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Building S Heat Gains

Heat Loss-Gain Calculations Solar Heat Gain Coefficient (SHGC) : Amber Book 40 Minutes of Competence 029 Final Four of Building Systems - 40 Minutes of Competence | Amber Book Part 6 - Heat Gain Calculations in OpenBuildings Energy Simulator Heat Loss/Gain Intro Essential Building Science: Understanding Energy \u0026 Moisture in High Performance House Design Passive Solar Simplified 2; Direct gain systems Senior Design Showcase 2023: Decreasing the Solar Heat Gain on Reactor Buildings iBwave and the Evolution of Precision: The Future of In-Building Systems Building Envelope Optimisation to Minimise External Heat Gain | GA x PERAFI Series HVACR Design: Lecture from April 13, 2020 Heat Loss/Heat Gain and Ventilation / Infiltration UCL-Energy seminar: 'Heat loss or heat gain:are we inviting overheating problems in new housing?' Code Adjacencies - 40 Minutes of Competence | Amber Book Bodge Buster: Heat Pump Guide Book Building as a System- from the Heart of a Building documentary series Part 1 Completing the Heat Loss, Heat gain calculation Worksheet Passive Solar Siting for Buildings, Maximizing Solar Gain Refrigeration Systems - Cooling Load Calculation - Wall Gain Load shared Thermal Properties of Materials, Human Comforts and Heat loss \u0026 Heat gain calcualtions BAM 94: 10 Energy Efficiency Strategies for Your BAS

Heating and Cooling
Ventilation of Buildings
Climate Responsive Architecture
Energy Performance of Residential Buildings
Modelling Methods for Energy in Buildings
Design Solutions for nZEB Retrofit Buildings
Design for Efficiency, Revised Second Edition
Agricultural Engineering Volume 2: Agricultural Buildings
CIBSE Guide A.
Environmental Science in Building
Passive Solar Buildings
Building Integrated Photovoltaics

An Ecosystem Approach
The Handbook of Sustainable Refurbishment: Non-Domestic Buildings
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Efficient Buildings 2
Solving Urban Infrastructure Problems Using Smart City Technologies
Minimizing heat gain in buildings
Providing for energy efficiency in homes and small buildings
Minimizing Heat Gain in Buildings
Environmental Design
Designing Zero Carbon Buildings Using Dynamic Simulation Methods

OMB No. 1392147940028 edited by

STEVENS UNDERWOOD

Heating and Cooling Springer Science & Business Media
Winner of Choice Magazine - Outstanding Academic Titles for 2007 Buildings account for over one third of global energy use and associated greenhouse gas emissions worldwide. Reducing energy use by buildings is therefore an essential part of any strategy to reduce greenhouse gas emissions, and thereby lessen the likelihood of potentially catastrophic climate change. Bringing together a wealth of hard-to-obtain information on energy use and energy efficiency in buildings at a level which can be easily digested and applied, Danny Harvey offers a comprehensive, objective and critical sourcebook on low-energy buildings. Topics covered include: thermal envelopes, heating, cooling, heat pumps, HVAC systems, hot water, lighting, solar energy, appliances and office equipment, embodied energy, buildings as systems and community-integrated energy systems (cogeneration, district heating, and district cooling). The book includes exemplary buildings and techniques from North America, Europe and Asia, and combines a broad, holistic perspective with technical detail in an accessible and insightful manner.

Ventilation of Buildings

Crisp Pub Incorporated
A study of those services that contribute to the environment which exists in and around buildings. The main topics are heating, lighting and sound; and the supply of electricity and water to buildings. The text emphasizes an integrated approach to the study and design of environmental services.
Climate Responsive Architecture CRC Press
The refurbishment of existing buildings is a crucial yet often neglected subject within sustainable architecture; attention is usually focused on new buildings. Many old buildings waste large amounts of

energy and provide poor internal conditions for occupants through poor lighting, poor ventilation, solar penetration and glare, and poor control of heating and cooling. Demolition is an option but the refurbishment alternative is increasingly seen as more sustainable in terms of architectural value, materials use, neighbourhood disruption and waste disposal. In addition, the potential impact of low energy refurbishment is much greater than that for new build since there are many more buildings already in existence than will be built in the next 10 - 20 years, the period over which many CO2 emission targets apply. The Handbook of Sustainable Refurbishment: Non-Domestic Buildings offers architects, engineers and a wide range of building professionals practical advice, illustrated by real examples. It moves from principles of sustainable refurbishment to specific design and engineering guidance for a variety of circumstances. It emphasises the need for an integrated approach by showing how refurbishment measures interact with one another and with the occupants, and how performance is ultimately influenced by this interaction.

Macmillan International Higher Education
This set of proceedings volumes provides a broad coverage of basic and applied research projects dealing with the application of engineering principles to both food production and processing. The set consists of the following four volumes: Land and water use, Agricultural buildings, Agricultural mechanisation and Power, processing and systems. Includes about 450 papers from over 50 countries worldwide, drawn from the Eleventh International Congress on Agricultural Engineering, Dublin, 4-8 September 1989.

Energy Performance of Residential Buildings CRC Press
Buildings influence people. They account for one third of energy consumption across the globe and represent an annual capital expenditure of 7%-10% of GNP in industrialized countries. Their lifetime operation costs can exceed capital investment. Building Engineering aims to make buildings more efficient, safe and economical. One branch of this discipline, Building Physics/Science, has gained prominence, with a heightened awareness of such phenomena as sick buildings, the energy crisis and sustainability, and considering the performance of buildings in terms of climatic loads and indoor conditions. The book reflects the advanced level and high quality of research which Building Engineering, and Building Physics/Science in particular, have reached at the beginning of the twenty-first century. It will be a valuable resource to: engineers, architects, building scientists, consultants on the building envelope, researchers and graduate students.

Modelling Methods for Energy in Buildings Heating and Cooling of BuildingsPrinciples and Practice of Energy Efficient Design, Third Edition
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.

Design Solutions for nZEB Retrofit Buildings Routledge

When it comes to architecture, there has been a focus on sustainable buildings and human well-being in the built environment. Buildings should not only be environmentally friendly and sustainable, but dually focused on human health, wellness, and experience. This includes considerations into the quality of buildings, ranging from ventilation to thermal comfort, along with environment considerations such as energy usage and material selection. Specific architectural choices and design for buildings can either contribute to or negatively impact both society and the environment, leading research in the field of architecture to be focused on environmental and societal well-being in accordance with the built environment. The Research Anthology on Environmental and Societal Well-Being Considerations in Buildings and Architecture focuses on how the built environment is being constructed to purposefully enhance societal well-being while also maintaining green standards for environmental sustainability. On one side, this book focuses on the specific building choices that can be made for the purpose of human well-being and the occupants who will utilize the building. On the other side, this book also focuses on environmental sustainability from the standpoint of green buildings and environmental concerns. Together, these topics allow this book to have a holistic view of modern architectural choices and design. This book is essential for architects, IT professionals, engineers, contractors, environmentalists, interior designers, civil planners, regional government officials, construction companies, policymakers, practitioners, researchers, academicians, and students interested in architecture and how it can promote environmental and societal well-being.

Design for Efficiency, Revised Second Edition Springer Science & Business Media First Published in 2008. Routledge is an imprint of Taylor & Francis, an informa company.

Agricultural Engineering Volume 2: Agricultural Buildings

Routledge

Construction projects, once they are completed, are intended to exist in the skylines of cities and towns for decades. Sustainable technologies seek to take these existing structures and make them environmentally friendly and energy

efficient. Design Solutions for nZEB Retrofit Buildings is a critical scholarly resource that examines the importance of creating architecture that not only promotes the daily function of these buildings but is also environmentally sustainable. Featuring a broad range of topics including renewable energy sources, solar energy, and energy performance, this book is geared toward professionals, students, and researchers seeking current research on sustainable options for upgrading existing edifices to become more environmentally friendly.
CIBSE Guide A. Elsevier
A handbook on how to integrate photovoltaics into building skins.

Environmental Science in Building

John Wiley & Sons
In addition to the application of fundamental principles that lead to a structured method for zero carbon design of buildings, this considerably expanded second edition includes new advanced topics on multi-objective optimisation; reverse modelling; reduction of the simulation performance gap; predictive control; nature-inspired emergent simulation leading to sketches that become ‘alive’; and an alternative economics for achieving the sustainability paradigm. The book features student design work from a Master’s programme run by the author, and their design speculation for a human settlement on Mars. Tasks for simple simulation experiments are available for the majority of topics, providing the material for classroom exercise and giving the reader an easy introduction into the field. Extended new case studies of zero carbon buildings are featured in the book, including schemes from Japan, China, Germany, Denmark and the UK, and provide the reader with an enhanced design toolbox to stimulate their own design thinking.
Passive Solar Buildings Taylor & Francis
An ideal introduction to the principles of managing and conserving energy consumpton in buildings people use for work or leisure that will be invaluable to students and energy managers. This updated edition includes two new chapters on current regulations and the environmental impact of building services.

Building Integrated Photovoltaics
Routledge
Describes developments in passive solar technology that will save time, energy, and resources in planning for the buildings of the future.This companion to Passive Cooling and Solar Building Architecture (volumes 8 and 9) describes developments in passive solar technology that will save time, energy, and resources in planning for the buildings of the future. It is filled with tips and useful research for architects and designers and includes three substantial chapters on general modeling. Passive solar heating works. Properly designed and constructed, it is cost-effective, practical, comfortable, and aesthetic. Balcomb's introductory remarks set the tone for the rest of the contributions, which describe the considerable record of achievements in passive solar heating. Balcomb summarizes and evaluates the era between 1976 and 1983 when most of the major developments took place and highlights the design features that have contributed to effective buildings. Three chapters cover modeling passive systems (applicable to both heating and cooling),

and six chapters focus on the application of passive solar heating, with emphasis on components, analytical results for specific systems, test modules, subsystem integration into buildings, performance monitoring and results, and design tools.J. Douglas Balcomb is a Principal Engineer with the Solar Energy Research Institute.
An Ecosystem Approach Taylor & Francis
The intention of this book is to develop an understanding of the things we build, how they are created, and how they affect our lives. Photos and line drawings.

The Handbook of Sustainable Refurbishment: Non-Domestic Buildings

Springer Science & Business Media
"Environmental Science in Building covers the science, technology and services that relate to the comfort of humans and the environmental performance of buildings. The new edition of this well-established text continues with and improves the environmental narrative based on appropriate principles and technologies such as carbon, lifetime performance and ratings schemes. It also expands the building services content with new coverage of equipment options, specifications and performance implications."--Provided by publisher.
Environmental Science in Building 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:
Efficient Buildings 2 The Fairmont Press, Inc.
Climate change mitigation and sustainable practices are now at the top of political and technical agendas. Environmental system modelling provides a way of appraising options and this book will make a significant contribution to the uptake of such systems. It provides knowledge of the principles involved in modelling systems, builds confidence amongst designers and offers a broad perspective of the potential of these new technologies. The aim of the book is to provide an understanding of the concepts and principles behind predictive modelling methods; review progress in the development of the modelling software available; and explore modelling in building design through international case studies based on real design problems.

Solving Urban Infrastructure Problems Using Smart City

Technologies

Tata McGraw-Hill Education
Energy Rating is a crucial consideration in modern building design, affirmed by the new EC Directive on the energy performance of buildings. Energy represents a high percentage of the running costs of a building, and has a significant impact on the comfort of the occupants. This book represents detailed information on energy rating of residential buildings, covering: * Theoretical and experimental energy rating techniques: reviewing the state of the art and offering guidance on the in situ identification of the UA and gA values of buildings. * New experimental protocols to evaluate energy performance: detailing a flexible new approach based on actual energy consumption. Data are collected using the Billed Energy Protocol (BEP) and Monitored Energy Protocol (MEP) * Energy Normalization techniques: describing established methods plus a new Climate Severity Index, which offers significant benefits to the user. Also included in this book are audit forms and a CD-ROM for applying the new rating methodology. The software, prepared in Excel, is easy to use, can be widely applied using both deterministic and experimental methods, and can be adapted to national peculiarities and energy policy criteria. Energy Performance of Residential Buildings offers full and clear treatment of the key issues and will be an invaluable source of information for energy experts, building engineers, architects, physicists, project managers and local authorities. The book stems from the EC-funded SAVE project entitled EUROCLASS. Participating institutes included: * University of Athens, Greece * Belgium Building Research Institute, Belgium * University of Seville, Spain * Royal Institute of Technology, Sweden

Minimizing heat gain in buildings
Routledge
In the quest for improving building energy efficiency raising the level of performance of the building enclosure has become critical. As the thermal performance of the building enclosure improves so does the overall energy efficiency of the building. One key component in determining the energy performance of the building enclosure is windows. Windows have an integral role in determining the energy performance of a building by allowing light and heat from the sun to enter into a space. Energy efficient buildings take advantage of this free solar energy to help offset heating energy consumption and electric lighting loads. However, windows are traditionally the least insulating component of the modern building assembly. With excessive use, larger window areas can lead to greater occupant discomfort and energy consumption from greater night-time heat loss, higher peak and total cooling energy demand from unwanted solar gains, and discomfort glare. As a result, windows must be carefully designed to not only minimize heat loss, but also effectively control solar gains to maintain both a thermally and visually comfortable environment for the appropriate climate region and orientation. In this thesis, a complete analysis of window assemblies for commercial office buildings is presented. The analysis is divided into three sections: the Insulated Glazing Unit (IGU), the Curtain Wall Section (frames), and the overall energy performance of a typical office building. The first section

investigates the performance characteristics of typical and high performance IGUs, specifically its insulating value (Ucg), its solar heat gain properties (Solar Heat Gain Coefficient, SHGC), and its visual transmittance (VT) through one-dimensional heat transfer and solar-optical modeling. Mechanisms of heat transfer across IGUs were investigated giving insight into the parameters that had the most significant effect on improving each performance characteristic. With a through understanding of IGU performance, attainable performance limits for each of property were generated from combining of different glazing materials, fill gases, and coatings. Through the right combination of materials IGU performance can be significantly altered. The U-value performance of IGUs ranges from 2.68 W/m2K (R-2.1) for a double-glazed, clear, air filled IGU to 0.27 W/m2K (R-21) for a quint-glazed, low-E, xenon filled high performance IGU. The second part of the thesis looks at the thermal performance of curtain wall sections that hold the IGU through two-dimensional heat transfer modeling. Similar to the IGUs, heat transfer mechanisms were studied to by substituting different materials to determine which components are crucial to thermal performance. From this analysis improvements were made to typical curtain wall design that significantly reduces the overall heat transfer within the frame section, producing a high performance curtain wall section. With simple modifications, a high performance curtain wall section can reduce its U-value by as much as 81% over a typical curtain wall section, going from 13.39 W/m2K to 2.57 W/m2K. Thus significantly reducing the U-value of curtain wall systems, particularly for smaller windows. The final part of the thesis examines the impact of typical and high performance windows on the energy performance of perimeter offices of a high-rise commercial building located in Southern Ontario. An hourly simulation model was set up to evaluate both the annual and peak energy consumption of a typical perimeter office space. The office faced the four cardinal directions of north, east, south, and west to evaluate the effect of orientation. The model also included continuous dimming lighting controls to make use of the available daylight. The effect of exterior shading on perimeter space energy performance was also investigated with both dynamic and static exterior shading devices. The results of the simulations revealed that window properties have very little influence on the energy performance of a high internal heat gain office, that is typical of older offices with less energy efficient office equipment and lighting and a higher occupant density. Conversely, window properties, particularly the insulating value of the window, has a greater effect on the energy performance of a mid to low internal heat gain office that is typical of most modern day commercial buildings. The results show windows with lower U-values yet higher SHGC are preferred over windows of similar U-values but with lower SHGC. The results also indicate that both static and dynamic shading have very little effect on energy performance of mid to low internal heat gain offices. From this analysis optimal window areas in the form of window-to-wall ratios (WWR) are presented for each orientation for mid to low internal heat gain offices. The optimal WWR for south-facing facades are

between 0.50 to 0.66, and 0.30 to 0.50 for east-, west-, and north-facing facades, while for high internal heat gain perimeter spaces window areas should be kept to a minimum.

Providing for energy efficiency in homes and small buildings IGI Global

Updated to include recent advances, this third edition presents strategies and analysis methods for conserving energy and reducing operating costs in residential and commercial buildings. The book explores the latest approaches to measuring and improving energy consumption levels, with calculation examples and Case Studies. It covers field testing, energy simulation, and retrofit analysis of existing buildings. It examines subsystems—such as lighting, heating, and cooling—and techniques needed for accurately evaluating them. Auditors, managers, and students of energy systems will find this book to be an invaluable resource for their work. Explores state-of-the-art techniques and technologies for reducing energy combustion in buildings. Presents the latest energy efficiency strategies and established methods for energy estimation. Provides calculation examples that outline the application of the methods described. Examines the major building subsystems: lighting, heating, and air-conditioning. Addresses large-scale retrofit analysis approaches for existing building stocks. Introduces the concept of energy productivity to account for the multiple benefits of energy efficiency for buildings. Includes Case Studies to give readers a realistic look at energy audits. Moncef Krarti has vast experience in designing, testing, and assessing innovative energy efficiency and renewable energy technologies applied to buildings. He graduated from the University of Colorado with both MS and PhD in Civil Engineering. Prof. Krarti directed several projects in designing energy-efficient buildings with integrated renewable energy systems. He has published over 3000 technical journals and handbook chapters in various fields related to energy efficiency, distribution generation, and demand-side management for the built environment. Moreover, he has published several books on building energy-efficient systems. Prof. Krarti is Fellow member to the American Society for Mechanical Engineers (ASME), the largest international professional society. He is the founding editor of the ASME Journal of Sustainable Buildings & Cities Equipment and Systems. Prof. Krarti has taught several different courses related to building energy systems for over 20 years in the United States and abroad. As a professor at the University of Colorado, Prof. Krarti has been managing the research activities of an energy management center at the school with an emphasis on testing and evaluating the performance of mechanical and electrical systems for residential and commercial buildings. He has also helped the development of similar energy efficiency centers in other countries, including Brazil, Mexico, and Tunisia. In addition, Prof. Krarti has extensive experience in promoting building energy technologies and policies overseas, including the establishment of energy research centers, the development of building energy codes, and the delivery of energy training programs in several countries.

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