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Structural Condition Assessment, Monitoring and Improvement

Condition Assessment of Main Structural Members of Stream Schooner WAPAMA
Sensor Technologies for Civil Infrastructures
Sustainable Building with Earth
Guidelines for Electrical Transmission Line Structural Loading

MICHAELA HEZEKIAH

Structural Condition Assessment of Existing Buildings Amer Society of Civil Engineers
Coal- and gas-based power plants currently supply the largest proportion of the world's power generation capacity, and are required to operate to increasingly stringent environmental standards. Higher temperature combustion is therefore being adopted to improve plant efficiency and to maintain net power output given the energy penalty that integration of advanced emissions control systems cause. However, such operating regimes also serve to intensify degradation mechanisms within power plant systems, potentially affecting their reliability and lifespan.Power plant life management and performance improvement critically reviews the fundamental degradation mechanisms that affect conventional power plant systems and components, as well as examining the operation and maintenance approaches and advanced plant rejuvenation and retrofit options that the industry are applying to ensure overall plant performance improvement and life management.Part one initially reviews plant operation issues, including fuel flexibility, condition monitoring and performance assessment. Parts two, three and four focus on coal boiler plant, gas turbine plant, and steam boiler and turbine plant respectively, reviewing environmental degradation mechanisms affecting plant components and their mitigation via advances in materials selection and life management approaches, such as repair, refurbishment and upgrade. Finally, part five reviews issues relevant to the performance management and improvement of advanced heat exchangers and power plant welds.With its distinguished editor and international team of contributors, Power plant life management and performance improvement is an essential reference for power plant operators, industrial engineers and metallurgists, and researchers interested in this important field. Provides an overview of the improvements to plant efficiency in coal- and gas-based power plants Critically reviews the fundamental degradation mechanisms that affect conventional power plant systems and components, noting mitigation routes alongside monitoring and assessment methods Addresses plant operation issues including fuel flexibility, condition monitoring and performance assessment
Damage Models and Algorithms for Assessment of Structures under Operating Conditions CRC Press
Roads and Airports Pavement Surface Characteristics contains the papers presented at the 9th International Symposium on Pavement Surface Characteristics (SURF 2022, Milan, Italy, 12-14 September 2022). The symposium was jointly organized by the Italian company that manages Italy's National Roads (ANAS –Ferrovie dello Stato Italiane Group), the World Road Association (PIARC) and Politecnico di Milano. The contributions aim to improve the quality of pavement surface characteristics while accomplishing efficiency, safety, sustainability, and addressing new generation mobility needs. The book covers topics from emerging research to engineering practice, and is divided in the following sections: Advanced and performing construction methods and equipment Next generation mobility Data monitoring and performance assessment Surface features and performances| Maintenance and preservation treatments Pavement management Economic and political strategies Safety and risk issues Minimizing road impacts Sustainability and performances issues about materials and design Pavements surfaces and urban heat islands Weather conditions impact Airport pavements Roads and Airports Pavement Surface Characteristics is of interest to academics, engineers and professionals in the fields of pavement engineering, transport infrastructure, and related disciplines.
Structural Condition Assessment CRC Press
Life-Cycle of Structures and Infrastructure Systems contains the lectures and papers presented at IALCCE 2023- The Eighth International Symposium on Life-Cycle Civil Engineering, held at Politecnico di Milano, Milan, Italy, 2-6 July, 2023. This book contains the full papers of 514 contributions presented at IALCCE 2023, including the Fazlur R. Khan Plenary Lecture, nine Keynote Lectures, and 504 technical papers from 45 countries. The papers cover recent advances and cutting-edge research in the field of life-cycle civil engineering, including emerging concepts and innovative applications related to life-cycle design, assessment, inspection, monitoring, repair, maintenance, rehabilitation, and management of structures and infrastructure systems under uncertainty. Major topics covered include life-cycle safety, reliability, risk, resilience and sustainability, life-cycle damaging processes, life-cycle design and assessment, life-cycle inspection and monitoring, life-cycle maintenance and management, life-cycle performance of special structures, life-cycle cost of structures and infrastructure systems, and life-cycle-oriented computational tools, among others. This Open Access Book provides both an up-to-date overview of the field of life-cycle civil engineering and significant contributions to the process of making more rational decisions to mitigate the life-cycle risk and improve the life-cycle reliability, resilience, and sustainability of structures and infrastructure systems exposed to multiple natural and human-made hazards in a changing climate. It will serve as a valuable reference to all concerned with life-cycle of civil engineering systems, including students, researchers, practicioners, consultants, contractors, decision makers, and representatives of managing bodies and public authorities from all branches of civil engineering.
Guideline for Structural Condition Assessment of Existing Buildings (ASCE/SEI 11-99).: General; Chapter 2 Assessment Procedure; Chapter 3 Structural Materials Assessment; Chapter 4 Evaluation Procedures and Evaluation of Structural Materials and Systems; Chapter 5 Report of Structural Condition Assessment; Appendix A Report of Structural Condition Assessment; Appendix B Organization References Springer
This book is a collection of papers presented in the NDT

Conference held on February 20-23, 1996 at San Diego, California. The conference provided an opportunity to share experience and provide additional input to the Federal Highway Administration.

Structural Condition Assessment, Monitoring and Improvement CRC Press

The mooring system is a vital component of various floating facilities in the oil, gas, and renewables industries. However, there is a lack of comprehensive technical books dedicated to the subject. Mooring System Engineering for Offshore Structures is the first book delivering in-depth knowledge on all aspects of mooring systems, from design and analysis to installation, operation, maintenance and integrity management. The book gives beginners a solid look at the fundamentals involved during mooring designs with coverage on current standards and codes, mooring analysis and theories behind the analysis techniques. Advanced engineers can stay up-to-date through operation, integrity management, and practical examples provided. This book is recommended for students majoring in naval architecture, marine or ocean engineering, and allied disciplines in civil or mechanical engineering. Engineers and researchers in the offshore industry will benefit from the knowledge presented to understand the various types of mooring systems, their design, analysis, and operations. Understand the various types of mooring systems and the theories behind mooring analysis Gain practical experience and lessons learned from worldwide case studies Combine engineering fundamentals with practical applications to solve today’s offshore challenges

Risk-Based Strategies for Bridge Maintenance Frontiers Media SA

Effective maintenance of bridge structures comprises a broad spectrum of plans for repairs and services implemented to enable bridges to perform their intended function. These include in-depth inspection, fatigue analysis, design of mitigation measures and construction to avert component deterioration. Several incidents of in-service and under construction bridge failures have recently taken place. These dramatic failures emphasize the importance of risk-based inspections and analysis of real-life data to evaluate reliability of bridges. To effectuate benefits of reliability analysis in bridge maintenance, work on theoretical reliability must be equipped with practical analytical tools. Such an approach must underscore risk elements and identify processes to manage risk and avoid unexpected outcomes of failures and service disruption of bridges. The devastating earthquakes of February 6, 2023, in the southern region of Turkey near the northern border of Syria, which claimed tens of thousands of lives, caused enormous structural damage and staggering economic losses. These seismic events brought to focus on the vitality of instilling infrastructure routes that must accommodate emergency management plans to integrate the influx of medical and rescue response teams. The safe operation of bridges along these routes is indispensable for mobilization and deployment of rescue teams, medical personnel, humanitarian assistance, and the supply of food and water. The reliability of access routes and bridges is defined by their ability to adequately function as planned to effectuate emergency management plans, in the event of a similar seismic event, anywhere in the world. Risk-Based Strategies for Bridge Maintenance contains selected papers presented at the 11th New York City Bridge Conference (New York City, USA, 21-22 August 2023), and discusses issues of reliability, risk assessment, management, maintenance, inspection, monitoring, design, preservation, and rehabilitation of bridges. The book is aimed at bridge engineers.

Recent Advances in Structural Engineering, Volume 2 CRC Press

This volume contains the papers presented at IALCCE2018, the Sixth International Symposium on Life-Cycle Civil Engineering (IALCCE2018), held in Ghent, Belgium, October 28-31, 2018. It consists of a book of extended abstracts and a USB device with full papers including the Fazlur R. Khan lecture, 8 keynote lectures, and 390 technical papers from all over the world. Contributions relate to design, inspection, assessment, maintenance or optimization in the framework of life-cycle analysis of civil engineering structures and infrastructure systems. Life-cycle aspects that are developed and discussed range from structural safety and durability to sustainability, serviceability, robustness and resilience. Applications relate to buildings, bridges and viaducts, highways and runways, tunnels and underground structures, off-shore and marine structures, dams and hydraulic structures, prefabricated design, infrastructure systems, etc. During the IALCCE2018 conference a particular focus is put on the cross-fertilization between different sub-areas of expertise and the development of an overall vision for life-cycle analysis in civil engineering. The aim of the editors is to provide a valuable source of cutting edge information for anyone interested in life-cycle analysis and assessment in civil engineering, including researchers, practising engineers, consultants, contractors, decision makers and representatives from local authorities.

Proceedings of the Canadian Society of Civil Engineering Annual Conference 2021 Woodhead Publishing

The understanding of transmission line structural loads continues to improve as a result of research, testing, and field experience. Guidelines for Electrical Transmission Line Structural Loading, Third Edition provides the most relevant and up-to-date information related to structural line loading. Updated and revised, this edition covers weather-related loads, relative reliability-based design, and loading specifics applied to prevent cascading types of failures, as well as loads to protect against damage and injury during construction and maintenance. This manual is intended to be a resource that can be readily absorbed into a loading policy. It will be valuable to engineers involved in utility, electrical, and structural engineering.

Wood Pole Overhead Lines CRC Press

This book comprises the proceedings of the Annual Conference of the Canadian Society of Civil Engineering 2021. The contents of this volume focus on specialty conferences in construction, environmental, hydrotechnical, materials, structures, transportation engineering, etc. This volume will prove a valuable resource for those in academia and industry.

Mooring System Engineering for Offshore Structures CRC Press

In Structural Condition Assessment, editor-in-chief Robert T. Ratay gathers together the leading people in the field to produce the first unified resource on all aspects of structural condition assessment for strength, serviceability, restoration, adaptive reuse, code compliance, and vulnerability. Organized by the four main stages of a structural evaluation, this book provides an introduction to structural deterioration and its consequences, the business and legal aspects of conducting an evaluation, initial survey and evaluation techniques for various structures, and specific tests for five of the most common structural materials (concrete, steel, masonry, timber and fabric.)

Power Plant Life Management and Performance Improvement Gulf Professional Publishing

Overview of a Modal Based Condition Assessment Procedure: Condition assessment is a term that is used to describe the process of characterizing the physical condition of constructed systems. This paper summarizes a condition assessment (CA) procedure based on a complete system of field-testing, finite element (FE) modeling, and load rating. Development of Dynamic Response Based Objective Functions for Finite Element Modeling of Bridges: To quantify the calibration process, static response based objective functions are carefully developed based on two powerful condition indices: Bridge Girder Condition Indicators (BGCIs) and Unit Influence Lines (UILs). Using an existing calibration strategy, a nominal FE bridge model is optimized by minimizing this global static-response-based objective function. Development of Dynamic Response Based Objective Functions for Finite Element Modeling of Bridges: To quantify the calibration process, dynamic response based objective functions are carefully developed based on two powerful indices: the Modal Assurance Criterion (MAC) and Frequency Correlation Trend Line (FCTL). Using an existing calibration strategy, a nominal FE bridge model is optimized by minimizing this global dynamic-response-based objective function. Some Dynamic Characteristics of Steel Stringer Highway Bridges: A parametric study of critical dynamic characteristics of steel stringer highway bridges has been presented in this paper. A complete naming system of mode types is developed to sort all the modes for steel stringer bridges. This naming system consists of two related naming conventions. The naming system is applied to a set of 1D and 3D three-span, five-girder and four-span, five-girder bridge models. In this paper, the parametric study is done by varying span ratio of the bridge models. The mode type arrangements are analyzed based on mode shapes, natural frequencies, and modal contribution coefficients. Finally, the naming system will be applied to the calibration of nominal bridge model for a representative bridge in Ohio. The study summarized in this paper can be widely used in bridge modeling and analysis.

Annual Report of the Public Service Commission, Second District IET

There are about five hundred steel-truss highway bridges in Ohio, as well as many thousands in the nation, which are more than seventy-five years old. Preservation of aged historic steel-truss bridges first requires a consideration of public safety issues. Bridges with certain structural attributes and materials are well established as having non desirable failure modes, which make them public safety hazards. These should be removed from service with the highest possible priority. If non-technical issues such as historic significance and functional adequacy are favorable, the question then becomes whether a given bridge can be preserved within the available financial and technical resources of the responsible government agency.

Structural Materials Technology CRC Press

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 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.

Structural Analysis-I, 5th Edition Springer

The historic American ship WAPAMA is the last surviving example of the wooden steam-powered schooners designed for the 19th- and 20th-century Pacific Coast lumber trade and coastal service. Since its launching in 1915, the WAPAMA has had a long and productive life in plying cargo and passengers along the stormy West Coast from Mexico to Alaska. As the sole survivor of the once numerous class, the WAPAMA was declared a National Historic Landmark in 1984. The wood structure of the WAPAMA has significantly deteriorated over the years and currently resides on a barge with internal and external structural supports. Portions of the vessel are unsafe for public access. Assisting in an effort to stabilize and rehabilitate this historic vessel, we conducted a field investigation on the current physical condition of the wooden structural members in January 2006. A variety of nondestructive testing (NDT) methods were employed to locate problem areas and define the severity of deterioration on key structural members such as keelsons, keel, ceiling planking, hull frames, clamps, and main deck beams. This report presents the main findings from this field investigation and demonstrates the use of state-of-the-art NDT technologies in evaluating physical and biological conditions of historic wood structures.

... Report of the Railway Electrification Committee (1927) Elsevier

This book concentrates on the mechanical aspects of distribution wood pole lines, including live line working, environmental influences, climate change and international standards.

Condition Assessment of Aged Structures DEStech Publications, Inc

Structural Analysis, or the 'Theory of Structures', is an important subject for civil engineering students who are required to analyze and design structures. It is a vast field and is largely taught at the undergraduate level. A few topics like Matrix Method and Plastic Analysis are also taught at the postgraduate level and in structural engineering electives. The entire course has been covered in two volumes - Structural Analysis I and II. Structural Analysis I deals with the basics of structural analysis, measurements of deflection, various types of deflections, loads and influence lines, etc.

Apostle Islands National Lakeshore, Bayfield, Wisconsin: Long Island CLR Springer Nature

Sensor Technologies for Civil Infrastructure, Volume 2: Applications in Structural Health Monitoring, Second Edition, provides an overview of sensor applications and a new section on future and emerging technologies. Part one is made up of case studies in assessing and monitoring specific structures such as bridges, towers, buildings, dams, tunnels, pipelines, and roads. The new edition also includes sensing solutions for assessing and monitoring of naval systems. Part two reviews emerging technologies for sensing and data analysis including diagnostic solutions for assessing and monitoring sensors, unmanned aerial systems, and UAV application in post-hazard event reconnaissance and site assessment. Includes case studies in

assessing structures such as bridges, buildings, super-tall towers, dams, tunnels, wind turbines, railroad tracks, nuclear power plants, offshore structures, naval systems, levees, and pipelines Reviews future and emerging technologies and techniques including unmanned aerial systems, LIDAR, and ultrasonic and infrared sensing Describes latest emerging techniques in data analysis such as diagnostic solutions for assessing and monitoring sensors and big data analysis

Life Cycle Analysis and Assessment in Civil Engineering: Towards an Integrated Vision CRC Press

This book covers major components of a high voltage system and the different insulating materials applied in equipment, identifying measurable materials suitable for condition assessment, and also analyses insulation fault scenarios that may occur in power equipment.

Diagnostic and Proof Load Tests on Bridges CRC Press

This eBook is a collection of articles from a Frontiers Research Topic. Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: frontiersin.org/about/contact.

Structural Condition Assessment, Monitoring and Improvement John Wiley & Sons

Any structural system in service is subject to age-related deterioration, leading to potential concerns regarding maintenance, health & safety, environmental and economic implications. Condition assessment of aged structures is an invaluable, single source of information on structural assessment techniques for marine and land-based structures such as ships, offshore installations, industrial plant and buildings. Topics covered include: - Current practices and standards for structural condition assessment - Fundamental mechanisms and advanced mathematical methods for predicting structural deterioration - Residual strength assessment of deteriorated structures - Inspection and maintenance of aged structures - Reliability and risk assessment of aged structures Professionals from a broad range of disciplines will be able to gain a better understanding of current practices and standards for structural condition assessment or health monitoring, and what future trends might be. Single source of information on structural assessment techniques for marine and land-based structures Examines the residual strength and reliability of aged structures Assesses current practices covering inspection, health monitoring and maintenance

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