Proceedings of the International Workshop on Sustainable Development and Concrete Technology, Beijing, China, May 20-21, 2004

Concrete Technology for a Sustainable Development in the 21st Century

This book, as part of a series of five, aims to promote the use of sustainable construction materials. It is different to the norm and its uniqueness lies in developing a data matrix sourced from 525 publications, contributed by 1187 authors from 442 institutions in 48 countries from 1970 to 2016, on the subject of sewage sludge ash as a construction material, and systematically analysing, evaluating and modelling this information in ceramic, geotechnics and road pavement applications. Related environmental issues, case studies and standards are also discussed. The work establishes what is already known and can be used. It would also help to avoid repetitive research and save valuable resources, which can instead be directed towards new research to progress the use of sustainable construction materials. The book is structured in an incisive and easy to digest manner. As an excellent reference source, the book is particularly suited for researchers, academics, design engineers, specifiers, contractors, developers, and certifying and regulatory authorities, seeking to promote sustainability within the construction sector.

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Concrete Technology for a Sustainable Development in the 21st Century

This volume presents a wide-ranging review of the latest developments in concrete technology that have been largely missing from the global conference circuit. It is the first major international event under the auspices of the Institute of Concrete Technology (ICT) and is appropriately located in the Middle East at the heart of a construction boom. Themes covered include admixture technology, durability, mix design, special cements and supplementary materials, reinforced concrete and construction material binders for infrastructure. The book is structured in an incisive and easy to digest manner. As an excellent reference source, the book is particularly suited for researchers, academics, design engineers, specifiers, contractors, developers, and certifying and regulatory authorities, seeking to promote sustainability within the construction sector.

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Sustainable Development In The 21st Century

Science and Technology of Concrete Admixtures presents admixtures from both a theoretical and practical point-of-view. The authors emphasize key concepts that can be used to better understand the working mechanisms of these products by presenting a concise overview on the fundamental behavior of Portland cement and hydraulic binders as well as their chemical admixtures, also discussing recent effects in concrete in terms of rheology, mechanics, durability, and sustainability, but never forgetting the fundamental role played by the water/binder ratio and proper curing in concrete technology. Part One presents basic knowledge on Portland cement and concrete, while Part Two deals with the chemical and physical background needed to better understand what admixtures are chemically, and through which mechanism they modify the properties of the fresh and hardened concrete. Subsequent sections present discussions on admixtures technology and two particular types of concrete: self-consolidating and ultra-high strength concretes. The authors categorize the applications of microwave heating in concrete technology into three areas: microwave-assisted accelerated curing of concrete, microwave-assisted selective demolition and drilling of concrete, and the environmental issues involved in replacing conventional approaches with microwave heating. The authors of modern practitioners in the construction industry, and addresses the technological, scientific, and economic impact of dust from construction and demolition wastes. In addition to above this book also presents some environmentally-friendly and sustainable concrete technology including the use of supplementary cementing materials (SCM), recycling concrete and other materials, enhancement of service life of concrete structures. Emerging technologies that have the potential to significantly contribute to sustainable concrete industry and barriers against reuse are presented at the end of book.

**Science and Technology of Concrete Admixtures**

Document from the year 2015 in the subject Environmental Sciences, grade: 8.44, course: M.Tech., language: English, abstract: Concrete is the most widely used construction material for infrastructure needs in the Asian region and in the world. Unfortunately, the concrete industry is one of the largest consumers of natural resources and energy, and is responsible for large emissions of carbon dioxide that is one of the greenhouse gases responsible for global warming. It is imperative that the concrete industry must be in an active role of balancing the infrastructure needs and the protection of environment. This work presents a summary of some recent research closely associated with the sustainable development of concrete technology. The research projects include study and analysis of: - Causes of deterioration of concrete structures, problems at construction sites that causes early deterioration of concrete structures. In addition to above this book also presents some environmentally-friendly and sustainable concrete technology including the use of supplementary cementing materials (SCM), recycling concrete and other materials, enhancement of service life of concrete structures. Emerging technologies that have the potential to significantly contribute to sustainable concrete industry and barriers against reuse are presented at the end of book.

**Sustainable Construction Materials**

**Advanced Materials and Sustainability in Civil Engineering**

**Sustainable Construction**

**Green Building with Concrete**

Microwave Technology: A Powerful Technique The first book to combine microwave-assisted heating technology and concrete technology (covering production, demolition, and recycling), Microwave-Assisted Concrete Technology: Production, Demolition and Recycling explains the underlying concepts and fundamentals involved in the microwave-assisted heating of concrete. While most books on microwave heating focus on the behavior of microwaves, this text centers on the response of materials subjected to microwaves, and specifically concentrates on materials used in the concrete industry. A ready reference for the design of microwave-based equipment, the book describes how microwave-assisted heating technology may be harnessed in the production, demolition, and recycling of concrete. It covers microwave-assisted applications, the design concepts of microwave heating systems (generators and applicators) used in microwave-assisted concrete-processing methods, and process control techniques used to monitor the condition of concrete during the heating process. Learn How to use the Microwave-Assisted Heating Process for Industry The book is written from the perspective of modern practitioners in the construction industry, and addresses the technological, scientific, and environmental issues involved in replacing conventional approaches with microwave heating. The authors categorize the application of microwave heating in concrete technology into three areas: microwave-assisted accelerated curing of concrete, microwave-assisted selective demolition and drilling, with final remarks on the microwave-assisted recycling of concrete. They discuss sustainability and the environmental impact of incorporating sustainable concrete production, demolition, and recycling using microwave-assisted heating.
Sustainable Development In The 21st Century

Read Book Concrete Technology For A Sustainable Development In The 21st Century

technologies, and environmentally friendly microwave heating applications. This text covers: The basics of concrete-microwave field interactions Microwave-assisted concrete technologies for use in the production, demolition, and recycling of concrete as well as the control mechanisms required to ensure the efficiency of these methods. Microwave heating applicators Microwave-Assisted Concrete Technology: Production, Demolition and Recycling does not require a familiarity with electromagnetism science and can be easily understood by civil engineers as well as by readers with little or no engineering background.

Emerging Technologies for Sustainability

Sustainable Construction Materials: Recycled Aggregate focuses on the massive systematic need that is necessary to encourage the uptake of recycled and secondary materials (RSM) in the construction industry. This book is the fifth and the last of the series on sustainable construction materials and like the previous four, it is also different to the norm. Its uniqueness lies in using the newly developed, Analytical Systematisation Method, in building the data-matrix sourced from 1413 publications, contributed by 2213 authors from 965 institutions in 67 countries, from 1977 to 2018, on the subject of recycled aggregate as a construction material, and systematically analysing, evaluating and modelling this information for use of the material as an aggregate concrete and mortar, geotechnics and road pavement applications. Environmental issues, case studies and standards are also discussed. The work establishes what is already known and can be used to further progress the use of sustainable construction materials. It can also help to avoid repetitive research and save valuable resources. The book is structured in an incisive and easy to digest manner and is particularly suited for researchers, academics, design engineers, specifiers, contractors, and government bodies dealing with construction works. Provides an exhaustive and comprehensively organized list of globally-based published literature spanning 5000 references Offers an analysis, evaluation, repackaging and modeling of existing knowledge that encourages more responsible use of waste materials Provides a wealth of knowledge for use in many sectors relating to the construction profession, including academia, research, practice and adoption of RSM

Microwave-Assisted Concrete Technology


Sustainable Concrete Made with Ashes and Dust from Different Sources

Production of Portland cement is responsible for about seven percent of the world’s greenhouse gas emissions. The pressure to make the production of concrete more sustainable, or “greener”, is considerable and increasing. This requires a wholesale shift in processes, materials and methods in the concrete industry. Pure Portland cement will need to be replaced by more complex binary, tertiary or even quaternary binders, including other types of cementitious materials. We can expect an increasing use of high performance concrete, primarily because of its high sustainability and durability. Much more attention will have to be paid to the proper curing of the concrete if we want to improve its life expectancy. Presenting the latest advances in the science of concrete this book focuses particularly on sustainability, durability, and economy. It explores the potential for increased sustainability in concrete from the initial mixing right through to its behaviour in complex structures exposed to different types of loads and aggressive environments.

Sustainability of Construction Materials

Advanced Materials and Sustainability in Civil Engineering

Concrete Technology 4E

Sustainable Construction Materials: Municipal Incinerated Bottom Ash discusses the global use of virgin aggregates and CO2 polluter Portland cement. Given the global sustainability agenda, much of the demand for these two sets of materials can be substantially reduced through the appropriate use of waste materials, thereby conserving natural resources, energy and CO2 emissions. Realistically, this change can only be realized and sustained through engineering ingenuity and new concepts in design. Although a great deal of research has been published over the last 50 years, it remains fragmented and ineffective. This book develops a single global knowledge-base, encouraging greater use of selected waste streams. The focus of massive systematic reviews is to encourage the uptake of recycled secondary materials (RSM) by the construction industry and guide researchers to recognize what is already known regarding waste. Provides an extensive source of valuable database information, supported by an exhaustive list of globally-based published literature over the last 40-50 years Offer an analysis, evaluation, repackaging and modeling of existing knowledge on sustainable construction practices Provides a wealth of knowledge for use in many sectors relating to the construction profession

Sustainable Construction Materials

This book sheds light on recent advances in sustainable construction and building materials with special emphasis on the characterization of natural and composite hydraulic mortars, advanced concrete technology,
green building materials, and application of nanotechnology to the improvement of the design of building materials. The book covers in detail the characterization of natural hydraulic lime mortars, a decade of research on self-healing concrete, biocomposite cement binding process and performance, development of sustainable building materials from agro-industrial wastes, applications of sugarcane biomass ash for developing sustainable construction materials, oil-contaminated sand: sources, properties, remediation, and engineering applications, oil shale ash addition effect in concrete to freezing/thawing, connection node design and performance optimization of girders, functionally graded concrete structures, cumulative tensile damage and consolidation effects on fracture properties of sandstone. Key factors influencing the selection of construction methods used for the fabrication of building components in the Middle East, fly ash as a resource material for the construction industry, degradation monitoring systems for a building information modeling maintenance approach, durability of composite-modified asphalt mixtures based on inherent and improved performance, and bitumen and its modifiers.

**Binders for Durable and Sustainable Concrete**

**Advances in Sustainable Construction Materials**

**Developments in the Formulation and Reinforcement of Concrete**

With superior fire resistance, strength, and a long service life, concrete is the most widely used construction material in the world. A sustainable material, concrete is also easily and affordably reused and rehabilitated. The first book to provide an overview of sustainability and concrete, Green Building with Concrete: Sustainable Design and Construction surveys the material’s history in the green building movement and presents state-of-the-art methodologies and best practices. From the manufacturing of cement to the rehabilitation of concrete, this comprehensive book explains how concrete can be used for sustainable design and construction. It offers insight into new technological and social developments guiding the introduction of green buildings and examines the attributes that concrete has to offer the green building movement. The text also highlights research on economic analysis—particularly life cycle costing—to provide a full picture of the economic benefits of concrete. Expert contributors from around the world offer diverse viewpoints on global sustainability. Topics covered include: Principles of sustainable design Benefits of concrete’s thermal mass Mitigation of urban heat island effects Surface runoff and the application of pervious concrete for sidewalks and parking areas Reduction of construction waste Leadership in energy and environmental design (LEED) standards Emphasizing environmental impact and occupational and consumer health and safety, this book explains how to make the most of concrete in sustainable design. Written for university and concrete industry continuing education courses, it also serves as a reference for building owners and industry professionals who recognize the value of green building.

**Sustainable Concrete Construction**

**Sustainable Construction Materials**

This book is the fourth, in the series of five, on sustainable construction materials and like the previous three, it is also different to the norm. Its uniqueness lies in using the newly developed, Analytical Systemisation Method, in building the data-matrix sourced from 751 publications, contributed by 1402 authors from 513 institutions in 51 countries, from 1970 to 2017, on the subject of processed waste glass (glass cullet) as a construction material, and systematically analysing, evaluating and modelling this information for use of glass cullet as cement, aggregate or filler in concrete, ceramics, geotechnics and road pavement applications. Environmental issues and standards are also discussed. The work establishes what is already known and can be used to further progress the use of sustainable construction materials. It can also help to avoid repetitive research and save valuable resources. The book is structured in an incisive and easy to digest manner and is particularly suited for researchers, academics, design engineers, specifiers, contractors, and government bodies dealing with construction works. Provides an extensive source of valuable database information, supported by an exhaustive list of globally-based published literature over the last 40-50 years. Offer an analysis, evaluation, repackaging and modeling of existing knowledge on sustainable construction practices Provides a wealth of knowledge for use in many sectors relating to the construction profession.

**Towards a Sustainable Concrete Technology with the Use of Fly Ash**

Linking theory to practice, this book provides a better fundamental understanding of Portland cement and hydraulic binders which is necessary to make better concrete. It has been clearly demonstrated that concrete durability is closely linked to its water/binder ratio and proper curing during the first week after casting. In this rigorously presented work, Pierre-Claude Aïtcin explains the concept of the hydration reaction and how to make, use and cure durable and sustainable concrete. This book also details the problems with Portland cement composition at present and outlines the concept of an ideal hydraulic binder which is technically and ecologically efficient, as well as being long-lasting and robust. Binders for Durable and Sustainable Construction practical and innovative references which will be part of the technology portfolio of engineers and chemists working in the Portland cement, concrete and admixture industries. This book will also be of interest to academics and graduate-level students in Civil Engineering departments who specialize in Portland cement and concrete technology.

**Reuse of Concrete for Sustainable Development**

Sustainable Construction Materials: Sewage Sludge Ash, part of a series of five, aims to promote the use of sustainable construction materials. It is different from the norm, with its uniqueness lying in the
development of a data matrix sourced from over 600 publications and contributed by 1107 authors from 442 institutions in 48 countries from 1970 to 2016, all focusing on the subject of sewage sludge ash as a construction material, and systematically analyzing, evaluating, and modeling the information for use in cement, concrete, ceramics, geotechnics, and road pavement applications. Related environmental issues, case studies, and standards are also discussed. The book helps users avoid repetitive research and save valuable resources, giving them more latitude to explore new research to progress the use of sustainable construction materials. It is structured in an incisive and easy to digest manner. As an excellent reference source, the book is particularly suited for researchers, academics, design engineers, specifiers, contractors, developers, and certifying and regulatory authorities who seek to promote sustainability within the construction sector. Provides an extensive source of valuable database information supported by an exhaustive and comprehensively organized list of globally published literature spanning 40-50 years, up to 2016, with 5800 references. Offers an analysis, evaluation, repackaging, and modeling of existing knowledge, encouraging more responsible use of waste materials in construction. Presents a wealth of knowledge for use in many sectors relating to the construction profession.

**Concrete Technology**

This book presents select proceedings of the National Conference on Advances in Sustainable Construction Materials (ASCM 2019) held at the National Institute of Technology, Warangal, India. The book includes contributions from academics and practitioners on low-energy cement technologies, innovative materials and structural technologies towards cost-effective, environment friendly, durable, energy-efficient, and sustainable construction. The topics covered emphasize on cutting-edge, economically viable, and sustainable solutions with an aim to increase profitability, and decrease construction time and overall impact on the built environment. The book will be useful for researchers and practitioners interested in sustainable construction and allied fields.

**Concrete and Sustainability**

**Cement & Concrete, Contributing to Global Sustainability**

**Concrete Technology for Sustainable Development**

Concrete is by far the most common building material—accounting for twice the volume of all other such materials combined. With such a huge global economic impact, the industry has a correspondingly considerable responsibility to use it sustainably. Written by experts who pioneered research into environmental issues and concrete, Concrete and Sustainability examines the sustainability issues of the world's main construction material and proposes attainable solutions. It provides a complete overview of the topic and tackles the complexity of the challenges from different angles. This book offers new data regarding the social and economic importance of concrete and proposes a discussion centered on a holistic approach in terms of resource availability, technical viability, economic feasibility, and environmental compatibility. The authors attribute a growing worldwide concern and understanding of sustainability issues, and an increased focus on climate change as the catalyst in this process. Instead of offering detailed technical advice or recommendations on sustainable issues, they provide examples showcasing sustainability efforts taking place in the concrete environment worldwide. The book includes examples and ideas for solutions from a large number of countries from across the globe. It presents a holistic and more complete overview of the emission and absorption topic, takes a look at the challenges from a combined old and new world viewing platform and offers an exploration of issues from a social and economic perspective. Concrete and Sustainability details the various rules and regulations that the industry is facing, discusses the various environmental challenges, and explores its impact. As emission, absorptions, and recycling have been the most central elements of discussion in the cement and concrete environment so far, these topics each receive their own chapters. This book also discusses other issues of concern within the various platforms in the industry, as well as future developments, and provides a comprehensive reference list.

**Concrete Technology (Theory and Practice), 8e**

This book presents select proceedings of National Conference on Advances in Sustainable Construction Materials (ASCM 2020) and examines a range of durable, energy-efficient, and next-generation construction materials produced from industrial wastes and by-products. The topics covered include sustainable materials and construction, innovations in recycling concrete, green buildings and innovative structures, utilization of waste materials in construction, geopolymer concrete, self-compacting concrete by using industrial waste materials, nanotechnology and sustainability of concrete, environmental sustainability and development, recycling solid wastes as road construction materials, emerging sustainable practices in highway pavements construction, plastic roads, pavement analysis and design, application of geosynthetics for ground improvement, sustainability in offshore geotechnics, green tunnel construction technology and application, ground improvement techniques and municipal solid waste landfill. Given the scope of contents, the book will be useful for researchers and professionals working in the field of civil engineering and especially sustainable structures and green buildings.

**Sustainable Construction Materials**

**Advanced Concrete Technology**

The proceedings of this major international symposium held in November 1998, provide an overview of developments in the use of concrete aggregate in the construction industry. The current disposal of wastes and industrial residues to landfill is no longer considered sustainable. More governments throughout the
world are implementing policies actively promoting the recycling of these materials, indeed, recycling of concrete as an aggregate offers an environmentally responsible and economically viable route to convert this waste to a valuable resource.

**Concrete for the Modern Age Developments in materials and processes**

Over the past two decades concrete has enjoyed a renewed level of research and testing, resulting in the development of many new types of concrete. Through the use of various additives, production techniques and chemical processes, there is now a great degree of control over the properties of specific concretes for a wide range of applications. New theories, models and testing techniques have also been developed to push the envelope of concrete as a building material. There is no current textbook which brings all of these advancements together in a single volume. This book aims to bridge the gap between the traditional concrete technologies and the emerging state-of-the-art technologies which are gaining wider use.

**3rd International Conference on Innovative Technologies for Clean and Sustainable Development**

Concrete Technology: Theory and Practice* gives students of Civil Engineering a thorough understanding of all aspects of concrete technology from first principles. It covers types of Cement, Admixtures, Concrete strength, durability and testing with reference to national standards.

**Sustainability of Concrete**

Developments in the Formulation and Reinforcement of Concrete, Second Edition, presents the latest developments on topics covered in the first edition. In addition, it includes new chapters on supplementary cementitious materials, mass concrete, the sustainability of concrete, service life prediction, limestone cements, the corrosion of steel in concrete, alkali-aggregate reactions, and concrete as a multiscale material. The book’s chapters introduce the reader to some of the most important issues facing today’s concrete industry. With its distinguished editor and international team of contributors, users will find this to be a must-have reference for civil and structural engineers. Summarizes a wealth of recent research on structural concrete, including material microstructure, concrete types, and variation and construction techniques Emphasizes concrete mixture design and applications in civil and structural engineering Reviews modern concrete materials and novel construction systems, such as the precast industry and structures requiring high-performance concrete

**The Sustainable Use of Concrete**

Cement & Concrete, Contributing to Global Sustainability

The theme of conference is Emerging Technologies for Sustainability. Sustainability tends to be problem driven and oriented towards guiding decision making. The goal is to raise the global standard of living without increasing the use of resources beyond global sustainable levels. The conference is intended to act as a platform for researchers to share and gain knowledge, showcase their research findings and propose new solutions in policy formulation, design, processing and application of green materials, material selection, analysis, green manufacturing, testing and synthesis, thereby contributing to the creation of a more sustainable world.

**Sustainable Construction Materials: Sewage Sludge Ash**

Concrete Technology Forum

This book discusses the detailed concepts of concrete and its development with pros and cons. Besides, the significance of various industrial wastes as partial replacements with concrete ingredients such as cement and aggregates are discussed. The creation of cement contributes to around 7% of carbon emissions into the atmosphere leading to greenhouse effect and global warming. Similarly, the wastes generated from various industries such as thermal, steel, ceramic, marble, paper and etc. shows the impact on atmosphere and leads to air pollution and land pollution. Thus, it is essential to focus on these wastes to use them in a profitable manner without compromising the current needs. This book discusses a few examples on studies of using various industry wastes as partial replacement of cement in concrete

**Twelfth International Conference on Recent Advances in Concrete Technology and Sustainability Issues**

Concrete-based concrete has excellent properties as a construction material, and the raw materials of cement-rocks, and limestone and clay—are bountiful. Yet its production generates high quantities of CO2, making it a potentially unsustainable material. However, there are no alternatives to concrete and steel as basic methods for development of socioeconomic infrastructure at this time. Highlighting sustainability issues in the construction industry, The Sustainable Use of Concrete presents guidelines on how to move toward sustainable concrete construction. The book begins by clarifying the historic background and meaning of sustainability, after which it outlines areas that need to be considered in connection with sustainability in the concrete and construction field. It examines environmental, social and cultural, and economic aspects, then considers an evaluation system of sustainability. The authors include various tools and ISO standards, and then explore technologies for sustainability, with case studies and examples that promote understanding of current technologies. Although the construction sector, in the broadest sense, has come to recognize that infrastructure development over the past two centuries has been unsustainable, it has been slow to adjust.
Comprehensive information and relevant practical guidance are very scarce. This book lays out a roadmap for creating a human-friendly and safe environment with low environmental burden.

**Sustainable Construction and Building Materials**

Until recently, much of the development of building materials has predominantly focused on producing cheaper, stronger and more durable construction materials. More recently attention has been given to the environmental issues in manufacturing, using, disposing and recycling of construction materials. Sustainability of construction materials brings together a wealth of recent research on the subject. The first part of the book gives a comprehensive and detailed analysis of the sustainability of the following building materials: aggregates; timber, wood and bamboo; vegetable fibres; masonry; cement, concrete and cement replacement materials; metals and alloys; glass; and engineered wood products. A final group of chapters cover the use of waste tyre rubber in civil engineering works, the durability of sustainable construction materials and nanotechnologies for sustainable construction. With its distinguished editor and international team of contributors, Sustainability of construction materials is a standard reference for anyone involved in the construction and civil engineering industries with an interest in the highly important topic of sustainability. Provides a comprehensive and detailed analysis of the sustainability of a variety of construction materials ranging from wood and bamboo to cement and concrete. Assesses the durability of sustainable construction materials including the utilisation of waste tyre rubber and vegetable fibres. Collates a wealth of recent research including relevant case studies as well as an investigation into future trends.