EU represents about 40% of the total annual energy consumption. With greater awareness of the need to reduce energy consumption comes a growth of interest in passive cooling, particularly as an alternative to air-conditioning. This book describes the fundamentals of passive cooling together with the principles and formulae necessary for its successful implementation. The material is comprised largely of information and results compiled under the SAVE European Research Programme.
Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers John Wiley & Sons
Heating and Cooling of BuildingsCRC Press
Heating and Cooling of Buildings: Design for Efficiency Butterworth-Heinemann
Climate change is one of the most important environmental problems faced by Planet Earth. The majority of CO2 emissions come from burning fossil fuels for energy production and improvements in energy efficiency shows the greatest potential for any single strategy to abate global greenhouse gas (GHG) emissions from the energy sector. Energy related emissions account for almost 80% of the EU's total greenhouse gas emissions. The building sector is the largest energy user responsible for about 40% of the EU's total final energy consumption. In Europe the number of installed air conditioning systems has increased 500% over the last 20 years, but in that same period energy cooling needs have increased more than 20 times. The increase in energy cooling needs relates to the current higher living and working standards. In urban environments with low outdoor air quality (the general case) this means that in summer-time one cannot count on natural ventilation to reduce cooling needs. Do not forget the synergistic effect between heat waves and air pollution which means that outdoor air quality is worse in the summer aggravating cooling needs. Over the next few years this phenomenon will become much worse because more people will live in cities, more than 2 billion by 2050 and global warming will aggravate cooling needs. An overview of materials to lessen the impact of urban heat islands Excellent coverage of building materials to reduce air condtioning needs Innovative products discussed such as Thermo and Electrochromic materials
Exergy Analysis and Thermoeconomics of Buildings CRC Press
Using a qualitative rather than a quantitative approach, presents detailed information based on concepts, rules, guidelines, intuition, and experience for architects in the areas of heating, cooling, and lighting at the schematic design stage. The data explored supports a three-

tiered approach--load avoidance, using natural energy sources, and mechanical equipment. Among the topics covered are shading, thermal envelope, passive heating and cooling, electric lighting, and HVAC. Case studies illustrate how certain buildings use techniques at all three tiers for heating, cooling, and lighting. An appendix lists some of the more appropriate computer programs available to the architect for analysis at the schematic design stage.

Passive Solar Architecture John Wiley & Sons

The way we heat, cool and ventilate our buildings is central to many of today's concerns, including providing comfortable, healthy and productive environments, using energy and materials efficiently, and reducing greenhouse gas emissions. As we drive towards a zero-carbon society, design solutions that combine architecture, engineering and the needs of the individual are increasingly being sought. Thermal Design of Buildings aims to provide an understanding from which such solutions can be developed, placing technological developments within the context of a wider world view of the built environment and energy systems, and an historical perspective of how buildings have responded to climate and sustainable development.

Heating and Cooling Design for Buildings The Crowood Press

Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers presents current techniques and technologies for energy efficiency in buildings. Cases introduce and demonstrate applications in both the design of new buildings and retrofit of existing structures. The book begins with an introduction that includes energy consumption statistics, building energy efficiency codes, and standards and labels from around the world. It then highlights the need for integrated and comprehensive energy analysis approaches. Subsequent sections present an overview of advanced energy efficiency technologies for buildings, including dynamic insulation materials, phase change materials, LED lighting and daylight controls, Life Cycle Analysis, and more. This book provides researchers and professionals with a coherent set of tools and techniques for enhancing energy efficiency in new and existing buildings. The case studies presented help practitioners implement the techniques and technologies in their own projects. Introduces a holistic analysis approach to energy efficiency for buildings using the concept of energy productivity Provides coverage of individual buildings, communities and urban centers Includes both the design of new buildings and retrofitting of existing structures to improve energy efficiency Describes state-of-the-art energy efficiency technologies Presents several cases studies and examples that illustrate the analysis techniques and impact of energy efficiency technologies and controls

Eco-efficient Materials for Mitigating Building Cooling Needs John Wiley & Sons

Building energy design is currently going through a period of major changes. One key factor of this is the adoption of net-zero energy as a long term goal for new buildings in most developed countries. To achieve this goal a lot of research is needed to accumulate knowledge and to utilize it in practical applications. In this book, accomplished international experts present advanced modeling techniques as well as in-depth case studies in order to aid designers in optimally using simulation tools for net-zero energy building design. The strategies and technologies discussed in this book are, however, also applicable for the design of energy-plus buildings. This book was facilitated by International Energy Agency's Solar Heating and Cooling (SHC) Programs and the Energy in Buildings and Communities (EBC) Programs through the joint SHC Task 40/EBC Annex 52: Towards Net Zero Energy Solar Buildings R&D collaboration. After presenting the fundamental concepts, design strategies, and technologies required to achieve net-zero energy in buildings, the book discusses different design processes and tools to support the design of net-zero energy buildings (NZEBs). A substantial chapter reports on four diverse NZEBs that have been operating for at least two years. These case studies are extremely high quality because they all have high resolution measured data and the authors were intimately involved in all of them from conception to operating. By comparing the projections made using the respective design tools with the actual performance data, successful (and unsuccessful) design techniques and processes, design and simulation tools, and technologies are identified. Written by both academics and practitioners (building designers) and by North Americans as well as Europeans, this book provides a very broad perspective. It includes a detailed description of design processes and a list of appropriate tools for each design phase, plus methods for parametric analysis and mathematical optimization. It is a guideline for building designers that draws from both the profound theoretical background and the vast practical experience of the authors.

Solar Radiation Considerations in Building Planning and Design John Wiley & Sons

An updated paperback re-issue of the guide to energy-efficient building design based on local climate. Table of Contents--Introduction; Part I: Principles (1) Heat and People; (2) Comfort and Indoor Climate; (3) Strategies of Climate Control; (4) Promote Solar Gain; (5) Minimize Conductive Heat Flow; (6) Minimize Infiltration; (7) Minimize Solar Gain; (8) Promote Ventilation; (9) Promote Radiant Cooling; (10) Promote Evaporative Cooling - Roof Systems; (11) Promote Conductive Cooling; (12) Appendices; Part II: Practices; Part III: Climatic Data; Part IV: Bibliography. Index. 285 illustrations.

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