

Human Thermal Environments The Effects Of Hot Moderate And Cold Environments On Human Health Comfort And Performance Author Ken Parsons Feb 2003

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Biometeorology for Adaptation to Climate Variability and Change - Kristie L. Ebi 2008-12-17
Biometeorology continues to grow as a discipline. It is increasingly recognised for its importance in providing science of relevance to society and well being of the environment. This book is the first in a new book series on Biometeorology. The purpose of the new series is to communicate the interdisciplinary philosophy and science of biometeorology to as wide an audience as possible, introduce scientists and policy makers to the societal relevance of and recent developments in its s- fields and demonstrate how a biometeorological approach can provide insights to the understanding and possible solution of cross-cutting environmental issues. One such cross-cutting environmental issue is climate change. While the literature on the science of climate change, climate change mitigation and the impacts of climate change is voluminous, that on adaptation to climate change is meagre in comparison. The purpose of this book is to partly redress this imbalance by providing insights from a biometeorological perspective. The book acknowledges that society has a long history of adapting to the impacts associated with climatic variability and change but makes the point that climate change poses a real threat to already strained coping systems. Therefore there is a need to realign human use systems with changing climate conditions.

Thermal Comfort in Naturally-ventilated and Air-conditioned Classrooms in the Tropics - Alison Grace Kwok 1997

Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and the 44th Annual Meeting of the Human Factors and Ergonomics Society - International Ergonomics Association. Congress 2000

The Dynamics and Mechanism of Human Thermal Adaptation in Building Environment - Maohui Luo 2019-11-06

This book focuses on human adaptive thermal comfort in the building environment and the balance between reducing building air conditioning energy and improving occupants' thermal comfort. It examines the mechanism of human thermal adaptation using a newly developed adaptive heat balance model, and presents pioneering findings based on an on online survey, real building investigation, climate chamber experiments, and theoretical models. The book investigates three critical issues related to human thermal adaptation: (i) the dynamics of human thermal adaptation in the building environment; (ii) the basic rules and effects of human physiological acclimatization and psychological adaptation; and (iii) a new, adaptive, heat balance model describing behavioral adjustment, physiological acclimatization, psychological adaptation, and physical improvement effects. Providing the basis for establishing a more reasonable adaptive thermal comfort model, the book is a valuable reference resource for anyone interested in future building thermal environment evaluation criteria.

Drawdown - Paul Hawken 2017-04-18

• New York Times bestseller • The 100 most substantive solutions to reverse global warming, based on meticulous research by leading scientists and policymakers around the world “At this point in time, the Drawdown book is exactly what is needed; a credible, conservative solution-by-solution narrative that we can do it. Reading it is an effective inoculation against the widespread perception of doom that humanity cannot and will not solve the climate crisis. Reported by-effects include increased determination and a sense of grounded hope.” —Per Espen Stoknes, Author, What We Think About When We Try Not To Think About Global Warming “There’s been no real way for ordinary people to get an understanding of what they can do and what impact it can have. There remains no single, comprehensive, reliable compendium of carbon-reduction solutions across sectors. At least until now. . . . The public is hungry for this kind of practical wisdom.” —David Roberts, Vox “This is the ideal environmental sciences textbook—only it is too interesting and inspiring to be called a textbook.” —Peter Kareiva, Director of the Institute of the Environment and Sustainability, UCLA In the face of widespread fear and apathy, an international coalition of researchers, professionals, and scientists have come together to offer a set of realistic and bold solutions to climate change. One hundred techniques and practices are described here—some are well known; some you may have never heard of. They range from clean energy to educating girls in lower-income countries to land use practices that pull carbon out of the air. The solutions exist, are economically viable, and communities throughout the world are currently enacting them with skill and determination. If deployed collectively on a global scale over the next thirty years, they represent a credible path forward, not just to slow the earth’s warming but to reach drawdown, that point in time when greenhouse gases in the atmosphere peak and begin to decline. These measures promise cascading benefits to human health, security, prosperity, and well-being—giving us every reason to see this planetary crisis as an opportunity to create a just and livable world.

Outdoor Thermal Comfort in Urban Environment - Kevin Ka-Lun Lau 2021-09-16

This book highlights the importance of outdoor thermal comfort for improving urban living quality in the context of urban planning and urban geometry design. It introduces readers to a range of assessment methods and applications of outdoor thermal comfort and addresses urban geometry and thermal environment at the neighbourhood scale using real-world examples and parametric studies. In addition, the subjective evaluations by urban dwellers and numerical modelling tools introduced in this book provide not only a comprehensive assessment of outdoor thermal comfort but also an integrated approach to using thermal comfort indicators as a standard in high-density cities. Given its scope, the book offers a valuable guide for urban climate researchers, urban planners, and designers, and policymakers pursuing more liveable urban environments.

Human Thermal Comfort - Ken Parsons 2019-11-20

Thermal comfort is a desirable state familiar to all people. Providing inspirational indoor and outdoor environments that provide thermal comfort, in the context of energy use and climate change, is a challenge

for the 21st century. This book provides an up-to-date, comprehensive coverage of thermal comfort from principles and theory to practical application. The book begins with current knowledge and understanding of thermal comfort and its application to providing thermal conditions for indoor and outdoor environments. It integrates and presents new ideas to provide a comprehensive model of thermal comfort so that we can move on from the 20th and early 21st century and provide a focus for developments for future decades. This book will be of interest to practitioners and students and anyone involved with fields such as environmental design, physiology, ergonomics, human factors, industrial hygiene, architecture, health and safety and air conditioning. • Provides current thermal comfort standards and regulations • Describes the PMV, PPD, ET* and SET thermal comfort indices • Discusses adaptive thermal comfort, adaptive opportunity and explains why we have not moved towards a more dynamic and interactive approach to providing thermal comfort • Presents a new model relating thermal discomfort to performance • Shows how to construct a computer model of thermal comfort • Offers how to conduct a thermal comfort survey Human Thermal Comfort provides new ideas for achieving thermal comfort for offices, vehicles, atriums, and plazas of the future.

Nutritional Needs in Cold and High-Altitude Environments - Institute of Medicine 1996-05-15

This book reviews the research pertaining to nutrient requirements for working in cold or in high-altitude environments and states recommendations regarding the application of this information to military operational rations. It addresses whether, aside from increased energy demands, cold or high-altitude environments elicit an increased demand or requirement for specific nutrients, and whether performance in cold or high-altitude environments can be enhanced by the provision of increased amounts of specific nutrients.

Human Heat Stress - Ken Parsons 2019-02-05

Thousands of people continue to die from heat. Heat illnesses and advice for preventing heat casualties at work, during heatwaves, sport and the effects of global warming are described. A new perspective on thermoregulation integrates physiological and psychophysical regulated variables. Heat stress indices, the WBGT and the SWreq are presented. It is time to understand and routinely use computer simulations of people in hot conditions. How to understand how a model can be constructed is also described. This book provides an accessible, concise and comprehensive coverage into how people respond to heat and how to predict and avoid heat casualties. A practical productivity model, and Burn thresholds, complete the book which begins with up to date knowledge on measurement of heat stress, heat strain, metabolic rate and the thermal properties and influences of clothing. Features Provides methods and regulations through international standards Illustrates the WBGT and analytical heat stress indices and how to construct a thermal model Discusses the role of clothing on heat stress and thermal strain Presents a new model for predicting productivity in the heat Offers a new method of human thermoregulation Considers heat illness and prevention during heatwaves and in global warming

Effects of Exposures to Extremely Hot Environments on Temperatures of the Tympanic Membrane, the Oesophagus, and the Rectum of Men - 1963

The oesophageal, tympanic, and rectal temperatures of resting nude human subjects were investigated in extremely hot thermal environments ranging from 50 to 130 C. Changes in temperatures in the oesophagus and at the tympanic membrane appeared rapidly, were linear, and were of equal magnitude. They were considered to follow closely the blood temperature in the central circulation. The simultaneous changes in the rectal temperature were slow and irregular. (Author).

Human Cold Stress - Ken Parsons 2021-07-20

This book provides an up-to-date, accessible, and comprehensive coverage of human cold stress from principles and theory to practical application. It defines cold stress and how people respond to it. It describes how to assess a cold environment to predict when discomfort, wind-chill, hypothermia, shivering, frostbite, and other consequences will occur. It also advises on what to do to prevent unacceptable outcomes, including determination and selection of clothing to preserve comfort and health. The book will be of interest to practitioners and students and anyone involved with fields such as textiles, clothing, and industrial hygiene.

Human Heat Stress - Kenneth C. Parsons 2019

Thousands of people continue to die from heat. Heat illnesses and advice for preventing heat casualties at work, during heatwaves, sport and the effects of global warming are described. A new perspective on thermoregulation integrates physiological and psychophysical regulated variables. Heat stress indices, the WBGT and the SWreq are presented. It is time to understand and routinely use computer simulations of people in hot conditions. How to understand how a model can be constructed is also described. This book provides an accessible, concise and comprehensive coverage into how people respond to heat and how to predict and avoid heat casualties. A practical productivity model, and Burn thresholds, complete the book which begins with up to date knowledge on measurement of heat stress, heat strain, metabolic rate and the thermal properties and influences of clothing. Features Provides methods and regulations through international standards Illustrates the WBGT and analytical heat stress indices and how to construct a thermal model Discusses the role of clothing on heat stress and thermal strain Presents a new model for predicting productivity in the heat Offers a new method of human thermoregulation Considers heat illness and prevention during heatwaves and in global warming

Environmental Ergonomics - The Ergonomics of Human Comfort, Health, and Performance in the Thermal Environment - Yutaka Tochihara 2005-04-02

Environmental Ergonomics addresses the problems of maintaining human comfort, activity and health in stressful environments. Its subject areas include thermal environments, illumination, noise and hypo- and hyperbaric environments. The book concentrates fundamentally on the way the thermal environment has affected human comfort, health and performance from the age of cave-dwellings to our age of skyscrapers. This book contains only papers selected from the 10th ICEE held in Japan 23-27 September 2002. The ICEE has been held biannually since 1982, and has firmly established itself as the world's most distinguished conference in its field, offering the ideal forum for research scientists, medical doctors, engineers, administrators, technicians, healthcare professionals and students to share their work and ideas. Selected papers from the 10th International Conference on Environmental Ergonomics held in Japan, 23-27 September 2002. They have been revised and peer-reviewed. Papers included in this text have been widely recognised as the catalyst for the recent advances witnessed in Environmental Ergonomics in Asia. They strike a balance between academia and industries' views on environmental ergonomics. Add this volume to your copy of the Elsevier Ergonomics Book Series.

Human Thermal Environments - Ken Parsons 1993-10-27

Environments are assessed and environmental limits defined often only in terms of air temperature, which is insufficient; in most situations the interaction of air temperature with five other factors - radiant temperature; humidity; air movement; activity-generated metabolic heat; and clothing is central to that environment's evaluation.; In this book, Ken Parsons focuses on the principles and practice of human response to thermal environments. He incorporates psychology, physiology and environmental physics with an applied ergonomic approach. The book details important new developments in determining the thermal properties of clothing, computer modelling and computer-aided environmental design, and offers practical applications and case studies.

Effects of Hot and Cold Environments on Military Performance - John L. Kobrick 1988*

Climate Change, the Indoor Environment, and Health - Institute of Medicine 2011-10-01

The indoor environment affects occupants' health and comfort. Poor environmental conditions and indoor contaminants are estimated to cost the U.S. economy tens of billions of dollars a year in exacerbation of illnesses like asthma, allergic symptoms, and subsequent lost productivity. Climate change has the potential to affect the indoor environment because conditions inside buildings are influenced by conditions outside them. Climate Change, the Indoor Environment, and Health addresses the impacts that climate change may have on the indoor environment and the resulting health effects. It finds that steps taken to mitigate climate change may cause or exacerbate harmful indoor environmental conditions. The book discusses the role the Environmental Protection Agency (EPA) should take in informing the public, health professionals, and those in the building industry about potential risks and what can be done to address them. The study also recommends that building codes account for climate change projections; that federal agencies join to develop or refine protocols and testing standards for evaluating emissions from materials, furnishings, and

appliances used in buildings; and that building weatherization efforts include consideration of health effects. Climate Change, the Indoor Environment, and Health is written primarily for the EPA and other federal agencies, organizations, and researchers with interests in public health; the environment; building design, construction, and operation; and climate issues.

Thermal and Moisture Transport in Fibrous Materials - N Pan 2006-10-30

The transfer of heat and moisture through textiles is vital to the manufacture and design of clothing, technical and protective textiles. Continued advances in textile processing technology, the growth of manufactured nonwovens and the application of nanotechnology have resulted in a wealth of research in order to characterise the behaviour of these materials. Thermal and moisture transport in fibrous materials provides a comprehensive guide of the technological developments and scientific understanding in this area. The first section summarises the structure, geometry and stereology of fibrous materials. The fundamentals of wetting and its dynamics are also discussed. Part two analyses thermal and liquid interactions in textiles and offers insights into the thermodynamic behaviour of moisture as well as heat and moisture coupling. The book concludes with chapters on the human thermoregulatory system, interfacing between fibrous materials and the human body and innovative computer modelling simulations. Thermal and moisture transport in fibrous materials is an essential reference for all those involved in the textile industry, especially those concerned with the design and manufacture of technical textiles and protective clothing. Summarises the structure, geometry and stereology of fibrous materials Discusses the fundamentals of wetting and its dynamics Analyses thermal and liquid interactions in textiles

Effect of Environment on Nutrient Requirements of Domestic Animals - National Research Council 1981-02-01

Advanced Environmental Exercise Physiology - Stephen S. Cheung 2021-03-16

Advanced Environmental Exercise Physiology, Second Edition, offers physiology students and exercise science professionals a complete look at the major topics and debates in the field of environmental physiology. In this second edition, Dr. Stephen Cheung is joined by the coauthor Dr. Phil Ainslie, who has extensive professional expertise in mountaineering and high-altitude physiology and has led numerous high-altitude research expeditions. Among the issues explored in this text are the effects of heat, hydration, and cold in the thermal environment; diving, altitude training, and other pressure effects on the human system; and the influences that pollution and air quality have on exercise. The text also explores the microgravity (space) environment and chronobiological rhythms. The second edition includes new chapters on heat adaptation and therapy, breath-hold diving, physiological adjustments to acute hypoxia, sex differences in environmental response, and cross-adaptation. Through Advanced Environmental Exercise Physiology, Second Edition, readers will learn the following: The initial physiological responses upon exposure to an environment that a person is not adapted to How the body adapts to repeated exposure to an environment How various environments affect the ability to exercise and work Individual variability in response to stressful environments Countermeasures that people can take to minimize the impact of environmental stressors Advanced Environmental Exercise Physiology, Second Edition, contains twice the number of figures and illustrations from the previous edition to offer better visualization and explanation of the content. New learning aids include chapter objectives, chapter summaries, and review questions to enhance reader comprehension. Sidebars throughout the text highlight lively areas of current research and debate to stimulate further investigation. Supported by evidence-based information and numerous references, Advanced Environmental Exercise Physiology, Second Edition, addresses the primary environmental factors affecting people when they are working, exercising, and competing in sport. By linking research with recommendations for real-world situations, this text serves as an invaluable resource for students and professionals alike.

Environmental Factors Affecting Office Worker Performance - Nigel Oseland 1999

Human Thermal Environments - Kenneth C. Parsons 2001

Human Thermal Environments - Ken Parsons 2014-04-09

In the ten years since the publication of the second edition of Human Thermal Environments: The Effects of Hot, Moderate, and Cold Environments on Human Health, Comfort, and Performance, Third Edition, the world has embraced electronic communications, making international collaboration almost instantaneous and global. However, there is still a need for a compilation of up-to-date information and best practices. Reflecting current changes in theory and applications, this third edition of a bestseller continues to be the standard text for the design of environments for humans to live and work safely, comfortably, and effectively, and for the design of materials that help people cope with their environments. See What's New in the Third Edition: All existing chapters significantly updated Five new chapters Testing and development of clothing Adaptive models Thermal comfort for special populations Thermal comfort for special environments Extreme environments Weather Outdoor environments and climate change Fun runs, cold snaps, and heat waves The book covers hot, moderate, and cold environments, and defines them in terms of six basic parameters: air temperature, radiant temperature, humidity, air velocity, clothing worn, and the person's activity. It focuses on the principles and practice of human response, which incorporates psychology, physiology, and environmental physics with applied ergonomics. The text then discusses water requirements, computer modeling, computer-aided design, and current standards. A systematic treatment of thermal environments and how they affect humans in real-world applications, the book links the health and engineering aspects of the built environment. It provides you with updated tools, techniques, and methods for the design of products and environments that achieve thermal comfort.

Indoor Thermal Comfort - Francesca Romana d'Ambrosio Alfano 2020-12-07

As the century begins, natural resources are under increasing pressure, threatening public health and development. As a result, the balance between man and nature has been disrupted, with climatic changes whose effects are starting to be irreversible. Due to the relationship between the quality of the indoor built environment and its energy demand, thermal comfort issues are still relevant in the disciplinary debate. This is also because the indoor environment has a potential impact on occupants' health and productivity, affecting their physical and psychological conditions. To achieve a sustainable compromise in terms of comfort and energy requirements, several challenging questions must be answered with regard to design, technical, engineering, psychological, and physiological issues and, finally, potential interactions with other IEQ issues that require a holistic way to conceive the building envelope design. This Special Issue collected original research and review articles on innovative designs, systems, and/or control domains that can enhance thermal comfort, work productivity, and wellbeing in a built environment, along with works considering the integration of human factors in buildings' energy performance.

Adaptation Measures for Urban Heat Islands - Hideki Takebayashi 2020-03-20

Adaptation Measures for Urban Heat Islands helps the reader understand the relative performance of these adaptation measures, methods and analysis relating to their creation and maintenance, evaluation methods, and the role of policy and governance in implementing them. A suite of case studies is included on these urban or metropolitan areas that are significantly warmer than their surrounding rural areas due to human activities. In recent years, a suite of adaptation measures have been developed to mitigate the urban heat island phenomena. Provides a range of concrete implementation methods Assesses relative performance of adaptation measures and countermeasure technologies Establishes methods for human thermal environmental interventions Reviews adaptation cities selected for excellent energy performance and thermal comfort indicators

Man and His Thermal Environment - William Bruce 1960

"This report is concerned with the physiological adjustments of man and his subjective assessment of his environment as related to the heating, ventilating and air-conditioning of buildings. Its purpose is to present a review of the literature on the subject, to interpret the data where possible in terms of Canadian conditions and requirements, and to indicate those particular aspects in which further investigation by laboratory and field studies could yield benefits to building practice in Canada, through the achievement of indoor environmental conditions which approach the optimum. The design and construction of buildings for human occupancy are affected by many physiological factors, the most important being the provision for a controlled and adequate rate of heat loss from the human body. Excessive or greatly deficient rates of heat loss can produce harmful physiological stress in the body. Even minor deviations, if they cannot be

prevented by the body vasomotor heat regulating mechanism, will cause marked sensations of discomfort. Control of the heat loss by adjustments in the physical environment is effected by regulation of air temperature, air motion, radiation exchange of the human body with the surrounding surfaces, and humidity. Such other factors as activity, type and amount of clothing, acclimatization, age, sex, and state of health of the occupants, as well as the rate of ventilation, the sterility of the air and its freedom from dust, fumes, and odors are also of considerable importance in the establishment of an environment conducive to human comfort and well-being."--Introduction.

Climate Change and Public Health - Barry Levy 2015-07-02

Climate change is causing, and will increasingly cause, a wide range of adverse health effects, including heat-related disorders, infectious diseases, respiratory and allergic disorders, malnutrition, mental health problems, and violence. The scientific bases for the associations between climate change and health problems are evolving as are the strategies for adapting to climate change and mitigating the greenhouse gases, which are its primary cause. With contributions from 78 leading experts in climate change and in public health, this book contains a concise and comprehensive book that represents a core curriculum on climate change and public health, including key strategies for adaptation and mitigation. Written primarily for students and mid-career professionals in public health and environmental sciences, the book clearly describes concepts and their application to the health impacts of climate change. Chapters are supplemented with case studies, graphs, tables and photographs. The book's organization in 15 chapters makes it an ideal textbook for graduate and undergraduate courses in public health, environmental sciences, public policy, and other fields.

Heat Stress in Sport and Exercise - Julien D. Périard 2019-03-06

The book is designed to provide a flowing description of the physiology of heat stress, the illnesses associated with heat exposure, recommendations on optimising health and performance, and an examination of Olympic sports played in potentially hot environmental conditions. In the first section the book examines how heat stress effects performance by outlining the basics of thermoregulation and how these responses impact on cardiovascular, central nervous system, and skeletal muscle function. It also outlines the pathophysiology and treatment of exertional heat illness, as well as the role of hydration status during exercise in the heat. Thereafter, countermeasures (e.g. cooling and heat acclimation) are covered and an explanation as to how they may aid in decreasing the incidence of heat illness and minimise the impairment in performance is provided. A novel and particular feature of the book is its inclusion of sport-specific chapters in which the influence of heat stress on performance and health is described, as well as strategies and policies adopted by the governing bodies in trying to offset the deleterious role of thermal strain. Given the breadth and scope of the sections, the book will be a reference guide for clinicians, practitioners, coaches, athletes, researchers, and students.

Human Responses to Outdoor Thermal Environments - Ju Youn Kwon 2009

This thesis presents a series of studies into the responses of people to outdoor thermal conditions experienced over all seasons in the United Kingdom. The aim was to investigate practical methods for predicting human responses to outside weather conditions, which would be useful in predicting effects on human comfort and health. The studies involved both laboratory experiments and field trials. One particular aspect of outside conditions, not usually investigated in laboratory studies, is the contribution of solar radiation. Single subject and thermal manikin studies were used to determine the contribution of solar radiation to human response. In addition to this, a total of 168 subjects responses were recorded during trials at the Loughborough University weather station compound. (latitude 52.47N and longitude 01.11W). The trials were distributed between July 2007 and October 2008. This provided a comprehensive data-base for the evaluation of thermal indices. The thesis is divided into four parts. Part one provides an introduction to the subject and a comprehensive literature review. It also describes equipment, calibration procedures and methods used. Part two quantified the contribution of solar radiation to the heat load on a person. A human subject and a heated thermal manikin were exposed to outdoor thermal conditions, while in light clothing and (for the person) conducting a step test. They were then exposed to identical conditions in a thermal chamber, but without the contribution of the sun. The conditions outside were 23°C air temperature, 42°C mean radiant temperature and 54% relative humidity with an average air velocity of

0.75 ms⁻¹. The difference in sweat rate (person) and heat required (manikin) between outdoor and indoor conditions were used to estimate the contribution of the sun. Using three different analyses estimates were 14 Wm⁻², 35 Wm⁻² and 50 Wm⁻² depending upon the assumptions made. Part three describes current thermal indices that can be used to assess the effects of weather conditions on people. It also presents the results of weather station measurements over the time period considered. In chapters 8 and 9 field trials are described which capture both the thermal conditions and human physiological and subjective responses to those conditions. Chapter 10 uses the data collected to provide an evaluation of current thermal indices for predicting human responses. The range of air temperature and relative humidity (at 2 pm) over a year was -2°C to 29°C and 34% to 95% respectively. Wind speed varied and was greater in winter and spring than in summer and autumn. Solar radiation was influenced by the altitude of the sun which depended upon season. Mean solar radiation increased from December to June and decreased from June to December. The subjective and physiological responses for 130 people (65 males and 65 females) over a range of outdoor weather conditions are presented. Physiological responses for females generally showed a stronger relationship with environmental variables and subjective responses than those for males. The subjective and physiological responses of four groups (one in each season of the year - involving a total of 38 people), are presented. It was found that there were significant individual differences in response. Part four provides a suggestion for an improved thermal index. The PMV (Predicted Mean Vote) out of four thermal indices (WBGT, PMV, WCI/tch and Twc) had the strongest relationship with environmental variables and physiological responses but had a weak relationship with subjective responses. A PMVoutdoors index was developed to improve the prediction of subjective responses for the outdoor conditions investigated. Conclusions and recommendations for future research are provided.

Space Travel and Human Thermal Limits - Robert C. Gex 1962

Evaluation of Cool Pavement Strategies for Heat Island Mitigation - Hui Li 2012

This dissertation research examines the effects of different cool pavement design and management strategies on improving the thermal environment and mitigating near-surface heat island effects through field measurements, modeling and simulation. In this research, nine experimental test sections were designed, constructed and instrumented and the thermal performance of different types of pavements and management strategies (including high reflectance, high thermal resistance pavement, and permeable pavement with evaporative cooling) were empirically investigated. Different cooling effects were identified for each strategy along with their advantages and associated disadvantages. Relevant properties of pavement materials (e.g. albedo, permeability, thermal conductivity, heat capacity and evaporation rate) were measured in many cases using newly developed methods. With these fundamental materials properties, a local microclimate model was developed, validated and applied to conduct sensitivity analysis on some key parameters to evaluate the thermal impacts of different cool pavement strategies in different climate regions. In addition, the impacts of different strategies on outdoor human thermal comfort were evaluated for different climate regions (Sacramento and Los Angeles in California and Phoenix in Arizona). One type of thermal load associated with building energy use was evaluated for Davis, California. Findings indicate that using high reflectance pavement will reduce pavement surface temperature and consequently might help improve the air quality through reduction of the formation of ground-level ozone. However, increasing the pavement reflectance would affect human thermal comfort during hot periods due to an increase in the Mean Radiant Temperature contributed by the increased reflected radiation striking human bodies. Enhancing the evaporation from the pavement through use of permeable pavement and creating shading on pavement with trees or other devices (e.g. solar panels) are likely to be effective strategies to reduce pavement surface temperature and improve human thermal comfort in hot periods. However, to be effective in arid and semiarid climates such as California, the water level must be kept near the surface of the permeable pavement through infusions of waste water such as waste landscape irrigation. Some cool pavement strategies used to improve the summer thermal environments might make the cold winter slightly colder. Therefore strategies such as evaporation and shading only in summer that can help reduce the summer hot temperatures but will not heavily reduce the winter cold temperature is desirable for some regions. Based on the findings from this study, some preliminary recommendations on the application of

cool pavement strategies for mitigating near-surface heat island are: (1) Pave less and plant more. For some areas such as parking lots and alleys, the sites could be partly paved, and more grass and/or trees could be planted on the sites to reduce negative impacts of pavement. (2) Pave smart if it has to be paved. Permeable pavements (integrated with irrigation systems during hot dry seasons), including pervious concrete pavement, porous asphalt pavement, and permeable interlocking concrete pavers and reinforced grass pavers, could be good alternatives for paving if applicable, to both manage the stormwater runoff and potentially help mitigate near-surface heat island effect and improve thermal environments. (3) Care should be taken with the application of high-reflectance pavements. High-reflectance pavements can be used in open areas to help mitigate the heat island effects. However, special attention should be given when applied in high-density areas or areas with frequent walking or cycling human occupancy. (4) Consider evaporation and shading. Evaporation and shading could be very effective strategies to help improve the thermal environments in hot climates. (5) The models developed in this study for local microclimate, thermal comfort and building energy use can be used, if needed, and improved for evaluating seasonal impacts of different pavement strategies in different contexts. (6) Life cycle cost analysis (LCCA) and/or benefit-cost analysis (BCA), as well environmental life cycle assessment (LCA) should be performed to quantitatively evaluate the life cycle economic and environmental impacts for different cool pavement strategies in different climates.

Seasonal Forecasts, Climatic Change and Human Health - Madeleine C. Thomson 2008-04-30

Awareness that many aspects of public health are influenced by climate is growing dramatically. Results presented at the Wengen conference make clear that the science and art of integrating climate knowledge into the control of climate sensitive diseases on a year to year time frame, as well as careful assessments of the potential impacts of climate change on health outcomes over longer time frames, is advancing rapidly. This book provides a snapshot of these emerging themes.

Thermal Analysis--human Comfort--indoor Environments - B. W. Mangum 1977

Lecture Notes On Engineering Human Thermal Comfort - Ting David S-k 2020-03-13

Human thermal comfort, namely in the areas of heating, ventilation and air conditioning (collectively known as 'HVAC'), is ubiquitous wherever human habitation may be found. Today, a large portion of the developed world's current energy demands are used to artificially keep the temperatures of our environments comfortable. It is therefore imperative for everyone, decision-makers and engineers alike, involved with the future of energy to be appropriately acquainted with HVAC. Lecture Notes on Engineering Human Thermal Comfort explains the quintessence of engineering human thermal comfort through straight-forward writing designed to help students better comprehend the materials presented. Illustrative figures, anecdotal banter, and ironical analogies interject the necessary technical humdrum to provide timeous stimuli in the midst of arduous technical details. This book is primarily for senior undergraduate engineering students interested in engineering human thermal comfort. It invokes some undergraduate knowledge of thermodynamics, heat transfer, and fluid mechanics as needed, to enable students to appreciate thermal comfort engineering without the need to seek out other textbooks.

Protective Clothing - F. Wang 2014-08-04

Protective clothing protects wearers from hostile environments, including extremes of heat and cold. Whilst some types of protective clothing may be designed primarily for non-thermal hazards (e.g. biological hazards), a key challenge in all protective clothing remains wearer comfort and the management of thermal stress (i.e. excessive heat or cold). This book reviews key types of protective clothing, technologies for heating and cooling and, finally, modeling aspects of thermal stress and strain. Explores different types of protective clothing, their uses and their requirements, with an emphasis on full-scale or prototype clothing, including immersion suits, body armour and space suits Considers novel and commercial technologies for regulating temperature in protective clothing, including phase change materials, shape memory alloys, electrically heated clothing and air and water perfusion-based cooling systems Reviews the human thermoregulatory system and the methods of modelling of thermal stress in protective clothing through various conditions, including cold water survival and firefighting

Proceedings of the 11th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC

2019) - Zhaojun Wang 2020-03-19

This book presents selected papers from the 11th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC 2019), with a focus on HVAC techniques for improving indoor environment quality and the energy efficiency of heating and cooling systems. Presenting inspiration for implementing more efficient and safer HVAC systems, the book is a valuable resource for academic researchers, engineers in industry, and government regulators.

Safety and Health at Work - 1996

Niosh Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments - National Institute for Occupational Safety and Health (U.S.) 2018-08-03

Occupational exposure to heat can result in injuries, disease, reduced productivity, and death. To address this hazard, the National Institute for Occupational Safety and Health (NIOSH) has evaluated the scientific data on heat stress and hot environments and has updated the Criteria for a Recommended Standard: Occupational Exposure to Hot Environments [NIOSH 1986a]. This updated guidance includes information about physiological changes that result from heat stress, and relevant studies such as those on caffeine use, evidence to redefine heat stroke, and more. Related products: Weather & Climate collection is available here: <https://bookstore.gpo.gov/catalog/weather-climate> Emergency Management & First Responders can be found here: <https://bookstore.gpo.gov/catalog/emergency-management-first-responders> Fire Management collection is available here: <https://bookstore.gpo.gov/catalog/fire-management>

Human Thermal Environments - Ken Parsons 2007-03-22

Our responses to our thermal environment have a considerable effect on our performance and behavior, not least in the realm of work. There has been considerable scientific investigation of these responses and formal methods have been developed for environmental evaluation and design. In recent years these have been developed to the extent that detailed national and international standards of practice have now become feasible. This new edition of Ken Parson's definitive text brings us back up to date. He covers hot, moderate and cold environments, and defines these in terms of six basic parameters: air temperature, radiate temperature, humidity, air velocity, clothing worn, and the person's activity. There is a focus on the principles and practice of human response, which incorporates psychology, physiology and environmental physics with applied ergonomics. Water requirements, computer modeling and computer-aided design are brought in, as are current standards. Special populations, such as the aged or disabled and specialist environments such as those found in vehicles are also considered. This book continues to be the standard text for the design of environments for humans to live and work safely, comfortably and effectively, and for the design of materials which help the same people cope with their environments.

Ergonomics of the Thermal Environment. Methods for the Assessment of Human Responses to Contact with Surfaces. Hot Surfaces - British Standards Institute Staff 2006-10

Ergonomics, Surfaces, Temperature, Skin (body), Human body, Hazards, Equipment safety, Occupational safety, Domestic safety, Risk assessment, Physiological effects (human body), Heat, Combustion, Thermal properties of materials, Safety measures, Tolerances (human body)

Applications of the Universal Thermal Climate Index UTCI in Biometeorology - Eduardo L. Krüger 2021-07-22

This book introduces the UTCI (Universal Thermal Climate Index) and summarizes progress in this area. The UTCI was developed as part of the European COST Action Program and first announced to the scientific community in 2009. Since then, a decade has followed of applicability tests and research results, as well as knowledge gained from applying the UTCI in human adaptation and thermal perception. These findings are of interest to researchers in the interdisciplinary areas of biometeorology, climatology and urban planning. The book summarizes this progress, discussing the limitations found and provides pointers to future developments. It also discusses UTCI applications in the areas of human biometeorology and urban planning including possibilities of using UTCI and similar indices in climate-responsive urban planning. The book's message is illustrated with many case studies from the real world. Chapter 10 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

