

Performance Measurement Protocols for Commercial Buildings



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Performance Measurement Protocols For Commercial Buildings

Brendan G. Carr



Performance Measurement Protocols For Commercial Buildings:

Performance Measurement Protocols for Commercial Buildings, 2010 Provides three levels of standardized protocols for assessing building performance that identify what how and how often to measure in six performance categories energy water thermal comfort indoor air quality lighting and acoustics Such protocols give feedback when performance does not match design intent and lend credibility to performance claims Provided by publisher

Performance Measurement Protocols for Commercial Buildings, 2012 Performance Measurement Protocols for Commercial Buildings Best Practices Guide is the how to guide for continuously evaluating and improving the performance of commercial buildings throughout their service life It is also intended to support integrated commissioning and all activities of the building's O and M team It is the book that facility managers building operators technicians consultants commissioning authorities architects and design engineers need to ensure that their buildings are green energy efficient highly productive healthy and attractive to others This Guide gives building owners and their consultants the practical performance measurement guidance to meet market demands for keeping operating costs down without sacrificing the health comfort and productivity of their highest cost component the building's occupants This book provides specific best practices in the areas of energy use water use and four elements of indoor environmental quality IEQ thermal comfort indoor air quality IAQ lighting daylighting and acoustics Using this guidance owners can be proactive on an ongoing basis to reduce costs through measurement and verification of their buildings environments This book is a follow on publication to ASHRAE's Performance Measurement Protocols for Commercial Buildings which describes what to measure how it is to be measured and how often it is to be measured to quantitatively assess the performance of commercial buildings This Guide provides the process and tools for performance evaluation and improvement and is user friendly phased and readily applicable with step by step procedures provided at three levels of application Basic Evaluation which uses observations of building characteristics perceptions of occupants and data from utility bills to characterize performance Diagnostic Measurement which uses physical measurements to diagnose problems indicated at the Basic Evaluation Level and to identify how performance can be improved Advanced Analysis which uses the results of the first two levels plus the results of professional investigative processes to identify specific actions for performance improvement

Methodology for Rating a Building's Overall Performance Based on the

ASHRAE/CIBSE/USGBC Performance Measurement Protocols for Commercial Buildings Hyojin Kim, 2013 This study developed and applied a field test to evaluate the American Society of Heating Refrigerating and Air Conditioning Engineers ASHRAE Chartered Institute of Building Services Engineers CIBSE United States Green Building Council USGBC Performance Measurement Protocols PMP for Commercial Buildings in a case study office building in central Texas As the first integrated protocol on building performance measurement the ASHRAE PMP accomplished its goal of providing the standardized protocols for measuring and comparing the overall performance of a building including energy water thermal

comfort Indoor Air Quality IAQ lighting and acoustics However several areas for improvement were identified such as conflicting results from different procedures or benchmarks provided in the ASHRAE PMP limited guidelines for performing the measurements lack of detailed modeling techniques graphical indices and clear benchmarks and some practical issues i e high cost requirements and time intensive procedures All these observations are listed as the forty issues including thirteen for energy five for water and twenty two for Indoor Environmental Quality IEQ Recommendations were developed for each issue identified For the selected high priority issues twelve new or modified approaches were proposed and then evaluated against the existing procedures in the ASHRAE PMP Of these twelve new or modified approaches the following are the most significant developments a more accurate monthly energy use regression model including occupancy a monthly water use regression model for a weather normalized comparison of measured water performance a method how to use a vertical temperature profile to evaluate room air circulation a method how to use L_{Ceq} L_{Aeq} difference as a low cost alternative to estimate low frequency noise annoyance a statistical decomposition method of time varying distribution of indices and a real time wireless IEQ monitoring system for the continuous IEQ measurements The application of the forty recommendations and the twelve new or modified approaches developed in this study to the ASHRAE PMP is expected to improve the applicability of the ASHRAE PMP which aligns the overall purpose of this study Finally this study developed a new single figure of merit rating system based on the ASHRAE PMP procedures The developed rating system is expected to improve the usability of the protocols The electronic version of this dissertation is accessible from <http://hdl.handle.net/1969.1/148375>

Assessing the Validity, Reliability, and Practicality of ASHRAE's Performance Measurement Protocol Gabrielle McMorow, 2017 In 2010 ASHRAE published Performance Measurement Protocols for Commercial Buildings which defines a standardized method of measuring and analyzing building performance in six different categories including energy water thermal comfort indoor air quality lighting and acoustics Each category within the PMP has three levels basic intermediate and advanced and with each category depth of analysis and exploration into building performance increases Tasks prescribed by the PMP were implemented in two diverse buildings located in Laramie WY with the goal of testing and evaluating the current protocol Based on experiences performing the protocol in this wide range of buildings we assess the validity reliability and practicality of the current Performance Measurement Protocols PMP In the context of PMP analysis validity is defined as the legitimacy of metrics and benchmarking criteria recommended by the PMP reliability deals with the accuracy and repeatability of the measurement methods and practicality concerns the cost feasibility and ease of measurement of the measurements required by the PMP The study found that many tasks prescribed by the PMP are in fact valid however can be difficult to repeat within a variety of building types Additionally many intermediate and advanced level measurements experiments require costly equipment and complex procedures that may not be feasible for implementation within all facilities A summary of recommendations for inclusion in future editions of the PMP can be found in this document

Building Performance Evaluation Wolfgang F.E. Preiser, Andrea E. Hardy, Ulrich Schramm, 2017-08-30 The main aim of this book is to present an intriguing retrospective of Building Performance Evaluation BPE as it evolved from Post Occupancy Evaluation POE over the past 25 years On one hand this is done by updating original authors chapter content of Building Evaluation the first edition published in 1989 That in turn is augmented by an orientation toward current and future practice on the other including new authors who are engaged in ongoing cutting edge projects Therefore individual methodology oriented chapters covering the fundamental principles of POE and BPE go along with major thematic chapters topics of which like sustainability or integration of new technologies are addressed in a diversity of case studies from around the globe Research methodologies and framework of POEs continue to evolve POEs are one step on the larger scale of BPE in understanding how buildings function after they are occupied This resource helps architects building owners and facility managers understand the implications and reactions to the facilities that they designed built and or commissioned By considering the whole process from conception to future uses of the building there can be a more holistic approach to the planning programming design construction occupancy and future adaptability of the structure This book is dedicated to first editor Wolfgang F E Preiser who passed away during the process of editing and reviewing chapters of this volume

Data-Driven Research on Characteristics of Operating Performance of Green Office Buildings Yang Geng, 2025-09-26 This book facilitates more comprehensive understandings of operating performance of green buildings and provides technical supports for high quality developments in building industry In recent years the development of green building is facing a transformation from quantity to quality The acquisition of actual performance data including energy consumption IEQ and occupant satisfaction and its in depth quantitative research are of great significance to comprehensively improve the quality of green buildings However there was a lack of high quality long term and large scale operating performance data of green buildings which resulted in shallow and incomplete cognitions of performance characteristics and failures to guide building operation In this thesis the author carries out pioneering researches on data collection characteristics cognition performance diagnosis and optimization i An intelligent IEQ monitoring and feedback system is developed for continuous data collection with a high spatial temporal resolution Based on that 63 buildings from different climate zones in China have been measured and a database with more than 100 million records is established including energy consumption indoor air temperature relative humidity CO₂ PM_{2.5} illumination and occupant satisfaction ii Seasonal and regional distribution characteristics of IEQ in green office buildings are revealed as well as its quantitative correlation with energy consumption Both positive and negative effects of energy saving on thermal comfort are found and the negative effect is more significant in buildings with natural ventilation iii A series of data driven analysis and diagnosis models are proposed such as the IEQ diagnosis method based on multi dimensional dynamic field the regression model between energy use and outdoor weather the coupling approach of data mining models and physical functions for building

performance diagnosis and optimization Effective Daylighting with High-Performance Facades Kyle Konis, Stephen Selkowitz, 2017-05-09 The book explores advanced building facade daylighting design practices based on diverse energy and human factor performance metrics It also defines effective daylighting by rethinking the simplified approach to glazing and facade systems to incorporate the local climate and the needs of building occupants as critical drivers of building performance design solutions and technological innovation It discusses state of the art approaches in the context of simulation based design workflows innovative technologies and real project case studies all targeting low and net zero energy solutions that enhance occupant comfort Readers benefit from a comprehensive approach that improves the feedback loop between design intent and performance in use The book is intended for architects lighting designers facade engineers manufacturers and building owners operators as well as advanced students *Smart Zero-energy Buildings and Communities for Smart Grids* Nikos Kampelis, Denia Kolokotsa, 2022-03-07 Smart zero energy buildings and communities have a major role to play in the evolution of the electric grid towards alignment with carbon neutrality policies The goal to reduce greenhouse gas emissions in the built environment can be pursued through a holistic approach including the drastic reduction of buildings energy consumption The state of the art in this field relates on the one hand to design methodologies and innovative technologies which aim to minimize the energy demand at the building level On the other hand the development of information and communication technologies along with the integration of renewable energy and storage provide the basis for zero and positive energy buildings and communities that can produce store manage and exchange energy at a local level This book provides a structured and detailed insight of the state of the art in this context based on the analysis of real case studies and applications **LEED v4 BD&C EXAM GUIDE** Gang Chen, 2015-06-26 Pass the LEED AP BD they are helpful as reference manuals because of the easy to follow format Definitely a keeper in my bookshelf for future project reference Karen M Scott Great resource for studying for the LEED Exam I have taken and passed the LEED AP BD C exam and know what it takes As this author says it s not an easy exam and he is right What is critical to passing is having great teaching tools and this book is one of them He touches on every aspect of how to memorize data how questions are formed what to expect on tricky questions the content the test writers are looking for and every little detail you need to know when preparing for this exam I highly recommend this author s books if you are serious about passing any of the LEED exams hopefully on the first try S Jennifer Sakiewicz LEED BD it gave me insight and knowledge on how credits are applied Some questions in your book helped me answer ones on the test Good book I ll go through it once again when I appear for AP Haresh Vibhakar AIIA India AIA LEED Green Associate Architect A good outline The book is an excellent outline to learn the necessary items required to study for the exam It is not a comprehensive study guide in and of itself Practice exam is good indicator of test preparation Paul Levine Solid LEED Study Guide This is the kind of book I wish was available when I did my original LEED AP exam It teaches you how to study which is so important when school is a distant memory The bulk of the

book helps you review and memorize with mnemonics the concepts for each credit that you need to know for the exam The questions are good representations of questions on the exam I would recommend to anyone studying for their exam that they First read the chapters in this book on how to study Second read the actual LEED BD C guide to give you the background information on the credits and gain comprehension Underline and review as the author indicates to get the most out of your study time Finally read the rest of this exam guide to help you review and memorize for the exam missfitz missfitz Very Helpful Guide Gang Chen s LEED BD C Exam Guides very helpful in consolidating information from USGBC and GBCI sources as well as providing the information that is necessary for the exam without excess irrelevant information I highly recommend this book for preparation for the LEED BD C exams leedap Handbook of Research on Issues, Challenges, and Opportunities in Sustainable Architecture Ng, Veronica Foong Peng, Srirangam, Sucharita, Zainal Abidin, Siti Norzaini, 2022-06-24 Ensuring current and future architecture is both successfully and sustainably produced is critical for cities and communities to not only survive but thrive Additionally improving built environment practices is necessary to protect the world as well as its various populations Further study on the current challenges and future directions of sustainable architecture is required in order to create a stronger healthier society The Handbook of Research on Issues Challenges and Opportunities in Sustainable Architecture discusses the role of architecture and the built environment on communities ecology and society relevant issues related to the production of sustainable built environments and the socio cultural integration aspects of innovative architectural designs in urban settings The book also addresses heritage practices responses to climate action and technology applications Covering key topics such as energy efficiency urban green spaces and sustainable solutions this reference work is ideal for policymakers architects industry professionals researchers scholars academicians practitioners instructors and students **Guide to the LEED Green Associate V4 Exam** Michelle Cottrell, 2014-09-29 GUIDE TO THE LEED GREEN ASSOCIATE V4 EXAM PASS THE LEED GA V4 EXAM WITH THE HELP OF SOMEONE WHO S BEEN THERE The Guide to the LEED Green Associate V4 Exam is a motivating engaging guide to LEED design packed with expert advice from one who has taken and passed the exam Fully updated with the latest advances in sustainable design thought and technology this book goes beyond traditional study guides to provide full coverage of the exam topics plus expert tips on preparing and taking the exam itself The information is organized clearly with sample questions and flashcards throughout and the companion website features additional study aids including interactive flashcards and practice exams Understand the LEED credentialing process and the fundamental concepts of sustainable design Study the strategies and technologies of LEED design from site selection to atmosphere Discover how best to handle water energy and waste during the construction process Gain insight into effective exam prep methods and know what to expect on test day Test your knowledge with practice exam questions and interactive flashcards on the companion website Professionals eager to prove their skills will find the Guide to the LEED Green Associate V4 Exam to be an invaluable one

stop resource **American Clean Energy and Security Act of 2009, June 5, 2009, 111-1 House Report 111-137, Part 1** ,2009 **Blueprint for Sustainability: LEED Implementation in Commercial Projects** ,2024-09-06 Blueprint for Sustainability LEED Implementation in Commercial Projects by Ruchit Parekh is the ultimate guide for professionals seeking to implement sustainable practices in commercial construction This comprehensive manual walks you through the entire LEED certification process from understanding foundational green building concepts to achieving LEED accreditation With detailed insights into energy efficiency water conservation materials selection and indoor environmental quality this book is a must have resource for architects engineers and project managers Packed with case studies step by step instructions and practical strategies this guide will help you navigate the complexities of sustainable construction Whether you re new to LEED or aiming for advanced certification Blueprint for Sustainability offers actionable tips for incorporating green building principles into every stage of your project Key Topics Preparing for LEED certification Energy efficiency strategies Sustainable site selection and design Green materials and resource management Water efficiency in commercial projects Achieving LEED credits in real world applications Ideal for Architects engineers and construction managers Sustainability consultants Professionals aiming for LEED certification Make your next project eco friendly and cost effective with Blueprint for Sustainability Transform your commercial buildings into sustainable high performance spaces that benefit both the environment and the bottom line **Mixed Methods Research Design for the Built Environment** Julius

Akotia,Bankole Osita Awuzie,Charles Egbu,2023-12-08 The application of mixed methods research design in the built environment discipline by students and academics has continued to grow exponentially However with no dedicated mixed methods research design textbook in this domain students have struggled to conduct research projects involving a mixed methods research design Mixed Methods Research Design for the Built Environment provides a useful research methodology resource for students academics and researchers across various disciplines in the built environment such as construction management and project management property and real estate management quantity surveying and commercial management building surveying building services engineering civil and geodetic engineering and other built environment disciplines The book can also be useful for students and academics outside the built environment knowledge domain This textbook offers practical and step by step guidance on how to apply mixed methods research design including an elucidation of the various philosophical and methodological underpinnings upon which the choice of a particular variant of the mixed methods research design is predicated It provides practical case examples and guidance on the processes involved to design and undertake mixed methods research the advantages and disadvantages of using mixed methods research and how multiple sources of qualitative and quantitative data can be combined and applied to carry out research projects

Environmental ergonomics Sasi Gangiah,2023-03-01 This book focuses on the environmental ergonomics of restaurant kitchens and the challenges related hereto in a semitropical city from a chef s perspective It establishes the urgent need for

commercial kitchens to be conducive to the well being of kitchen workers as heat illness is unreported in this industry This research is relevant from an occupational health and safety point of view It evaluates the indoor environmental quality IEQ parameters such as heat ventilation and humidity noise and lighting in kitchens cognisant that with different cuisines the kitchen loads are different The goals of occupational safety are health intervention for worker comfort to enhanced work performance The book generates new knowledge regarding the factors affecting the body mass index of kitchen workers prediction of heat and humidity near cooking stoves discomfort near ovens lighting in preparation areas and factors affecting reaction to stove noise The book implements an exploratory design with multiple case studies *A Prototype Toolkit for Evaluating Indoor Environmental Quality in Commercial Buildings* Tom Webster (PE),University of California, Berkeley. Center for the Built Environment,2013 Journal of the House of Representatives of the United States United States. Congress. House,2009 Some vols include supplemental journals of such proceedings of the sessions as during the time they were depending were ordered to be kept secret and respecting which the injunction of secrecy was afterwards taken off by the order of the House *Building Health and Wellbeing* Stephen Emmitt,2023-08-18 This book focuses on the relationship between buildings and our health and wellbeing and by extension our quality of life Expanding on the 50th anniversary Special Issue of Building Research Information BRI which was dedicated to health and wellbeing articles have been extended and updated to complement contributions from new authors Building Health and Wellbeing covers design for ageing energy poverty and health productivity and thermal comfort in offices housing space and occupancy standards and much more The aim is to explore the inter relationship between people and our buildings Chapters are supported with new case studies to illustrate global approaches to a common challenge while demonstrating local strategies to suit different climates The content covers housing offices and healthcare facilities and the unique aspect of the book is the people perspective providing outlooks from different age groups and users of buildings It will act as an important reference for academics in the built environment and healthcare sectors **"Code of Massachusetts regulations, 2011"** ,2011 Archival snapshot of entire looseleaf Code of Massachusetts Regulations held by the Social Law Library of Massachusetts as of January 2020 **"Code of Massachusetts regulations, 2015"** ,2015 Archival snapshot of entire looseleaf Code of Massachusetts Regulations held by the Social Law Library of Massachusetts as of January 2020

Unveiling the Magic of Words: A Overview of "**Performance Measurement Protocols For Commercial Buildings**"

In a global defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their capability to kindle emotions, provoke contemplation, and ignite transformative change is actually awe-inspiring. Enter the realm of "**Performance Measurement Protocols For Commercial Buildings**," a mesmerizing literary masterpiece penned by a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve in to the book is central themes, examine its distinctive writing style, and assess its profound affect the souls of its readers.

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