

Non Destructive Assessment Of Concrete Structures Reliability And Limits Of Single And Combined Techniques State Of The Art Report Of The Rilem 207 Inr Rilem State Of The Art Reports

Computational Methods, Seismic Protection, Hybrid Testing and Resilience in Earthquake Engineering
Electromagnetic Non-Destructive Evaluation (XXI)
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Computational Methods, Seismic Protection, Hybrid Testing and Resilience in Earthquake Engineering

This book gathers the peer-reviewed contributions presented at two parallel, closely interconnected events on advanced construction materials and processes, namely the 2nd International RILEM Conference on Rheology and Processing of

Construction Materials (RheoCon2) and the 9th International RILEM Symposium on Self-Compacting Concrete (SCC9), held in Dresden, Germany on 8-11 September 2019. The papers discuss various aspects of research on the development, testing, and applications of cement-based and other building materials together with their specific rheological properties. Furthermore, the papers cover the latest findings in the fast-growing field of self-compacting concrete, addressing topics including components' properties and characterization; chemical admixtures, effect of binders (incl. geopolymers, calcined clay, etc.) and mixture design; laboratory and in-situ rheological testing; constitutive models and flow modelling; numerical simulations; mixing, processing and casting processes; and additive manufacturing / 3D-printing. Also presenting case studies, the book is of interest to researchers, graduate students, and industry specialists, such as material suppliers, consultants and construction experts.

Electromagnetic Non-Destructive Evaluation (XXI)

Ultrasonic Methods of Non-Destructive Testing covers the basic principles and practices of ultrasonic testing, starting with the basic theory of vibration and propagation, design and properties and probes, and then proceeding to the principles and practice of the various ultrasonic techniques for different types of components and structures, both metallic and non-metallic. The design and operation of various types of equipment are covered and references to appropriate national and international standards are provided. Numerous applications are discussed comprehensively and special attention is paid to latest developments. A large number of references is provided so as to enable the reader to obtain further information.

Non-destructive Testing and Evaluation of Civil Engineering Structures

The non-destructive evaluation of civil engineering structures in reinforced concrete is becoming an increasingly important issue in this field of engineering. This book proposes innovative ways to deal with this problem, through the characterization of concrete durability indicators by the use of non-destructive techniques. It presents the description of the various non-destructive techniques and their combination for the evaluation of indicators. The processing of data issued from the combination of NDE methods is also illustrated through examples of data fusion methods. The identification of conversion models linking observables, obtained from non-destructive measurements, to concrete durability indicators, as well as the consideration of different sources of variability in the assessment process, are also described. An analysis of in situ applications is carried out in order to highlight the practical aspects of the methodology. At the end of the book the authors provide a methodological guide detailing the proposed non-destructive evaluation methodology of concrete indicators. Presents the latest developments performed in the community of NDT on different aspects Provides a methodology developed in laboratory and transferred onsite for the evaluation of concrete properties which are not usually addressed by NDT methods Includes the use of data fusion for merging the measurements provided by several NDT methods Includes

examples of current and potential applications

NDT Methods Applied to Fatigue Reliability Assessment of Structures

Recent Advances in Geo-Environmental Engineering, Geomechanics and Geotechnics, and Geohazards

This book is intended to help satisfy an urgent requirement for up-to date comprehensive texts at graduate and senior undergraduate levels on the subjects in non-destructive testing (NDT). The subject matter here is confined to electrical and magnetic methods, with emphasis on the widely used eddy current and magnetic flux leakage methods (including particle inspection), but proper attention is paid to other techniques, such as microwave and AC field applications, which are rapidly growing in importance. Theoretical analyses relating to the various methods are discussed and the depths of presentation are often governed by whether or not the information is readily available elsewhere. Thus, for example, a considerable amount of space is devoted to eddy current theory at what the author considers to be a reasonable standard and not, as usually experienced, in either a too elementary manner or at a level appreciated only by a postgraduate theoretical physicist. The inclusion of the introductory chapter is intended to acquaint the reader with some of the philosophy of NDT and to compare, briefly, the relative performances of the more important methods of testing.

First RILEM International Conference on Concrete and Digital Fabrication - Digital Concrete 2018

Nondestructive Testing of Deep Foundations

Many concrete structures and elements of concrete infrastructure have exceeded their original design lives and are deteriorating to an extent where they are becoming dangerous. The deterioration can be internal or not obvious and therefore only shows up with detailed testing. Non-destructive evaluation of reinforced concrete structures, Volume 1: Deterioration processes and standard test methods reviews the processes of deterioration and classical and standard test methods. Part one discusses deterioration of reinforced concrete and testing problems with chapters on topics such as key issues in the non-destructive testing of concrete structures, when to use non-destructive testing of reinforced concrete structures, deterioration processes in reinforced concrete, modelling ageing and corrosion processes in reinforced concrete structures, components in concrete and their impact on quality, and predicting the service life of reinforced concrete

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structures. Part two reviews classical and standard testing methods including microscopic examination of deteriorated concrete, the analysis of solid components and their ratios in reinforced concrete structures, the determination of chlorides in concrete structures, and investigating the original water content of reinforced concrete structures. With its distinguished editors and international team of contributors, Non-destructive evaluation of reinforced concrete structures, Volume 1: Deterioration processes and standard test methods will be a standard reference for civil and structural engineers as well as those concerned with making decisions regarding the safety of reinforced concrete structures. Provides a comprehensive discussion from examination of the components in concrete and their affect on quality through to the role of and tools required for lifetime management Experts in the field identify the testing problems associated with infrastructure considering design, build and maintenance stages Presents a guide for when to use non-destructive testing of reinforced concrete structures including the role of time in testing

Rheology and Processing of Construction Materials

Non-Destructive Techniques for the Evaluation of Structures and Infrastructure

Written by international experts in the field, this new edition provides the most comprehensive, up-to-date information available on nondestructive testing (NDT) methods used to evaluate concrete structures. Sixteen chapters give you a comprehensive understanding of the tools and techniques used to estimate the in-place strength of concrete and permeation properties that relate to potential durability, and describe methods used to assess the internal condition of concrete and corrosion activity of steel reinforcement.

Testing of Concrete in Structures

The book is a tribute to the research contribution of Professor Andrei Reinhorn in the field of earthquake engineering. It covers all the aspects connected to earthquake engineering starting from computational methods, hybrid testing and control, resilience and seismic protection which have been the main research topics in the field of earthquake engineering in the last 30 years. These were all investigated by Prof. Reinhorn throughout his career. The book provides the most recent advancements in these four different fields, including contributions coming from six different countries giving an international outlook to the topics.

Non-Destructive Testing

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" TRB's second Strategic Highway Research Program (SHRP 2) Report S2-R06A-RR-1: Nondestructive Testing to Identify Concrete Bridge Deck Deterioration identifies nondestructive testing technologies for detecting and characterizing common forms of deterioration in concrete bridge decks. The report also documents the validation of promising technologies, and grades and ranks the technologies based on results of the validations. The main product of this project will be an electronic repository for practitioners, known as the NDTtoolbox, which will provide information regarding recommended technologies for the detection of a particular deterioration. " -- publisher's description.

Nondestructive Testing of Materials and Structures

This report contains nine specific-application cases of various nondestructive test (NDT) methods in fatigue and fracture reliability assessment of structures.

Electrical and Magnetic Methods of Non-destructive Testing

This book was proposed and organized as a means to present recent developments in the field of nondestructive testing of materials in civil engineering. For this reason, the articles highlighted in this editorial relate to different aspects of nondestructive testing of different materials in civil engineering—from building materials to building structures. The current trend in the development of nondestructive testing of materials in civil engineering is mainly concerned with the detection of flaws and defects in concrete elements and structures, and acoustic methods predominate in this field. As in medicine, the trend is towards designing test equipment that allows one to obtain a picture of the inside of the tested element and materials. From this point of view, interesting results with significance for building practices have been obtained

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Emerging Technologies in Non-Destructive Testing VI

The development of NDT (non-destructive testing) techniques used for the inspection of concrete structures is currently in high demand, because many existing structures have become aged and deteriorated in service. In order to formulate predictions on their stability and to estimate their safety, it is necessary to identify damage signals and to determine their causes. In this regard, the development and establishment of innovative and highly advanced non-destructive methods are required. Acoustic Emission (AE) and related NDE (non-destructive evaluation) techniques have been extensively used to

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determine crack detection and damage evaluation in concrete. With the move towards a more sustainable society, and the need to extend the long-term service life of infrastructure and aging and disastrous damage due to recent earthquakes, Acoustic Emission (AE) and Related Non-destructive Evaluation (NDE) Techniques in the Fracture Mechanics of Concrete: Fundamentals and Applications is a critical reference source for civil engineers, contractors working in construction and materials scientists working both in industry and academia. Presents innovative Acoustic Emission (AE) and related non-destructive evaluation (NDE) techniques, used for damage detection and inspection of aged and deteriorated concrete structures Contributions from recognized world-leaders in the application of acoustic emission (AE) and NDE techniques used for the damage assessment of concrete and concrete structures With the move towards a more sustainable society, and the need to extend the long-term service life of infrastructure and damage due to recent earthquakes, this book is of critical importance An essential knowledge resource for civil engineers, contractors working in construction and materials scientists working both in industry and academia

Non-Destructive Test And Evaluation Of Materials

Non- Destructive Test and Evaluation of Materials offers every engineer, technical professional, teacher and student engaged in NDE activities an authoritative guide to the most commonly used and emerging methods of NDE. It helps readers to prepare for professional NDE Level I, II, and III tests. The book elaborately provides guidelines on developing specific NDE techniques and criteria for acceptance of materials for various applications as well as the NDE requirements of design, manufacturing and maintenance agencies. Containing over 200 illustrations, this essential reference discusses: 1. Complete overview of NDE technology and its capabilities in providing support to designers and manufactures 2. Principles and applications of different non-destructive evaluation methods 3. Industrial applications of NDE 4. Modern trends in various disciplines of NDE

Non-Destructive Assessment of Concrete Structures: Reliability and Limits of Single and Combined Techniques

This edited volume contains the best papers in the geo-engineering field accepted for presentation at the 1st Springer Conference of the Arabian Journal of Geosciences, Tunisia 2018. In addition, it includes 3 keynotes by international experts on the following topics: 1. A new three-dimensional rock mass strength criterion 2. New tools and techniques of remote sensing for geologic hazard assessment 3. Land subsidence induced by the engineering-environmental effects in Shanghai China The book is useful for readers who would like to get a broad coverage in geo-engineering. It contains 11 chapters covering the following main areas: (a) Applications in geo-environmental engineering including soil remediation, (b) Characterization of geo-materials using geological, geotechnical and geophysical techniques, (c) Soil improvement

applications, (d) Soil behaviour under dynamic loading, (e) Recent studies on expansive soils, (f) Analytical and numerical modelling of various geo-structures, (g) Slope stability, (h) Landslides, (i) Subsidence studies and (j) Recent studies on various other types of geo-hazards.

Nondestructive Testing to Identify Concrete Bridge Deck Deterioration

Focusing on visual and optical inspection, ultrasonics, acoustic emission, dynamic techniques, X-ray radiography, material characterization, industrial applications and qualification programmes, this book is intended for engineers and researchers, as well as teachers and graduate students.

Handbook on Nondestructive Testing of Concrete

Nondestructive evaluation (NDE) inspection schemes are important in design, manufacturing, and maintenance. By correctly applying techniques of NDE, we can reduce machine and system failures and increase reliability of operating systems over an extended lifetime. Nondestructive Evaluation: A Tool in Design, Manufacturing, and Service introduces and discusses primary techniques used in the field, including ultrasonics, acoustic emission, magnetics, radiography, penetrants, and eddy currents. Examples of each of these techniques are included, demonstrating typical applications.

Non-Destructive Evaluation (NDE) of Polymer Matrix Composites

The book presents the work of the RILEM Technical Committee 249-ISC. Addressing the effective application of new recommendations for non-destructive in situ strength assessment of concrete, it provides information about the different steps of the investigation and processing of test results, until the delivery of strength estimates, and includes tables giving the minimum required number of cores in a variety of situations as well as several examples of how the recommendations can be used in practice. The book explores a topic which is of major importance, i.e. the assessment of concrete compressive strength in existing structures. This property (both mean and standard deviation) is a key input in many cases, such as the reinforcement of structures, the safety checking, the extension of service life. As the new RILEM recommendations imply a deep revision (and improvement) of field practice, the book is intended for managers of structures, structural engineers and specialists of NDT that have to answer these issues. More widely, it will benefit engineers and students who are interested in NDT and in the safety analysis of structures.

Non-destructive Evaluation of Damage in Concrete with Applications in Shallow Foundations

The increased use of polymer matrix composites in structural applications has led to the growing need for a very high level of quality control and testing of products to ensure and monitor performance over time. Non-destructive evaluation (NDE) of polymer matrix composites explores a range of NDE techniques and the use of these techniques in a variety of application areas. Part one provides an overview of a range of NDE and NDT techniques including eddy current testing, shearography, ultrasonics, acoustic emission, and dielectrics. Part two highlights the use of NDE techniques for adhesively bonded applications. Part three focuses on NDE techniques for aerospace applications including the evaluation of aerospace composites for impact damage and flaw characterisation. Finally, the use of traditional and emerging NDE techniques in civil and marine applications is explored in part four. With its distinguished editor and international team of expert contributors, Non-destructive evaluation (NDE) of polymer matrix composites is a technical resource for researchers and engineers using polymer matrix composites, professionals requiring an understanding of non-destructive evaluation techniques, and academics interested in this field. Explores a range of NDE and NDT techniques and considers future trends Examines in detail NDE techniques for adhesively bonded applications Discusses NDE techniques in aerospace applications including detecting impact damage, ultrasonic techniques and structural health monitoring

Nondestructive Evaluation

This book gives information on non destructive techniques for assessment of concrete structures. It synthesizes the best of international knowledge about what techniques can be used for assessing material properties (strength) and structural properties (geometry, defects). It describes how the techniques can be used so as to answer a series of usual questions, highlighting their capabilities and limits, and providing advices for a better use of techniques. It also focuses on possible combinations of techniques so as to improve the assessment. It is based on many illustrative examples and give in each case references to standards and guidelines.

Non-Destructive In Situ Strength Assessment of Concrete

Providing a comprehensive overview of the techniques involved in testing concrete in structures, Testing of Concrete in Structures discusses both established techniques and new methods, showing potential for future development, and documenting them with illustrative examples. Topics have been expanded where significant advances have taken place in the field, for example integrity assessment, sub-surface radar, corrosion assessment and localized dynamic response tests. This fourth edition also covers the new trends in equipment and procedures, such as the continuation of general moves to automate test methods and developments in digital technology and the growing importance of performance monitoring, and includes new and updated references to standards. The non-specialist civil engineer involved in assessment, repair or maintenance of concrete structures will find this a thorough update.

Emerging Technologies in Non-Destructive Testing V

Non-destructive testing (NDT) is a pertinent task in nearly every field of human activity, from the assuring of aircraft integrity to the evaluation of infrastructural decay caused by deterioration or damage. The development of non-destructive methods for quality management results in economic and environmental benefits, in an increase in

Nondestructive Evaluation of Wood

This authoritative book provides a comprehensive review of the highly important subject of non-destructive evaluation of reinforced concrete structures. Engineers have a range of sophisticated techniques at their disposal to assess the condition of reinforced concrete structures that do not cause material damage and which usually enable the structure to be used while the surveys are carried out. Non-destructive evaluation of the infrastructure also plays a key role in calculating and prioritising where money should be spent on repair or replacement. Providing details of related techniques and case studies, this book offers an overview of how to plan and implement the NDT of reinforced concrete structures.

Non-Destructive Evaluation of Reinforced Concrete Structures

NON DESTRUCTIVE TESTING

Microwave and millimeter-wave non-destructive testing and evaluation (NDT&E) is generally understood to mean using high-frequency electromagnetic energy to inspect and characterize materials and structures. In spite of possessing some distinct advantages in certain applications to other NDT&E techniques, microwave NDT&E has only found compared limited practical application during the past 45 years. These advantages include lack of a need for contact between the sensor and the object being inspected, the ability to penetrate dielectric materials, and superior sensitivity to certain material constituents and flaws. One factor contributing to this minimal acceptance by the NDT &E community has been a generally poor understanding in this community of the theory and practice that underlie the technology. This situation exists partly because of a paucity of microwave NDT&E textbook and reference material. Some chapters, reviews, and books aimed at filling this need have been published in the past but, for the most part, this material is based on the use of older microwave technology. However, during the past ten years great strides have been made in terms of the cost, size, and ease of use of microwave components. In addition, recent advances in modeling and measurement techniques have expanded the range of applications for microwave NDT&E. Such applications include inspecting modern materials such as composites, detecting and characterizing surface flaws, and evaluating the compressive strength of cement structures. These advances have

created an urgent need for up-to-date textbook material on this subject.

Acoustic Emission and Related Non-destructive Evaluation Techniques in the Fracture Mechanics of Concrete

The most widely used material for civil infrastructure is reinforced concrete. The concrete deteriorates over time because of several reasons, and therefore, inspection of concrete is necessary to ensure its compliance with the design requirements. Decision makers often have insufficient data to implement the appropriate corrective measures in the face of infrastructure failure. Better assessment methods are essential to obtain comprehensive and reliable information about the concrete elements. Although, different methods exist to inspect concrete members, there is no comprehensive technique available for condition assessment of concrete of shallow foundations. To ensure the integrity of shallow foundations during construction and during its service life, it is necessary to monitor their conditions periodically. To achieve this goal a new NDT methodology is developed to reliably evaluate the conditions of new shallow foundations without changing their future performances. Recently, there is a trend to overcome coupling issues between the transducers and the object under investigation, by installing sensor networks in concrete to assess its integrity. Although many NDT approaches are designed to evaluate the integrity of concrete structural elements, shallow foundations, which are concrete elements embedded in soil, have received less attention. The challenging aspect of characterizing shallow foundations is limited accessibility for in-service foundation inspections because of structural restrictions. Even when accessibility is possible, the NDT methods (ultrasonic pulse velocity, UPV) used may produce measurements with high uncertainties because of inconsistent coupling between the transducer and the surface of the material being tested. In the current research project, a new NDT procedure is developed based on design of new transducers embedded at the base of lab-scale concrete foundation models, and these transducers are waterproof and used as receivers. The transducers consist of radial-mode piezoceramics that can detect waves from different orientations. The developed methodology relies mainly on two methods to emit the transmission pulse; either using a direct contact method by gluing the transducer to the concrete surface or using a plastic tube partially embedded in concrete and filled with water. The first procedure is used when the accessibility to the top surface of the foundations is possible; otherwise, the second option is employed to reach the concrete surface of foundations. The new methodology can be used in different stages: during construction of foundations to monitor the uniformity and quality of the concrete, and during in-service life to periodically assess the condition of the foundations, specifically after an event that may cause severe damage in concrete such as earthquake and overloading. To verify the applicability of the methodology, unreinforced and reinforced shallow foundation lab-scale concrete models were tested in the laboratory under uniaxial compression loads. In this work, all ultrasonic measurements are averaged 16 times to ensure the consistency of the results and to eliminate high frequency noise. The average coefficient of variance obtained is less than 3.5%; which is considered acceptable in this type of measurements (typical measurement error ~5%). Also, different tests were repeated more than

three times by removing and putting back all the ultrasonic transducers to enhance the statistical significance of the results. The main contributions of the research presented in this thesis are: □ Characterization of low and high frequency transducers using laser vibrometer to characterize their responses for better ultrasonic measurements. □ Characterization of a single fracture growth in a homogenous material based on wave velocity and wave attenuation. □ Characterization of cement-based materials using ultrasonic pulse velocity and laser vibrometer methods. □ Evaluation of freeze/thaw damage and monitoring progressive damage in concrete specimens subjected to uniaxial compression load using ultrasonic pulse velocity and laser vibrometer methods. □ Fabrication of thirty-six new radial ultrasonic transducers to embed in concrete models for quality control purposes and to monitor progressive damage using new transmission pulse methodology.

Impact-echo

Non-destructive testing (NDT) is based on inspection methodologies that do not require the change or destruction of the component or system under evaluation. Numerous NDT techniques are increasingly used, thanks to the recent advances in sensing technologies, data acquisition, data storage and signal processing. Inspection information is widely employed in order to make effective maintenance decisions based on the defects identified, their location and severity. This book presents the main advances recently made on different NDT techniques, together with the principal approaches employed to process the signals obtained during inspection.

Intelligent Sensing Technologies for Nondestructive Evaluation

Electromagnetic Nondestructive Evaluation (ENDE) is a technique crucial to a great many engineering activities, as well as to environmental evaluation and protection issues. It is a discipline recognized for its theoretical insight, efficient models and simulations, robust data interpretation, and accurate instrumentation. This book presents contributions from the 22nd ENDE International Workshop, held in Saclay, France, in September 2017. It includes 1 of the 3 keynotes and 34 peer-reviewed and extended versions of the 47 oral contributions delivered during the workshop. Topics covered include static to THz electromagnetic; smart models and high-performance computations; advanced sensors; adaptive databases; model selection and the qualification of uncertainty; multi-sensor data fusion; the monitoring and diagnosis of mechanical structures; and innovative industrial applications. The book will be of interest to all those whose work involves the development or use of electromagnetic non-destructive evaluation.

Microwave Non-Destructive Testing and Evaluation Principles

Digital fabrication has been termed the “third industrial revolution”, and is promising to revolutionize many disciplines,

including most recently the construction sector. Both academia and industry see immense promise in cementitious materials, which lend themselves well to additive manufacturing techniques for digital fabrication in construction. With this recent trend and high interest in this new research field, the 1st RILEM International Conference on Concrete and Digital Fabrication (Digital Concrete 2018) was organized. Since 2014, ETH Zurich has been host for the Swiss National Centre for Competence in Research (NCCR) for Digital Fabrication in Architecture, which is highly interdisciplinary and unique worldwide. In 2018, this NCCR opened the "DFAB House", which incorporates many digital fabrication principles for architecture. It is also responsible for the 600 m² Robotic Fabrication Lab and the first robotically built roof in the world. Held in tandem with Rob|Arch 2018, the leading conference for robotics in architecture, RILEM deemed it the right time to combine forces at this new conference, which will be the first large conference to feature the work of the recently created RILEM Technical Committee on Digital Fabrication with Cement-based Materials, among other leaders in this new field worldwide. This conference proceedings brings together papers that take into account the findings in this new area. Papers reflect the varying themes of the conference, including Materials, Processing, Structure, and Applications.

Strain-Hardening Cement-Based Composites

Nondestructive Testing involves the use of methods such as wave propagation, electromagnetism, electrical conductivity, and thermal conductivity to test structural integrity and thereby allow nondestructive assessment of structures and the possibility of structural failures before they occur. Nondestructive Testing of Deep Foundations covers different techniques designed to provide information about the integrity and quality of the material that makes up a deep foundation. Nondestructive Testing methods are used at all stages of a structure's life - from new construction quality control to residual lifetime prediction, and even during the monitoring of demolition. In addition, Nondestructive Testing is being increasingly specified in deep foundation projects, though often without a good understanding of its limitations and with the result that methods are often misused. In order to be able to specify an appropriate method, or to recognize an inappropriate specification, it is necessary for the engineer, specifier and/or contractor to understand the capabilities and limitations of each of the methods currently in use. Nondestructive Testing of Deep Foundations: Describes the most commonly used deep foundation construction techniques, including typical use of material Provides a brief history of the development of commercially available nondestructive methods Summarises each method's capabilities and limitations Acts as a one stop reference drawing together resources only previously available in conference proceedings and journal papers This manual will prove to be a welcome addition to the bookshelf of all practitioners in civil/structural and geotechnical engineering and architecture. It will also provide a valuable insight into this highly technical field for university researchers, lecturers and postgraduate students in civil/structural and geotechnical engineering.

Non-Destructive Testing

Non-Destructive Testing (NDT) is of worldwide significance, and is strongly related to the detection of damage in engineering structures (buildings, bridges, aircrafts, ships, pressure vessels, etc.) using non-invasive techniques (ultrasound, X-rays, Radar, neutrons, thermography, vibrations, acoustic emission, etc.). Emerging Technologies in Non-D

ICE Manual of Construction Materials: Fundamentals and theory; Concrete; Asphalts in road construction; Masonry

This is the proceedings of the 4th International Conference on Strain-Hardening Cement-Based Composites (SHCC4), that was held at the Technische Universität Dresden, Germany from 18 to 20 September 2017. The conference focused on advanced fiber-reinforced concrete materials such as strain-hardening cement-based composites (SHCC), textile-reinforced concrete (TRC) and high-performance fiber-reinforced cement-based composites (HPFRCC). All these new materials exhibit pseudo-ductile behavior resulting from the formation of multiple, fine cracks when subject to tensile loading. The use of such types of fiber-reinforced concrete could revolutionize the planning, development, dimensioning, structural and architectural design, construction of new and strengthening and repair of existing buildings and structures in many areas of application. The SHCC4 Conference was the follow-up of three previous successful international events in Stellenbosch, South Africa in 2009, Rio de Janeiro, Brazil in 2011, and Dordrecht, The Netherlands in 2014.

Non-Destructive Evaluation of Reinforced Concrete Structures

This book provides an overview and up-to-date synthesis of the most commonly used non-destructive technologies for the reverse engineering of built infrastructure facilities. These technologies tackle both the geometric and radiometric characterization of built structures, and thus, validated technologies such as laser scanning, photogrammetry, and

Emerging Technologies in NDT

Condition assessment and characterization of materials and structures by means of nondestructive testing (NDT) methods is a priority need around the world to meet the challenges associated with the durability, maintenance, rehabilitation, retrofitting, renewal and health monitoring of new and existing infrastructures including historic monuments. Numerous NDT methods that make use of certain components of the electromagnetic and acoustic spectrum are currently in use to this effect with various levels of success and there is an intensive worldwide research effort aimed at improving the existing methods and developing new ones. The knowledge and information compiled in this book captures the current state of the art in NDT methods and their application to civil and other engineering materials and structures. Critical reviews and advanced interdisciplinary discussions by world-renowned researchers point to the capabilities and limitations of the

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currently used NDT methods and shed light on current and future research directions to overcome the challenges in their development and practical use. In this respect, the contents of this book will equally benefit practicing engineers and researchers who take part in characterization, assessment and health monitoring of materials and structures.

Non-destructive Testing of Materials in Civil Engineering

Non-destructive evaluation (NDE) methods have dominated most of the fields of applied research and technology over the last twenty years. These techniques provide information on the functional efficiency of materials and structures without causing any structural impact on the structure itself. Their use enables the monitoring of the structural inte

Ultrasonic Methods of Non-destructive Testing

This report summarizes information on nondestructive testing and evaluation of wood. It includes information on a wide range of nondestructive assessment technologies and their uses for evaluating various wood products.

Non-destructive Testing of Concrete

Describing NDE issues associated with real-world applications, this comprehensive book details conventional and forthcoming NDE technologies. It instructs on current practices, common techniques and equipment applications, and the potentials and limitations of current NDE methods. Each chapter details a different method, providing an overview, an e

Nondestructive Evaluation

This book is a printed edition of the Special Issue "Intelligent Sensing Technologies for Nondestructive Evaluation" that was published in Sensors

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