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The amount and variety of waste that humanity dumps in landfill sites is nothing

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short of a scandal, believes Rafat Siddique, of Deemed University in Patiala, India. Instead, we ought to be building new homes out of it! Siddique shows in this important book that many

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non-hazardous waste materials and by-products which are landfilled, can in fact be used in making concrete and similar construction materials. This book comprises select

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peer-reviewed papers presented at the International Conference on Sustainable Development through Engineering Innovations (SDEI) 2020. It presents recent advances,

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new directions, and opportunities for sustainable and resilient approaches to design and protect the built-environment through engineering innovations & interventions. The topics

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covered are highly diverse and include all civil engineering and construction-related aspects such as construction and environmental Issues, durability and survivability

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under extreme conditions, design of new materials for sustainability, eco-efficient and ultra-high performance cementitious materials, embedded structural and foundation systems and

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environmental geomechanics. The book will be of potential interest to the researchers and students in the fields of civil engineering, architecture and sustainable

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development.

*The Foundry Sands of
Minnesota*

*Usage and Management
Handbook of Research on
Investigations in Artificial
Life Research and*

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*Development
Sustainable Construction
and Building Materials
Waste and Supplementary
Cementitious Materials in
Concrete
Controlled Low-strength*

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Materials

Research on artificial life is critical to solving various dynamic obstacles individuals face on a daily basis. From electric wheelchairs to navigation,

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artificial life can play a role in improving both the simple and complex aspects of civilian life. The Handbook of Research on Investigations in Artificial Life Research and

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Development is a vital scholarly reference source that examines emergent research in handling real-world problems through the application of various computation technologies

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and techniques. Examining topics such as computational intelligence, multi-agent systems, and fuzzy logic, this publication is a valuable resource for academicians, scientists,

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researchers, and individuals interested in artificial intelligence developments.

A study was conducted to determine how the unconfined compressive

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strength and flow of flowable fills prepared with foundry sand depends on the bentonite content of the sand. The study showed that there are several advantages of using

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foundry sands with bentonite content > 6% as the fine aggregate in flowable fill. These advantages include: (i) lower long-term strength gain (making the design of

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excavatable mixtures simpler and less risky), (ii) less flow loss, (iii) fewer components and fewer interactions between components that are difficult to characterize,

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and (iv) a larger fraction of inexpensive foundry sand being used in the mixture. The unconfined compressive strength (UCS) of flowable fills prepared with foundry sands is

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sensitive to the water-cement ratio (W/C), at least when the W/C spans a broad range (4-11). Mixtures with W/C 6.5 generally will have excessive UCS, whereas a

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suitable UCS is generally associated with W/C 6.5. Bentonite content does not affect the UCS systematically, but it does have an indirect effect in that foundry sands with

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more bentonite require more water to flow, which affects strength. The amount of water required to achieve adequate flow primarily is a function of the bentonite content of

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the foundry sand, to general, as the bentonite content of the foundry sand increases, the water content of the mixture should increase correspondingly. The

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amount of fly ash has only a modest effect on the amount of water required. The most important factor affecting flow loss is the presence of cementitious fly ash in the mixture. Flow

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loss can be reduced appreciably by using a foundry sand with at least 6% bentonite so that fly ash fines need not be added to the mixture.
Technical Support

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***Document
Flowable Fill Using Waste
Foundry Sand
Symposium on Foundry
Sand Reclamation
A Sand Casting Manual for
the Small Foundry***

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***Foundry Sand Facts for
Civil Engineers
Use of Waste Foundry Sand
in Highway Construction***

Complete Casting Handbook is the result of a long-awaited update, consolidation and expansion of

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expert John Campbell's market-leading casting books into one essential resource for metallurgists and foundry professionals who design, specify or manufacture metal castings. The first single-volume guide to

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cover modern principles and processes in such breadth and depth whilst retaining a clear, practical focus, it includes: A logical, two-part structure, breaking the contents down into casting metallurgy and casting

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manufacture Established, must-have information, such as Campbell's '10 Rules' for successful casting manufacture New chapters on filling system design, melting, molding, and controlled solidification

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techniques, plus extended coverage of a new approach to casting metallurgy Providing in-depth casting knowledge and process know-how, from the noteworthy career of an industry-leading authority, Complete

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Casting Handbook delivers the expert advice needed to help you make successful and profitable castings. Long-awaited update, consolidation and expansion of expert John Campbell's market-leading casting books into one

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essential handbook Separated into two parts, casting metallurgy and casting manufacture, with extended coverage of casting alloys and new chapters on filling system design, melting, moulding and controlled solidification

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techniques to compliment the renowned Campbell '10 Rules' Delivers the expert advice that engineers need to make successful and profitable casting decisions This book presents select proceedings of the International

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Conference on Sustainable Construction and Building Materials (ICSCBM 2018), and examines a range of durable, energy-efficient, and next-generation construction and building materials produced from

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industrial wastes and byproducts. The topics covered include alternative, eco-friendly construction and building materials, next-generation concretes, energy efficiency in construction, and sustainability in

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construction project management. The book also discusses various properties and performance attributes of modern-age concretes including their durability, workability, and carbon footprint. As such, it offers a

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valuable reference for beginners, researchers, and professionals interested in sustainable construction and allied fields.

Modern Foundry Practice
Sustainable Civil Engineering
Practices

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The Charcoal Foundry
Sandy Materials in Civil
Engineering
The Structural Integrity of
Recycled Aggregate Concrete
Produced With Fillers and
Pozzolans

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Sustainable Development Through
Engineering Innovations

*As the world moves
further into
urbanization, there is a
greater need for
construction materials*

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to meet society's needs. As natural resources become scarce, the use of recycled materials for construction purposes has become increasingly common.

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Over the past decade, there has been a significant increase in the utilization of recycled materials in the construction industry. This will

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result in substantial advantages in structure and infrastructure construction coupled with a reduction in the construction cost, as well as improving

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sustainability. However, significant development limitations and many relevant considerations must be addressed when using recycled materials in construction. This

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book introduces innovative and alternative construction materials used in civil engineering.

Mould and Core Materials for Steel Foundry covers

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the significant progress in the development of various types of mould and core materials for steel founding. This book is composed of 17 chapters, and begins

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with the presentation of the testing procedures for the materials' properties such as green and dry strengths, permeability, amount of gas evolved, shatter

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index together with hardness of rammed moulds. The next chapters provide the testing procedures and routine control of sand, silica, non-siliceous

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materials, binders, and clay bond. These topics are followed by discussions on sand preparation, shell mould, and other core materials, such as

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furanes. This book describes some steel foundry processes, including heat extraction, casting, and hot tear. The final chapters deal with the

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*reconditioning and
reclamation of sand,
casting and scab
defects, evaluation of
high temperature
properties, and the
technical control of raw*

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materials to ensure conformation to the specified standards.

Beneficial Reuse of Foundry Sands in Controlled Low Strength Material

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*Mould & Core Material
for the Steel Foundry
Select Proceedings of
ICSCEP 2019*

*Use of Olivine as
Foundry Sand*

Science and Technology

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of Casting Processes Foundry Sand

The Utilization of Slag
in Civil Infrastructure
Construction strives to
integrate the theory,
research, and practice

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of slag utilization, including the production and processing of slags. The topics covered include: production and smelting processes for metals; chemical and

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physical properties of slags; pretreatment and post-treatment technology to enhance slag properties; potential environmental impact; mechanisms of

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potential expansion;
special testing methods
and characteristics;
slag processing for
aggregate and
cementitious
applications;

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suitability of slags for use in specific applications; overall properties of materials containing slags; and commercialization and economics. The focus of

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the book is on slag utilization technology, with a review of the basic properties and an exploration of how its use in the end product will be technically

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sound, environment-friendly, and economic. Covers the production, processing, and utilization of a broad range of ferrous, non-ferrous, and non-

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metallurgical slags
Provides information on
applicable methods for a
particular slag and its
utilization to reduce
potential environmental
impacts and promote

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natural resource
sustainability Presents
the overall technology
of transferring a slag
from the waste stream
into a useful materials
resource Provides a

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detailed review of the appropriate utilization of each slag from processing right through to aggregate and cementitious use requirements

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This book deals with various science and technology factors that need careful consideration in producing a casting. It consists of 11 chapters

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contributed by experts in their respective fields. The topics include simulation of continuous casting process, control of solidification of

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continuous castings,
influence of mold flux
in continuous casting,
segregation in strip
casting of steel,
developments in shell
and solid investment

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mold processes,
innovative pressure
control during filling
of sand molds, fracture
toughness specifically
of castings, permanent
molding of cast iron,

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wear resistant castings and improvement of accuracy in estimating graphite nodularity in ductile iron castings.

Incorporation of Waste Foundry Sand in Concrete

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a Dissertation

Recovery of Chromite and
Silica from Steel

Foundry Waste Molding
Sands

The Utilization of Slag
in Civil Infrastructure

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Construction

Mineral Aggregate

Conservation Reuse and
Recycling

Testing, Research and
Development

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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

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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,

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utilization of waste materials in construction, geopolymer concrete, self-compacting concrete by using industrial waste materials, nanotechnology and sustainability of concrete, environmental sustainability

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and development, recycling solid wastes as road construction materials, emerging sustainable practices in highway pavements construction, plastic roads, pavement analysis and design,

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application of geosynthetics for ground improvement, sustainability in offshore geotechnics, green tunnel construction technology and application, ground improvement techniques and municipal solid waste

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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.

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A huge amount of sand is being used by the metal foundries within the metal casting process, the sand is successfully recycled and reused by the foundries. After some time, foundries are not able to use the same

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sand again, then sand is taken off the foundry and known as "Foundry Sand". There is almost 6 to 10 million tons production of foundry sand annually [3]. Similar to lots of waste materials, used sand has

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helpful implementation to additional industries. Used WFS contains mainly of silica sand, which is coated with a thin layer of burnt carbon, remaining binders and mud. To enhance the strength and other

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durability aspects, WFS can be utilized in concrete. So, it can be utilized as a partial alternative of cement or while a partial alternative of natural aggregates or fully substitute of natural fine

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aggregate and as a supplementary addition for accomplishing different properties of cement concrete. In this study, the effect of used foundry sand as a substitution of fine aggregate on the compressive

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strength, Flexural strength, split tensile strength and Modulus of elasticity of cement concrete of M30 grade was investigated. Moreover, to determine the homogeneity of concrete ultrasonic pulse velocity method and water

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permeability is also taken into consideration. There were five percentages of replacement to which foundry sand was replaced by weight of fine aggregates i.e. 0, 10, 20, 30 and 40% by weight of the fine aggregate. Tests

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were conducted for mechanical and durability properties of all replacement levels at different curing periods (7-days, 28-days & 90-days). Geotechnical Performance of Highway Embankment

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Constructed Using Waste
Foundry Sand
Sustainable Development
Recycling of Used Foundry
Sand to Enable Its Re-use in
Chemical Moulding Process
Its Uses and Abuses
Select Proceedings of ICSCBM

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2018

Metal Casting Processes,
Techniques and Design

*Waste and Supplementary
Cementitious Materials in Concrete:
Characterisation, Properties and
Applications provides a state-of-the-art
review of the effective and efficient use*

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of these materials in construction. Chapters focus on a specific type of material, addressing their characterization, strength, durability and structural applications. Sections include discussions of the properties of materials, including their physical, chemical and characterization, their

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strength and durability, modern engineering applications, case studies, the state of codes and standards of implementation, cost considerations, and the role of materials in green and sustainable construction. The book concludes with a discussion of research needs. Focuses on material

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properties and applications (as well as 'sustainability' aspects) of cementitious materials Assembles leading researchers from diverse areas of study Ideas for use as a 'one stop' reference for advanced postgraduate courses focusing on sustainable construction materials

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Flowable fill is generally a mixture of sand, fly ash, a small amount of cement, and water. Sand is the major component of most flowable fill mixes; consequently, using a waste material as a substitute for natural sand results in the beneficial use of the waste material. Waste foundry sand (WFS)

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was used as a fine aggregate in this study. Three green sands from ferrous foundries and two class F fly ashes were used. The flow behavior, hardening characteristics, ultimate strength behavior, and permeability characteristics of flowable fill were investigated. The penetration

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resistance necessary to sustain walkability as the fresh flowable fill hardens was determined. The pH of pore solution of hardened flowable fill indicated that the potential for corrosivity is low. The toxicity tests indicated that some WFSs are environmentally safe.

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*Select Proceedings of SDEI 2020
Waste Materials and By-Products in
Concrete*

*Evaluation of Toxicity Analysis for
Foundry Sand Specifications*

*A Substitute for Compacted Or
Stabilized Soil*

Foundry Sand Control

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Characterisation, Properties and Applications

The metal casting, uses large amounts of natural resources, energy and metals as well as generates significant amounts of gases and solid wastes, which have an essential influence on the natural

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environment and work conditions in casting houses. The condition of the further development is the adjustment to the strategy of the sustainable development. This book examines potential solutions to the economic, ecological, and occupational hazards

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generated by the foundry industry. It focuses on emissions of chemical compounds during the preparation and formation of molding sands, molds pouring with molten metal, molds cooling and castings knocking out. It also addresses the effects of the spent

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molding sands reclamation process and the influence of spent sands on the environment during their storage. Establishing the most sustainable techniques for limiting the negative impact of foundry processes on the environment is explored in detail. The

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book will be valuable to academics and industry professionals alike. Describes the mechanisms of hardening and thermal destruction of individual binders in moulding and core sands; Assesses the influence of moulding and core sands technology on the

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environment; Discusses state of the art moulding and core sand technology.
Foundry Sand Facts for Civil Engineers
Treatment Standards for Foundry Sand
Metal Casting
Select Proceedings of SPICE 2021

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Select Proceedings of ASCM 2020

Complete Casting Handbook

Architectural Precast Concrete

Charcoal Foundry, the first book in the "Metal Working Shop From Scrap Series", gives you plans for building a metal melting furnace and instructions on basic pattern

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making and molding. All the information needed to set up a foundry in your work shop can be found in this book. Simply stated, if you can build a sand castle or make a mud pie, you can make a sand mold to produce castings for your metal shop projects. The main

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ingredient in these projects is scrap aluminum and pot metal. The only tools you need to get started are ordinary home shop hand tools, many of which are probably already in your possession. Much of the remainder is found as salvage or cast-off and little expense need be

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involved. The charcoal foundry is simple to build and operate and the initial cost is so low that it can be in the reach of nearly anyone. And the fundamentals of pattern-making and molding are easily understood and mastered. Once you have built the charcoal foundry and the metal

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lathe in book 2, there is little beyond your reach by way of shop equipment. Build as large or small as you wish and you are your own parts supply company. If you already have some machine shop equipment, you will find that adding a foundry to your shop greatly

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expands your capacity. Being able to produce your own castings for accessories and equipment is a great advantage. Design your own, make a copy or follow a plan. It's easy when you're in control and can produce your own castings.

Metal foundries use large amounts

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of sand as part of the metal casting process. Foundries successfully recycle and reuse the sand many times in a foundry. When the sand can no longer be reused in the foundry, it is removed from the foundry and is termed "foundry sand." Foundry sand production is

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nearly 6 to 10 million tons annually. Like many waste products, foundry sand has beneficial applications to other industries. The purpose of this document is to provide technical information about the potential civil engineering applications of foundry sand. This

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will provide a means of advancing the uses of foundry sand that are technically sound, commercially competitive and environmentally safe.

Sustainable Practices and Innovations in Civil Engineering Advances in Sustainable

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**Construction Materials
Mold and Core Sands in
Metalcasting: Chemistry and
Ecology
Environmental Issues. Attachment
A
The Use of Blended Recycled
Foundry Sand in Hot Mix Asphalt**

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Report on Use of Recycled Foundry Sand in the Cleveland Area

This book comprises select proceedings of the International Conference on Sustainable Civil Engineering Practices

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(ICSCEP 2019). It covers several important aspects of sustainable civil engineering practices dealing with effective waste and material management, natural

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resources, industrial products, energy, food, transportation and shelter, while conserving and protecting the environmental quality and the natural resource base

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essential for future development. The book also discusses engineering solutions to sustainable development and green design issues. Special emphasis is given on

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qualitative guidelines for generation, treatment, handling, transport, disposal and recycling of wastes. The book is intended as a practice-oriented reference guide

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for researchers and practitioners, and will be useful for all working in sustainable civil engineering related fields.

The Structural Integrity

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***of Recycled Aggregate
Concrete Produced with
Fillers and Pozzolans
presents a review on the
use of by-products,
fillers and pozzolanic
materials in the***

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development of concrete, with an emphasis on structural integrity. The volume is broken down into key sections, including a review of the types of materials that are used as

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latent hydraulic supplements, fillers and pozzolans for making recycled aggregate concrete, rheology and hydration phenomenon, the mechanical and microscale

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nature of concrete, and the impact of fillers and pozzolans on the workability of concrete with case studies. Durability and strength development are also

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discussed. The final section looks at issues such as performance effect, LCA, environmental impact, sustainability and cost benefit analysis. With detailed case studies

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throughout, this volume will provide useful information for all stakeholders involved in the built environment, including materials scientists, civil

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engineers, builders, architects and policymakers. Identifies several potential by-products, fillers and pozzolans for the development of durable

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***concrete Acts as a
guidebook for constructors
and researchers working in
the broad field of
material science,
engineering and in-situ
application Presents the***

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durability properties of concrete made of by-products, fillers and pozzolans

Beneficial Use of Spent Molding Sand from Pennsylvania Foundries