

Quality Assurance Of Concrete Foundation Elements Using An

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["Code of Massachusetts regulations, 2010"](#) -

2010

Archival snapshot of entire looseleaf Code of Massachusetts Regulations held by the Social Law Library of Massachusetts as of January 2020.

NBS Technical Note - 1979

[Architectural Graphic Standards](#) - American

Institute of Architects 2016-03-21

The 'Architect's Bible' since 1932, updated with the latest codes and standards [Architectural Graphic Standards](#) is the written authority for architects, designers, and building contractors. It

provides comprehensive guidance on the visual representation of materials, products, systems, and assemblies. Updated to reflect the most current codes and standards, this new 12th edition features over 300 new drawings, tables, and designs and twenty-five percent new content. In response to architects' feedback and overwhelming demand for a more graphics-heavy format, this edition employs shorter, more accessible texts and more images of the standards and evolution of design and construction. New coverage includes building resiliency and the building envelope, expert discussion on the fundamentals of design and

construction documentation, and new examination of environmental factors and material properties and performance. Sustainable Design is no longer separated, but incorporated throughout, and extensive appendices keep useful data right at your fingertips. Graphic standards are essential to building design. They cover everything from door frames and roof designs to air ducts and outdoor sports facilities. This meticulous resource provides a compendium of planning standards, optimum dimensions, and normative construction details. The book is organized into three core sections covering: design and documentation, materials, and building elements. Architectural Graphic Standards features: Key architectural design and production processes—functional planning, environmental assessment, building resiliency, and architectural construction documentation Thorough coverage of materials: concrete, masonry, metals, wood, plastics, composites, and glass An exhaustive survey of building elements—substructures, shells, services, equipment, furnishings, special structures, and siteworks Comprehensive appendixes filled with pertinent data such as: classic architectural elements, mathematical data, and structural calculations Endorsed by the American Institute of Architects, this book has an enduring and unsurpassed reputation for high-quality illustration, text, and graphic design. For crucial information in a user-friendly format, Architectural

Graphic Standards is the go-to reference on building design and construction.

California Code of Regulations - 2013

"This document is Part 2 of 12 parts of the official triennial compilation and publication of the adoptions, amendments and repeal of administrative regulations to California Code of Regulations, Title 24, also referred to as the California Building Standards Code. This part is known as the California Building Code"--Preface.

Olin's Construction - H. Leslie Simmons

2011-12-20

Get the updated industry standard for a new age of construction! For more than fifty years, Olin's Construction has been the cornerstone reference in the field for architecture and construction professionals and students. This new edition is an invaluable resource that will provide in-depth coverage for decades to come. You'll find the most up-to-date principles, materials, methods, codes, and standards used in the design and construction of contemporary concrete, steel, masonry, and wood buildings for residential, commercial, and institutional use. Organized by the principles of the MasterFormat® 2010 Update, this edition: Covers sitework; concrete, steel, masonry, wood, and plastic materials; sound control; mechanical and electrical systems; doors and windows; finishes; industry standards; codes; barrier-free design; and much more Offers extensive coverage of the metric system of

measurement Includes more than 1,800 illustrations, 175 new to this edition and more than 200 others, revised to bring them up to date Provides vital descriptive information on how to design buildings, detail components, specify materials and products, and avoid common pitfalls Contains new information on sustainability, expanded coverage of the principles of construction management and the place of construction managers in the construction process, and construction of long span structures in concrete, steel, and wood The most comprehensive text on the subject, Olin's Construction covers not only the materials and methods of building construction, but also building systems and equipment, utilities, properties of materials, and current design and contracting requirements. Whether you're a builder, designer, contractor, or manager, join the readers who have relied on the principles of Olin's Construction for more than two generations to master construction operations.

Quality Management in a Lean Health Care Environment - Melissa Mannon 2015-07-06

Quality in a lean health care setting has one ultimate goal-to improve care delivery and value for the patient. The purpose of this book is to provide a blueprint to hospitals, healthcare organizations, leaders, and patient-facing workers with tools, training, and ideas to address quality within their organization. Examples from health

care an other industries are provider to illustrate lean methodology and learn their application in quality. The reader can learn how other organizations improve quality, what their roles are, and what they do daily. By the end of the book, you will have learned actionable concepts and have the tools and resources to start improving quality.

Nuclear Regulatory Commission Issuances - U.S. Nuclear Regulatory Commission 1978

Nondestructive Testing of Deep Foundations - Bernard Hertlein 2007-01-11

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.

Special Deep Foundation - Liebherr-Werk Nenzing GmbH, 2009-11-23

The methods and equipment technology employed in the deep foundation industry have improved rapidly in recent years. The ingenuity of civil engineers, the results of new scientific research and the ongoing and new developments in machine technology have all led to the

acceleration of this process. Applying technologies that have become very complex, and selecting the suitable machinery and equipment, demand ever more specialized knowledge and practical experience. It has become very difficult for users and manufacturers of special deep foundation machinery to maintain an overview of the level of technology in the sector. Both volumes provide a comprehensive overview of the special deep foundation applications, equipment and processes. They are intended as an aid to planning and implementation, and aim to help practitioners, public authorities, engineering companies and students to broaden and complete their level of knowledge. They are targeted primarily at occupational engineers and applications in the field. The individual chapters discuss manufacturing techniques and potential applications, along with the associated machine components. The specifics of each method and machine technology are examined in detail. Since the first volume of the compendium on Special Deep Foundation was published in March 2008, it has become a standard reference book.

Durability of Building Materials and Components 7 - Christer Sjoström 2004-01-14

These books contain articles on R&D into the major aspects of durability and service life prediction of building materials and components, as well as theoretical aspects of methods and

modelling of prediction, description of degradation environment by use GIS, as practical implementation of knowledge on durability in maintenance procedures and in standardisation and regulations.

Proceedings of the 1st Conference of the European Association on Quality Control of Bridges and Structures - Carlo Pellegrino
2021-12-11

This book gathers the latest advances and innovations in the field of quality control and improvement of bridges and structures, as presented by international researchers and engineers at the 1st Conference of the European Association on Quality Control of Bridges and Structures (EUROSTRUCT 2021), held in Padua, Italy on August 29 – September 1, 2021.

Contributions include a wide range of topics such as testing and advanced diagnostic techniques for damage detection; SHM and AI, IoT and machine learning for data analysis of bridges and structures; fiberoptics and smart sensors for long-term SHM; structural reliability, risk, robustness, redundancy and resilience for bridges; corrosion models, fatigue analysis and impact of hazards on infrastructure components; bridge and asset management systems, and decision-making models; Life-Cycle Analysis, retrofit and service-life extension, risk management protocols; quality control plans, sustainability and green materials.

Planning and design handbook on precast

building structures - FIB – International Federation for Structural Concrete 1994-05-01

"Code of Massachusetts regulations, 2009" - 2009

Archival snapshot of entire looseleaf Code of Massachusetts Regulations held by the Social Law Library of Massachusetts as of January 2020.

Physical Modelling in Geotechnics, Volume 1 - Andrew McNamara 2018-07-11

Physical Modelling in Geotechnics collects more than 1500 pages of peer-reviewed papers written by researchers from over 30 countries, and presented at the 9th International Conference on Physical Modelling in Geotechnics 2018 (City, University of London, UK 17-20 July 2018). The ICPMG series has grown such that two volumes of proceedings were required to publish all contributions. The books represent a substantial body of work in four years. Physical Modelling in Geotechnics contains 230 papers, including eight keynote and themed lectures representing the state-of-the-art in physical modelling research in aspects as diverse as fundamental modelling including sensors, imaging, modelling techniques and scaling, onshore and offshore foundations, dams and embankments, retaining walls and deep excavations, ground improvement and environmental engineering, tunnels and geohazards including significant contributions in

the area of seismic engineering. ISSMGE TC104 have identified areas for special attention including education in physical modelling and the promotion of physical modelling to industry. With this in mind there is a special themed paper on education, focusing on both undergraduate and postgraduate teaching as well as practicing geotechnical engineers. Physical modelling has entered a new era with the advent of exciting work on real time interfaces between physical and numerical modelling and the growth of facilities and expertise that enable development of so called 'megafuges' of 1000gtonne capacity or more; capable of modelling the largest and most complex of geotechnical challenges. Physical Modelling in Geotechnics will be of interest to professionals, engineers and academics interested or involved in geotechnics, geotechnical engineering and related areas. The 9th International Conference on Physical Modelling in Geotechnics was organised by the Multi Scale Geotechnical Engineering Research Centre at City, University of London under the auspices of Technical Committee 104 of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). City, University of London, are pleased to host the prestigious international conference for the first time having initiated and hosted the first regional conference, Eurofuge, ten years ago in 2008. Quadrennial regional conferences in both Europe

and Asia are now well established events giving doctoral researchers, in particular, the opportunity to attend an international conference in this rapidly evolving specialist area. This is volume 1 of a 2-volume set.

"Code of Massachusetts regulations, 2008" - 2008

Archival snapshot of entire looseleaf Code of Massachusetts Regulations held by the Social Law Library of Massachusetts as of January 2020.

Application of Stress-Wave Theory to Piles: Quality Assurance on Land and Offshore Piling - J. Beim 2014-04-21

This work collates the topics discussed in the sixth International Conference on land and offshore piling. It covers topics such as: wave mechanics and its application to pile mechanics; driving equipment and developments; and pile integrity and low strain dynamic testing.

Concrete Progress - G. M. Idorn 1997

Concrete progress deals with the technology that made concrete the most widely used building material in the world in the course of the past hundred years, and the most indispensable for the global socio-economic development in the new millennium. It offers an insight into many people's dedicated, exploratory concrete research, and into strategic planning and management of research and its transfer to engineering practice. This book is introduced by

retrospectively highlighting the international history of concrete technology and uses.

Design of Industrial Structures - Ashoke Kumar Dasgupta 2021-11-26

This book bridges the gap between academic and professional field pertaining to design of industrial reinforced cement concrete and steel structures.

It covers pertinent topics on contracts, specifications, soil survey and design criteria to clarify objectives of the design work. Further, it gives out guiding procedures on how to proceed with the construction in phases at site, negotiating changes in equipment and design development.

Safety, quality and economic requirements of design are explained with reference to global codes. Latest methods of analysis, design and use of advanced construction materials have been illustrated along with a brief on analysis software and drafting tool.

Highway Quality Compendium - 2007

Dispute Resolution and Conflict Management in Construction - Edward Davies 2005-10-05

Many construction conflicts and disputes are not limited to particular jurisdictions or cultures, but are increasingly becoming common across the industry worldwide. This book is an invaluable guide to international construction law, written by a team of experts and focusing on the following national systems: Australia, Canada, China, England and Wales, Estonia, Hong Kong, Iraq,

Ireland, Italy, Japan, Malaysia, the Netherlands, Oman, Portugal, Quebec, Romania, Scotland, Sweden, Switzerland, and the USA. The book provides a consistent and rigorous analysis of each national system as well as the necessary tools for managing conflict and resolving disputes on construction projects.

International Directory of Building Research Information and Development Organizations - International Council for Building Research, Studies and Documentation 2006-01-16

Every entry follows a standard pattern: after the address and telephone number of the institution there is a brief description of its history and financial support, followed by the names of the senior staff, total number of staff, the institution's structure and services, its main research programmes and a list of its publications. For this new edition a subject index has been added, allowing the reader to identify centres of research activity on individual construction topics throughout the world. The world-wide investment in construction industry research is enormous.

This unique directory is a guidebook to that investment which will enable its readers to isolate sources of advice on practical problems, information on national standards and requirements and potential research collaborators.

Supervision of Concrete Construction 1 - Dr J Richardson 1986-09-26

These two volumes provide authoritative guidance

on all aspects of concrete construction from the point of view of the supervisor responsible for the work on site. They will also be of value to the section manager, foreman, clerk of works as well as to the design and construction engineer who need to understand the basic principles of good concrete

Global Perspectives on Quality Assurance and Accreditation in Higher Education Institutions -

Magd, Hesham 2021-09-17

Quality accreditation in higher education institutions (HEIs) is currently a buzzword. The need to maintain high-quality education standards is a critical requirement for HEIs to remain competitive in the market and for government and regulatory bodies to ensure the quality standards of programs offered. From being an implicit requirement that is internally addressed, quality assurance activities become an explicit requirement that is regularly audited and appraised by national and international accreditation agencies. HEIs are voluntarily integrating quality management systems (QMS), institutional and program-specific, in response to the political and competitive environment in which it exists. Through its higher education department or by creating non-profitable accreditation bodies, many governments have implemented a quality framework for licensing HEIs and invigilates its adherence based on which accreditation statuses are granted for HEIs. Global Perspectives on

Quality Assurance and Accreditation in Higher Education Institutions provides a comprehensive framework for HEIs to address quality assurance and quality accreditation requirements and serves as a practical tool to develop and deploy well-defined quality management systems in higher education. The book focuses on the critical aspects of quality assurance; the need to develop a concise and agile vision, mission, values, and graduate attributes; and to develop a system that effectively aligns the various activities of the HEI to the attainment of the strategic priorities listed in the institutional plans. The chapters each cover the various facets of the quality assurance framework and accreditation agencies' requirements with practical examples of each. This book is useful for HEI administrators, quality assurance specialists in HEIs, heads of academic departments, internal auditors, external auditors, and other practitioners of quality, along with stakeholders, researchers, academicians, and students interested in quality assurance and accreditation in higher education.

Emerging Technologies in NDT - Gerhard Busse
2008-04-16

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

Product Lifecycle Management. PLM in Transition Times: The Place of Humans and Transformative Technologies - Frédéric Noël 2023-01-31

This book constitutes the refereed proceedings of the 19th IFIP WG 5.1 International Conference, PLM 2022, Grenoble, France, July 10–13, 2022, Revised Selected Papers. The 67 full papers included in this book were carefully reviewed and selected from 94 submissions. They were organized in topical sections as follows:

Organisation: Knowledge Management, Business Models, Sustainability, End-to-End PLM, Modelling tools: Model-Based Systems Engineering, Geometric modelling, Maturity models, Digital Chain Process, Transversal Tools: Artificial Intelligence, Advanced Visualization and Interaction, Machine learning, Product development: Design Methods, Building Design, Smart Products, New Product Development, Manufacturing: Sustainable Manufacturing, Lean Manufacturing, Models for Manufacturing.

Quality Assurance and Construction Manpower Management Conference, June 15, 16, and 17, 1977, Orlando, Florida - 1977

Analysis of Tentative Seismic Design Provisions for Buildings - James Robert Harris 1979

Concrete Mix Design, Quality Control and

Specification - Ken W. Day 2013-11-11

The nature of concrete is rapidly changing, and with it, there are rising concerns. Thoroughly revised and updated, this fourth edition of Concrete Mix Design, Quality Control and Specification addresses current industry practices that provide inadequate durability and fail to eliminate problems with underperforming new concrete and defective tests

Reinforced Concrete: Analysis and Design - S. S. Ray 1995-02-27

This book covers the analysis and design of reinforced concrete elements in foundations and superstructures in a logical, step-by-step fashion. The theory of reinforced concrete and the derivation of the code formulae have been clearly explained. The text is backed up by numerous illustrations, design charts and tables referring frequently to the relevant codes of practice. A large number of worked examples cover almost all types of reinforced concrete elements. The step-by-step approach will ensure that all design requirements are logically adhered to, a standardized approach is established in a design office and that a simplified procedure for checking and for quality assurance can be implemented.

Tunnelling Switzerland - Georgios Anagnostou 2013

Die Schweiz ist das Tunnelland par excellence: Rund 1300 Tunnel und Stollen prägen das Landschaftsbild. Und laufend kommen neue

hinzu. "Tunnelling Switzerland" stellt die Errungenschaften der letzten 15 Jahre auf allen Gebieten des Untertagbaus anhand von mehr als 90 Projekten vor. Dazu gehören u.a. Strassentunnel, Eisenbahntunnel, Tunnelanierungen, Kraftwerksanlagen, Hochwasserschutzbauten und Leitungstunnel zur Energieerzeugung und Wasserversorgung. Die einzelnen Bauwerke werden jeweils auf einer Doppelseite in Wort und Bild vorgestellt. Dazu kommen Informationen zur Geologie, zu Bauherrschaft, Projektierungsbüros und Unternehmerschaft. Die englischsprachigen Beschreibungen werden durch Übersetzungen in die Landessprachen ergänzt. Vorgestellte Tunnel (Auswahl): Gotthard-Basistunnel, Ceneri-Basistunnel, Durchmesserlinie Zürich: Weinbergtunnel, Unterfahrung Hauptbahnhof Zürich, Zimmerberg-Basistunnel, PTS-Tunnel am Flughafen Zürich, Tunnel Engelberg, Le métro lausannois, Tunnel Luzernerring, Uetlibergtunnel A3, Überdeckung Entlisberg A3, Islisbergtunnel, Tunnel Flüelen A4, Sicherheitsstollen Tunnel Flüelen, Tunnel Giswil A8, Tunnel Sachseln A8, Projektübersicht Südumfahrung Visp A9, Milchbucktunnel (Zürich), Tunnel Hausmatt (Olten), Umfahrung Bazenhaid, Tunnel routier du Grand Saint Bernard, Erneuerung Tunnel San Bernardino A13, SBB Simplontunnel, Hochwasser-Entlastungsstollen Thunersee, Pumpspeicherwerk Limmern, Pumpspeicherwerk

Nant de Drance, Ausbau der Grimselkraftwerke, Wasserkraftwerk Cleuson-Dixence, Trinkwasserstollen Uetliberg, Jungfrauoch – Top of Europe

Structural Safety and Its Quality Assurance -

Bruce Ellingwood 2005-01-01

Sponsored by Committee 9A/10 of the Council on Tall Buildings and Urban Habitat of the Structural Engineering Institute of ASCE. This report uses an international perspective to look at structural safety problems from basic concept to design and construction. The report examines the overall concept of safety, including how to ensure safety and can assist engineers in explaining safety concepts to a client or the public. Topics include: Øsafety concepts, Ørole of regulation and standards, Øload modeling, Øreliability analysis, Øreliability-based design, Ødurability in structural safety assessment, Øsoils and foundations, Øassessment of existing structures, Øquality management of structural design, Øquality management in construction, and Øhuman error. Practicing structural engineers and students in the field of structural engineering will find this report useful.

Deep Foundations on Bored and Auger Piles -

BAP_V - William F. Van Impe 2008-08-20

Although progressing very well over the last years, the design criteria for bored and auger piles are still not fully under control and in acceptable synergism with the real pile foundation

behaviour. Although there has been a lot of research in the past years worldwide on deep foundation engineering, the strong and competitive market has

Solar Energy Houses - Anne-Grete Hestnes

2013-11-05

Passive and active solar strategies together with the adoption of energy conservation measures and the integration of new materials and technologies can lead to a dramatic reduction of 75-90 per cent in the energy consumption of the buildings. The objective of Task 13 of the IEA's Solar Heating and Cooling Programme was to advance solar building technologies and demonstrate this potential by designing and constructing buildings that met very low energy consumption targets while maintaining a good indoor climate. This revised second edition of this book presents the findings of the Task 13 experts and includes the results of the monitoring programme, conducted to determine the effectiveness of the techniques and strategies adopted. This new edition also provides a detailed explanation of this research programme in terms of how far the expectations of the Task experts were met and highlights the specific successes and lessons learned from the project.

An Introduction to Quality Control and Performance of Roller Compacted Concrete - J.

Paul Guyer, P.E., R.A. 2020-11-29

Introductory technical guidance for civil engineers

and construction managers interested in quality control and performance of roller compacted concrete for streets and highways, dams and other infrastructure. Here is what is discussed: 1.

QUALITY CONTROL FOR ROLLER COMPACTED CONCRETE 2. PERFORMANCE.

Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory - 2003

Introduction to Tunnel Construction - David Chapman 2017-11-27

Tunnelling provides a robust solution to a variety of engineering challenges. It is a complex process, which requires a firm understanding of the ground conditions as well as the importance of ground-structure interaction. This book covers the full range of areas related to tunnel construction required to embark upon a career in tunnelling. It also includes a number of case studies related to real tunnel projects, to demonstrate how the theory applies in practice. New features of this second edition include: the introduction of a case study related to Crossrail's project in London, focussing on the Whitechapel and Liverpool Street station tunnels and including considerations of building tunnels in a congested urban area; and further information on recent developments in tunnel boring machines, including further examples of all the different types of machine as well as multi-mode

machines. The coverage includes: Both hard-rock and soft-ground conditions Site investigation, parameter selection, and design considerations Methods of improving the stability of the ground and lining techniques Descriptions of the various main tunnelling techniques Health and safety considerations Monitoring of tunnels during construction Description of the latest tunnel boring machines Case studies with real examples, including Crossrail's project in London Clear, concise, and heavily illustrated, this is a vital text for final-year undergraduate and MSc students and an invaluable starting point for young professionals and novices in tunnelling.

The Massachusetts register - 2008-08-22

ECPPM 2021 - eWork and eBusiness in Architecture, Engineering and Construction - Vitaly Semenov 2021-04-28

eWork and eBusiness in Architecture, Engineering and Construction 2021 collects the papers presented at the 13th European Conference on Product and Process Modelling (ECPPM 2021, Moscow, 5-7 May 2021). The contributions cover a wide spectrum of thematic areas that hold great promise towards the advancement of research and technological development targeted at the digitalization of the AEC/FM (Architecture, Engineering, Construction and Facilities Management) domains. High quality contributions are devoted to critically important

problems that arise, including: Information and Knowledge Management Semantic Web and Linked Data Communication and Collaboration Technologies Software Interoperability BIM Servers and Product Lifecycle Management Systems Digital Twins and Cyber-Physical Systems Sensors and Internet of Things Big Data Artificial and Augmented Intelligence in AEC Construction Management 5D/nD Modelling and Planning Building Performance Simulation Contract, Cost and Risk Management Safety and Quality Sustainable Buildings and Urban Environments Smart Buildings and Cities BIM Standardization, Implementation and Adoption Regulatory and Legal Aspects BIM Education and Training Industrialized Production, Smart Products and Services Over the past quarter century, the biennial ECPPM conference series, as the oldest BIM conference, has provided researchers and practitioners with a unique platform to present and discuss the latest developments regarding emerging BIM technologies and complementary issues for their adoption in the AEC/FM industry.

Nondestructive Measurements Using Mechanical Waves in Reinforced Concrete Structures - Stephen R. Sharp 2014

This study evaluated various techniques that use mechanical waves for the evaluation of critical concrete properties, such as proper consolidation of the concrete during placement and strength development; changes in modulus; and the

detection of cracks, voids, and delaminated regions. The methods evaluated were ultrasonic shear-wave tomography, ultrasonic pulse velocity, crosshole sonic logging, sonic echo-impulse response, spectral analysis of surface waves, and the use of an impact echo scanner on pavements and bridge structures. Ultrasonic shear-wave tomography can be successfully used to determine the major distressed areas in pavements. Crosshole sonic logging can detect voids in drilled shafts and can indicate concrete performance and quality. Sonic echo-impulse response can reliably detect voids but is not always able to establish a precise location because of the potential variability in wave velocity. However, it can still provide useful thickness or depth information. In addition, detection of distress is limited by the embedded length-to-diameter ratios of the foundation element being examined. The use of ultrasonic pulse velocity can improve the accuracy of sonic echo-impulse response measurements by providing the actual velocity of the concrete being evaluated. Use of the impact echo scanner can provide delamination data for structures with

smooth surfaces. In addition to detecting the condition of the concrete elements, these methods can be used to help determine compliance with end-result specifications. Quality control and acceptance using end-result specifications requires at least three test results to determine variability, which can be easily obtained using nondestructive test methods. The results regarding spectral analysis of surface waves were promising, but additional validation work is required to determine the abilities of this technique to assess asphalt-overlaid concrete decks. This study showed that nondestructive mechanical wave methods can be successfully used in determining concrete quality and the extent of distress in concrete structures. The study recommended that these methods be used by the Virginia Department of Transportation for condition assessment. The next step is to continue collecting data on pavements and bridge structures using these techniques.

Durability of Building Materials & Components 7 -

C Sjostrom 2014-02-24

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