

Handbook Of Recycled Concrete And Demolition Waste Woodhead Publishing Series In Civil And Structural Engineering

Start-up creation is the most distinctive feature of the entrepreneurial knowledge-based economy. It is also essential for economic growth and especially important in the current context of young graduate's high unemployment rates that are expected to increase in the next few decades. There are other books on the creation of start-up companies, designed to be of value to academics wishing to exploit the commercial value of a new technology or business solution, but none of these existing titles focus on start-up creation in the construction industry. In the second edition of this extremely successful title the editors present a state-of-the-art review on advanced technologies, and their application in several areas of the built environment covering energy efficiency, structural performance, air and water quality to inspire the creation of start-up companies from university research. Part One begins with the key factors behind successful start-up companies from university research, including the development of a business plan, start-up financing, and the importance of intellectual property. Part Two focuses on the use of Big Data, Intelligent decision support systems, the Internet of Things and their use in the energy efficiency of the built environment. Finally, Part three is an entire new section that focuses on several smartphone applications for the smart built environment. While in the first edition the section concerning apps for smart buildings had just two chapters, one for app programming basics and a second a case study on building security in this second edition the core of the book is about app development that constitutes 50% of the book. Entire new section that was not available in the first edition on smart-phone applications and virtual assistance for infrastructure monitoring Chapters on business plans, start-up financing and intellectual property have been brought fully up to date as well as algorithms, big data and the Internet of Things for eco-efficient smart buildings Comprehensive guide to start-ups that arise from college and university research and how the application of advanced technology can be applied to the built environment

This book describes how, given the global challenge of a shortage of natural resources in the 21st century, the recycling of waste concrete is one of the most important means of implementing sustainable construction development strategies. Firstly, the book presents key findings on the micro- and meso-structure of recycled aggregate concrete (RAC), while the second part focuses on the mechanical properties of RAC: the strength, elastic modulus, Poisson's ratio, stress-strain curve, etc. The third part of the book explores research on the durability of RAC: carbonization, chloride penetration, shrinkage and creep. It then presents key information on the mechanical behavior and seismic performance of RAC elements and structures: beams, columns, slabs, beam-column joints, and frames. Lastly, the book puts forward design guidelines for recycled aggregate concrete structures. Taken as a whole, the research results – based on a series of investigations the author has conducted on the mechanical properties, durability and structural performance of recycled aggregate concrete (RAC) over the past 10 years – demonstrate that, with proper design and construction, it is safe and feasible to utilize RAC structures in civil engineering applications. The book will greatly benefit researchers, postgraduates, and engineers in civil engineering with an interest in this field.

The concrete industry consumes thirty billion tons of aggregate annually, almost all from non-renewable natural sources. Demolition produces a growing amount of materials which are legally usable and readily available. If not used locally they must be transported and landfilled. Also, demolition generally takes place close to new construction sites: recycling promotes shorter transportation distances, a must for improving the overall environmental footprint of the construction world. This book encompasses all aspects of this current trend: How recycled aggregates are obtained and their properties. Improving their quality through phase selection or separation. Incorporating concrete from demolition into the cement production process and the properties of the product obtained. What are the properties of concrete incorporating recycled concrete aggregates at various replacement levels, throughout the lifecycle of the material, from the fresh state to the long-term, including durability and fire. How recycled concrete can be optimised for various uses. How this new structural material can be managed in reinforced concrete construction. Solid experience from a series of experimental sites, and drawing on the Recybéton project, which lasted more than 5 years and gathered about 50 partners (from both academia and industry). Specific issues in recycled concrete quality control. National practices in the most advanced countries, and the main national and European standards. Achieving a sustainable process.

This book focuses on the utilisation of construction waste material as coarse aggregate in making concrete. It discusses in detail the behaviour of recycled aggregate under impact load along with other structural applications, and explains the various quality-improvement techniques for recycled aggregate and recycled aggregate concrete (RAC). The first chapter describes the importance of recycling construction and demolition waste and the status quo of global construction and demolition waste recycling. The second chapter examines the recycled aggregate production methodology. Subsequent chapters address the physical and mechanical characteristics and different research findings, as well as the engineering properties of recycled aggregate concrete. Further, the interrelationships among the mechanical properties of recycled aggregate concrete are discussed. The book also explores long-term properties like shrinkage and creep, durability properties, and microstructural characterisation. It will serve as a valuable resource for researchers and professionals alike.

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First published in 1995, the award-winning Civil Engineering Handbook soon became known as the field's definitive reference. To retain its standing as a complete, authoritative resource, the editors have incorporated into this edition the many changes in techniques, tools, and materials that over the last seven years have found their way into civil engineering research and practice. The Civil Engineering Handbook, Second Edition is more comprehensive than ever. You'll find new, updated, and expanded coverage in every section. In fact, more than 1/3 of the handbook is new or substantially revised. In

particular you'll find increased focus on computing reflecting the rapid advances in computer technology that has revolutionized many aspects of civil engineering. You'll use it as a survey of the field, you'll use it to explore a particular subject, but most of all you'll use The Civil Engineering Handbook to answer the problems, questions, and conundrums you encounter in practice.

Handbook of Recycled Concrete and Demolition Waste Woodhead Publishing

The book presents high-quality research papers presented at the 2nd American University in the Emirates International research conference, AUEIRC'18, organized by the American University in the Emirates, Dubai, held on November 13th-15th, 2018. The book is broadly divided into four sections: Sustainability and Smart Technology, Sustainability and Social Responsibility, Sustainability, Human Security and Legislation, Sustainability and Education. The topics covered under these sections are sustainable smart technology such as developing green curriculum for information technology, use ultrasonic velocity to predict quality of wheat, improve security features for visa system, factors affecting the cost of production of electricity and desalination plants, impact of smart traffic sensing in smart cities, smart healthcare system, simulation of Grey wolf optimization algorithm in painting digital forensics. The topics covered for sustainability and creative industries such as sustainable concrete production, multimedia applications in digital transformation art, integrating biomimicry principles in sustainable architecture. Sustainability, human security and legislation covered topics of urban performance and sustainable environment, Eco-certification as response on climate change, the criminal offence of tax evasion in law: case study, skills engineering in sustainable counter defense against Cyber extremism, the international law and challenges of trans-boundary water resources governance, the legal status of nuclear energy: case study, sustainable energy development and nuclear energy legislation in UAE, corruption specific safety challenge, environmental management and sustainability, sustainable farming models for desert agro-ecosystems, future directions of climate change, earth and built environment towards new concept of sustainability, institution building from emotional intelligence perspective, virtue ethics, technology and sustainability, the role of humor in a sustainable education, HEIs practices and strategic decisions toward planning for sustainable education programs, TQM in higher education for sustainable future. The papers in this book present high-quality original research work, findings and practical development experiences.

This book is the result of a Special Issue published in Applied Sciences, entitled "New Trends in Recycled Aggregate Concrete". It identifies emerging research areas within the field of recycled aggregate concrete and contributes to the increased use of this eco-efficient material. Its contents are organised in the following sections: Upscaling the use of recycled aggregate concrete in structural design; Large scale applications of recycled aggregate concrete; Long-term behaviour of recycled aggregate concrete; Performance of recycled aggregate concrete in very aggressive environments; Reliability of recycled aggregate concrete structures; Life cycle assessment of recycled aggregate concrete; New applications of recycled aggregate concrete. The Handbook of Sustainable Concrete and Industrial Waste Management summarizes key research trends in recycling, reusing concrete and demolition waste to reduce environmental impact. Part one discusses eco-friendly innovative cement and concrete and reviews key substitute materials. Part two analyzes the use of industrial waste as aggregates and the mechanical properties of concrete containing waste materials. Part three discusses differences between innovative binders, focusing on alkali-activated and geopolymer concrete. Part four provides a thorough overview of the life cycle assessment (LCA) of concrete containing industrial wastes and the impacts related to the logistics of wastes, the production of the concrete, and the management of industrial wastes. By providing research examples, case studies, and practical strategies, this book is a state-of-art reference for researchers working in construction materials, civil or structural engineering, and engineers working in industry. Offers a systematic and comprehensive source of information on the latest developments in sustainable concrete Analyzes different types of sustainable concrete and innovative binders from a chemical, physical, and mechanical point of view Includes real case studies showing the application of the LCA methodology

Corrosion of reinforcing steel is now recognized as the major cause of degradation of concrete structures in many parts of the world. Despite this, infrastructure expenditure is being unreasonably decreased by sequestration and the incredible shrinking discretionary budget. All components of our infrastructure including highways, airports, water supply, waste treatment, energy supply, and power generation require significant investment and are subjected to degradation by corrosion, which significantly reduces the service life, reliability, functionality of structures and equipment, and safety. Corrosion of Steel in Concrete Structures provides a comprehensive review of the subject, in addition to recent advances in research and technological developments, from reinforcing materials to measurement techniques and modelling. This book contains not only all the important aspects in the field of corrosion of steel reinforced concrete but also discusses new topics and future trends. Part One of the book tackles theoretical concepts of corrosion of steel in concrete structures. The second part moves on to analyse the variety of reinforcing materials and concrete, including stainless steel and galvanized steel. Part Three covers measurements and evaluations, such as electrochemical techniques and acoustic emission. Part Four reviews protection and maintenance methods, whilst the final section analyses modelling, latest developments and future trends in the field. The book is essential reading for researchers, practitioners and engineers who are involved in materials characterisation and corrosion of steel in concrete structures. Provides comprehensive coverage on a broad range of topics related to the corrosion of steel bars in concrete Discusses the latest measuring methods and advanced modeling techniques Reviews the range of reinforcing materials and types of concrete

This book provides an updated state-of-the-art review on new developments in alkali-activation. The main binder of concrete, Portland cement, represents almost 80% of the total CO₂ emissions of concrete which are about 6 to 7% of the Planet's total CO₂ emissions. This is particularly serious in the current context of climate change and it could get even worse because the demand for Portland cement is expected to increase by almost 200% by 2050 from 2010 levels, reaching 6000 million tons/year. Alkali-activated binders represent an alternative to Portland cement having higher durability and a lower CO₂ footprint. Reviews the chemistry, mix design, manufacture and properties of alkali-activated cement-based concrete binders Considers performance in adverse environmental conditions. Offers equal emphasis on the science behind the technology and its use in civil engineering.

"This book will be the official reference guide to Sustainable Sites Initiative Rating System, the first national rating system for sustainable landscapes"--

The first edition of this comprehensive work quickly filled the need for an in-depth handbook on concrete construction engineering and technology. Living up to the standard set by its

bestselling predecessor, this second edition of the Concrete Construction Engineering Handbook covers the entire range of issues pertaining to the construction

The Handbook of Sustainable Concrete and Industrial Waste Management summarizes key research trends in recycling and reusing concrete and demolition waste to reduce their environmental impact. Part one discusses eco-friendly innovative cement and concrete and reviews key substitute materials. Part two analyzes the use of industrial waste as aggregates and the mechanical properties of concrete containing waste materials. Part three discusses differences between innovative binders, focusing on alkali-activated and geopolymer concrete. Part four provides a thorough overview of the life cycle assessment (LCA) of concrete containing industrial wastes and the impacts related to the logistics of wastes, the production of the concrete, and the management of industrial wastes. By providing research examples, case studies, and practical strategies, this book is a state-of-the-art reference for researchers working in construction materials, civil or structural engineering, and engineers working in the industry. Offers a systematic and comprehensive source of information on the latest developments in sustainable concrete; Analyzes different types of sustainable concrete and innovative binders from chemical, physical, and mechanical points of view; Includes real case studies showing application of the LCA methodology.

The civil engineering sector accounts for a significant percentage of global material and energy consumption and is a major contributor of waste material. The ability to recycle and reuse concrete and demolition waste is critical to reducing environmental impacts in meeting national, regional and global environmental targets. Handbook of recycled concrete and demolition waste summarises key recent research in achieving these goals. Part one considers techniques for managing construction and demolition waste, including waste management plans, ways of estimating levels of waste, the types and optimal location of waste recycling plants and the economics of managing construction and demolition waste. Part two reviews key steps in handling construction and demolition waste. It begins with a comparison between conventional demolition and construction techniques before going on to discuss the preparation, refinement and quality control of concrete aggregates produced from waste. It concludes by assessing the mechanical properties, strength and durability of concrete made using recycled aggregates. Part three includes examples of the use of recycled aggregates in applications such as roads, pavements, high-performance concrete and alkali-activated or geopolymer cements. Finally, the book discusses environmental and safety issues such as the removal of gypsum, asbestos and alkali-silica reaction (ASR) concrete, as well as life-cycle analysis of concrete with recycled aggregates. Handbook of recycled concrete and demolition waste is a standard reference for all those involved in the civil engineering sector, as well as academic researchers in the field. Summarises key recent research in recycling and reusing concrete and demolition waste to reduce environmental impacts and meet national, regional and global environmental targets Considers techniques for managing construction and demolition waste, including waste management plans, ways of estimating levels of waste, the types and optimal location of waste recycling plants Reviews key steps in handling construction and demolition waste

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 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 microwave-assisted recycling of concrete. They discuss sustainability and the environmental impact of incorporating sustainable concrete production, demolition, and recycling using microwave-assisted heating 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 The design of 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.

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, 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 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

Construction and Demolition Waste (CDW), from the construction, maintenance, renovation and demolition of buildings and structures, represents a large proportion of the waste in industrialized societies. Compared to other forms, such as household waste, more than 90% of CDW can be used as a resource and a substitute for construction materials, especially for primary, natural raw materials. Reuse, recovery and recycling depends on the quality and market for the materials, and the environmental impact of the processes for conversion of CDW from old structures to its use in new structures. However, the utilization today of CDW products as secondary resources is marginal. Most CDW is deposited or used as fill material, and the opportunities of high quality recycling are generally neglected. This book presents the opportunities for the sustainable and resource efficient utilisation of CDW, focusing on recycling of concrete and masonry as the major forms of CDW. The recycling of gypsum, timber, mineral wool, asphalt and other types are also described. Its aim is to present a chain of value and material streams in the transformation of obsolete buildings and structures into new buildings and structures. It takes a holistic view, focusing on the lifecycle economy (the circular economy) and integrated management aspects of various scenarios ranging from high industrial urban renewal to debris removal and management after disasters and conflicts. It is based on the author's 35 years of research and development combined with practical international experience within the demolition and recycling area. It addresses students, architects, civil engineers, building owners, public authorities and others working in urban planning, demolition and resource management in the building and construction sector and in the reconstruction of damaged buildings after disasters and wars.

Part One: Concrete Properties Part Two: Processes Part Three: Testing and Quality Part Four: Non-destructive Testing Methods.

Designing buildings and physical environments depends on social structure, social needs, economic data, environment, and technological development. Planning these environments is heavily influenced by cultural and regional need, the existing environment, and the materials available. Reusable and Sustainable Building Materials in Modern Architecture is an essential reference source that discusses the shaping of building design through culture and materials as well as the influence of environment on building design. Featuring research on topics such as passive design, ecological design, and urban design, this book is ideal for academicians, specialists, and researchers seeking coverage on culture, environment, and building design.

Advances in Construction and Demolition Waste Recycling: Management, Processing and Environmental Assessment is divided over three parts. Part One focuses on the management of construction and demolition waste, including estimation of quantities and the use of BIM and GIS tools. Part Two reviews the processing of recycled aggregates, along with the performance of concrete mixtures using different types of recycled aggregates. Part Three looks at the environmental assessment of non-hazardous waste. This book will be a standard reference for civil engineers, structural engineers, architects and academic researchers working in the field of construction and demolition waste.

Summarizes key recent research in recycling and reusing concrete and demolition waste to reduce environmental impacts Considers techniques for managing construction and demolition waste, including waste management plans, ways of estimating levels of waste, and the types and optimal location of waste recycling plants Reviews key steps in handling construction and demolition waste

This book gathers peer-reviewed contributions presented at the 3rd RILEM Spring Convention and Conference, held at Guimarães and hosted by the University of Minho, Portugal, on March 9-14, 2020. The theme of the Conference was "Ambitioning a Sustainable Future for Built Environment: comprehensive strategies for unprecedented challenges" which was aimed at discussing current challenges and impacts of the built environment on sustainability. The present volume is dedicated to the topic 'shift to a circular economy' which is focussed on sustainability and covers the research and recent technologies on the use and development of sustainable materials and structural systems, as well as on recycling and reusing. It also covers the implementation of industrial processes leading to minimized waste, including digital fabrication and deconstruction, as well as integrative approaches that lead to the achievement of the concept of circular economy. Additionally, this topic covers research on novel or existing construction materials and systems based on local resources and regional practices. The following subtopics are included: industrialized construction systems minimizing waste; recycling and reuse of materials and components; 4Ls: local constructions with local materials through local approaches for local development; Digital Manufacturing; design for deconstruction; smart demolition techniques; timber structures; Life-Cycle Assessment of construction materials and technologies; recycling of pavements and materials in roads.

New Trends in Eco-efficient and Recycled Concrete describes different recycled materials that have been used in eco-efficient concrete, reviewing previous publications to identify the most effective recycled materials to be applied in concrete manufacture. New trends on eco-efficient concrete are presented, filling a gap in the market. Sections cover various recycled materials applied in concrete production, present the latest on the lifecycle analysis of recycled aggregate concrete, detail new trends in recycled aggregate concrete research, and finally, present updates on upscaling the use of recycled aggregate concrete and structural reliability. Focuses on new trends in recycled aggregate concrete and its applications (rather than the more subjective 'sustainability' aspects) Contains very important contributions from researchers in eco-efficient concrete, including Chi Sun Poon, Jorge de Brito, Valeria Corinaldesi, Francisco Agrela, etc. Presents a 'one stop' reference for a graduate course on sustainable construction Handbook of Low Carbon Concrete brings together the latest breakthroughs in the design, production, and application of low carbon concrete. In this handbook, the editors and contributors have paid extra attention to the emissions generated by coarse aggregates, emissions due to fine aggregates, and emissions due to cement, fly ash, GGBFS, and admixtures. In addition, the book provides expert coverage on emissions due to concrete batching, transport and placement, and emissions generated by typical commercially produced concretes. Includes the tools and methods for reducing the emissions of greenhouse gases Explores technologies, such as carbon capture, storage, and substitute cements Provides essential data that helps determine the unique factors involved in designing large, new green cement plants

An increasing amount of waste is generated each year from textiles and their production. For economic and environmental reasons it is necessary that as much of this waste as possible is recycled instead of being disposed of in landfill sites. In reality the rate of textile recycling is still relatively low. On average, approximately ten million tonnes of textile waste is currently dumped in Europe and America each year. Considering the diversity of fibrous waste and structures, many technologies must work in concert in an integrated industry in order to increase the rate of recycling. Recycling in textiles shows how this can be achieved. The first part of the book introduces the subject by looking at the general issues involved and the technologies concerned. Part Two explores the chemical aspects of textile recycling. Part Three focuses on recycled textile products, including nonwovens and alternative fibres. Finally, the last part of the book discusses possible applications of recycled textiles, including using recycled products in the operating theatre, for soil stabilisation and in concrete reinforcement. Recycling in textiles presents several promising technologies and ideas for recycling systems. This is the first book of its kind to bring together textile recycling issues, technology, products, processes and applications. It will prove an invaluable guide to all those in the industry who are now looking for ways to recycle their textile waste. Provides extensive coverage of this hot topic An invaluable guide for all in the textile industry Learn how to increase the rate of recycling Interest in green and sustainable design is growing throughout the world. Both national and local governments are active in promoting reuse and recycling in order to reduce the amount of waste going to landfill. This guide identifies how building designers and constructors can minimize the generation of waste at the design stage of a building project by

using reclaimed components and materials. Authoritative, accessible and much-needed, this book highlights the opportunities for using reclaimed components and materials and recycled-content building products for each element of a building, from structure and foundations to building services and external works. Current experience is illustrated with international case studies and practical advice. It discusses different approaches to designing with recycling in mind, and identifies the key issues to address when specifying reclaimed components and recycled materials in construction work. This book will be invaluable for building professionals including architects, specifiers, structural and service engineers, quantity surveyors, contractors and facilities managers as well as students of architecture and civil engineering. Published with NEF

Marine Concrete Structures: Design, Durability and Performance comprehensively examines structures located in, under, or in close proximity to the sea. A major emphasis of the book is on the long-term performance of marine concrete structures that not only represent major infrastructure investment and provision, but are also required to operate with minimal maintenance. Chapters review the design, specification, construction, and operation of marine concrete structures, and examine their performance and durability in the marine environment. A number of case studies of significant marine concrete structures from around the world are included which help to reinforce the principles outlined in earlier chapters and provide useful background to these types of structures. The result is a thorough and up-to-date reference source that engineers, researchers, and postgraduate students in this field will find invaluable. Covers, in detail, the design, specification, construction, and operation of marine concrete structures Examines the properties and performance of concrete in the marine environment Provides case studies on significant marine concrete structures and durability-based design from around the world

Waste and By-Products in Cement-Based Materials: Innovative Sustainable Materials for a Circular Economy covers various recycled materials, by-products and wastes that are suitable for the manufacture of materials within the spectrum of so-called cement-based materials (CBM). Sections cover wastes for replacement of aggregates in CBM, focus on the application of wastes for the replacement of clinker and mineral additions in the manufacture of binders, discuss the optimization process surrounding the manufacture of recycled concrete and mortars, multi-recycling, advanced radiological studies, optimization of self-compacting concrete, rheology properties, corrosion prevention, and more. Final sections includes a review of real-scale applications that have been made in recent years of cement-based materials in roads, railway superstructures, buildings and civil works, among others, as well as a proposal of new regulations to promote the use of waste in the manufacture of CBM. Favors the institution of the circular economy in the construction industry by eliminating the barriers that currently prevent industrial waste from being valorized by its inclusion in CBM design Features an in-depth exploration of the strengths and weaknesses of new raw materials and their application to CBMs Features real-scale applications that have been made in recent years of cement-based materials in roads, railway superstructures, buildings and civil works, among others Presents current, state-of-the-art, and future-prospects for the use of industrial waste in CBMs

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, with final remarks on their future. Combines the knowledge of two leading authors to present both the scientific and technology of admixtures Explains what admixtures are from a chemical point-of-view and illustrates by which mechanisms they modify the properties of fresh and hardened concrete Presents a fundamental, practical, and innovative reference book on the topic Contains three detailed appendices that can be used to learn how to use admixtures more efficiently

Thorough and detailed, **The Carbon Footprint Handbook** encompasses all areas of carbon footprint, including the scientific elements, methodological and technological aspects, standards, industrial case studies, and communication of carbon footprint results. Written and edited by an international group of experts, the far-ranging topics on carbon footprinting are divided into three sections comprising chapters focused on methodology, modeling, and case studies. The concepts of carbon footprint and climate change are no longer new to the world. As a result, there is increasing interest in quantifying and reducing the carbon footprint around the world, from industrial to individual levels. This book describes modeling aspects and calculations of carbon footprint in organizations and production. It emphasizes the importance of locating non-polluting energy sources as well as sustainability. The book also provides case studies offering a wealth of information on practices and methods in detecting and addressing carbon footprint. The Carbon Footprint Handbook is an important reference that discusses, in depth, the essential details of carbon footprint assessment. It uses research and case studies on methods and practices from locations around the world including China, India, Spain, and Latin America. It demonstrates that the problems of carbon footprint are indeed worldwide while showing how they can be addressed in myriad areas of life, from industrial to personal action.

This book provides a State of the Art Report (STAR) produced by RILEM Technical Committee 254-CMS 'Thermal Cracking of Massive Concrete Structures'. Several recent developments related to the old problem of understanding/predicting stresses originated from the evolution of the hydration of concrete are at the origin of the creation this technical committee. Having identified a lack in the organization of up-to-date scientific and technological knowledge about cracking induced by hydration heat effects, this STAR aims to provide both practitioners and scientists with a deep integrated overview of consolidated knowledge, together with recent developments on this subject.

Winner of the International Solid Waste Association's 2014 Publication Award, **Handbook of Recycling** is an authoritative review of the current state-of-the-art of recycling, reuse and reclamation processes commonly implemented today and how they interact with one another. The book addresses several material flows, including iron, steel, aluminum and other metals,

pulp and paper, plastics, glass, construction materials, industrial by-products, and more. It also details various recycling technologies as well as recovery and collection techniques. To completely round out the picture of recycling, the book considers policy and economic implications, including the impact of recycling on energy use, sustainable development, and the environment. With contemporary recycling literature scattered across disparate, unconnected articles, this book is a crucial aid to students and researchers in a range of disciplines, from materials and environmental science to public policy studies. Portrays recent and emerging technologies in metal recycling, by-product utilization and management of post-consumer waste Uses life cycle analysis to show how to reclaim valuable resources from mineral and metallurgical wastes Uses examples from current professional and industrial practice, with policy and economic implications

The Pollution Prevention Handbook provides the necessary tools to set up a successful pollution program; implement specific projects to meet environmental regulation, and improve efficiency and product quality. Methods used to reduce waste generation are illustrated, and new treatment methods to reduce the volume or toxicity of waste are described. Practical examples illustrate key concepts, and numerous case studies provide successful programs found in the real world. The text is divided into three major sections:

Advances on Alkali-activated Concrete, a new edition in the Handbook of Alkali-Activated Cements, Mortars and Concrete series, provides comprehensive information on materials, structural properties and realistic potential for the application of alkali-activated concretes and cements. Divided over seven key parts, including the design of alkali-activated concrete, their fabrication and curing, rheology, properties of alkali-activated concrete, durability, dynamic performance and LCA, the book will be an essential reference resource for academic and industrial researchers, materials scientists, chemists, manufacturers and civil engineers working with alkali-activated materials and concrete structures. Since the first edition was published in 2014 many researchers from civil engineering have been studying alkali-activated concrete mixtures. This knowledge is now available to everyone with this updated release. Provides an essential guide on the latest developments in alkali-activated concrete Comprehensively examines alkali-activated concrete performance under cyclic loading Includes concrete systems containing coarser aggregates Presents several important cases studies of application

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