

Handbook Of Condition Monitoring Springer

This book offers a valuable guide for practicing bridge engineers and graduate students in structural engineering; its main purpose is to present the latest concepts in bridge engineering in fairly easy-to-follow terms. The book provides details of easy-to-use computer programs for:

- Analysing slab-on-girder bridges for live load distribution.
- Analysing slab and other solid bridge components for live load distribution.
- Analysing and designing concrete deck slab overhangs of girder bridges under vehicular loads.
- Determining the failure loads of concrete deck slabs of girder bridges under concentrated wheel loads.

In addition, the book includes extensive chapters dealing with the design of wood bridges and soil-steel bridges. Further, a unique chapter on structural health monitoring (SHM) will help bridge engineers determine the actual load carrying capacities of bridges, as opposed to their perceived analytical capacities. The chapter addressing structures made with fibre-reinforced polymers will allow engineers to design highly durable, economical and sustainable structures. This chapter also provides guidance on rehabilitating deteriorated structures with these new materials. The book also deals with the philosophy of bridge design without resorting to complex equations. Additional material to this book can be downloaded from <http://extras.springer.com>

This handbook presents global research on health expectancies, a measure of population health that examines the interaction between quantity and quality of life. With data from Europe, North America, Asia, and beyond, it explains how to define and measure health and morbidity and how to integrate these measurements with mortality. Coverage first highlights long-term trends in longevity and health. It also considers variations across and within countries, inequalities, and social gaps as well as micro and macro-level determinants. Next, the handbook deals with the methodological aspects of calculating health expectancies. It compares results from different methods and introduces tools, such as decomposition tool for decomposing gaps, an attrition tool for attributing a medical cause to reported disability, and a tool for measuring policy impact on health expectancies. It introduces methods of forecasting health expectancies. The handbook then goes on to examine the synergies and/or trade-off between longevity and health as well as considers such topics as the compression versus the expansion of morbidity/disability and the health-survival paradox. The last section considers new concepts and dimensions of health and, more broadly, well being which can be used in summary measures of population health, including psychological factors. Researchers, clinicians, demographers, and health planners will find this handbook an essential resource to this increasingly important public health and social policy tool. It will help readers gain insight into changes in health over time as well as inequalities between countries, regions, and population subgroups.

The purpose of this book is to give a basic understanding of rotor dynamics phenomena with the help of simple rotor models and subsequently, the modern analysis methods for real life rotor systems. This background will be helpful in the identification of rotor-bearing system parameters and its use in futuristic model-based condition monitoring and, fault diagnostics and prognostics. The book starts with introductory material for finite element methods and moves to linear and non-linear vibrations, continuous systems, vibration measurement techniques, signal processing and error analysis, general identification techniques in engineering systems, and MATLAB analysis of simple rotors. Key Features:

- Covers both transfer matrix methods (TMM) and finite element methods (FEM)
- Discusses transverse and torsional vibrations
- Includes worked examples with simplicity of mathematical background and a modern numerical method approach
- Explores the concepts of instability analysis and dynamic balancing
- Provides a basic understanding of rotor dynamics phenomena with the help of simple rotor models including modern analysis methods for real life rotor systems.

A motivation for structural health monitoring. Structural health monitoring of aircraft structures. Vibration-based damage diagnosis and monitoring of external loads. Statistical time series methods for vibration based structural health monitoring. Fiber optic sensors. Damage localisation using elastic waves propagation methods experimental techniques. Application for wind turbine blades. Experts actively working in structural health monitoring and control techniques present the current research, areas of application and tendencies for the future of this technology, including various design issues involved. Examples using some of the latest hardware and software tools, experimental data from small scale laboratory demonstrators and measurements made on real structures illustrate the book. It will be a reference for professionals and students in the areas of engineering, applied natural sciences and engineering management.

Handbook of Condition Monitoring Techniques and Methodology Springer Science & Business Media

This book provides readers with a snapshot of recent methods for non-stationary vibration analysis of machinery. It covers a broad range of advanced techniques in condition monitoring of machinery, such as mathematical models, signal processing and pattern recognition methods and artificial intelligence methods, and their practical applications to the analysis of nonstationarities. Each chapter, accepted after a rigorous peer-review process, reports on a selected, original piece of work presented and discussed at the International Conference on Condition Monitoring of Machinery in Non-Stationary Operations, CMMNO'2016, held on September 12 – 16, 2016, in Gliwice, Poland. The contributions cover advances in both theory and practice in a variety of subfields, such as: smart materials and structures; fluid-structure interaction; structural acoustics as well as computational vibro-acoustics and numerical methods. Further topics include: engines control, noise identification, robust design, flow-induced vibration and many others. By presenting state-of-the-art in predictive maintenance solutions and discussing important industrial issues the book offers a valuable resource to both academics and professionals and is expected to facilitate communication and collaboration between the two groups.

Successful development of effective computational systems is a challenge for IT developers across sectors due to uncertainty issues that are inherently present within computational problems. Soft computing proposes one such solution to the problem of uncertainty through the application of generalized set structures including fuzzy sets, rough sets, and multisets. The Handbook of Research on Generalized and Hybrid Set Structures and Applications for Soft Computing presents double blind peer-reviewed and original research on soft computing applications for solving problems of uncertainty within the computing environment. Emphasizing essential concepts on generalized and hybrid set structures that can be applied across industries for complex problem solving, this timely resource is essential to engineers across disciplines, researchers, computer scientists, and graduate-level students.

Artificial Intelligence Tools: Decision Support Systems in Condition Monitoring and Diagnosis discusses various white- and black-box approaches to fault diagnosis in condition monitoring (CM). This indispensable resource: Addresses nearest-neighbor-based, clustering-based, statistical, and information theory-based techniques Considers the merits of e

This book discusses condition based monitoring of rotating machines using intelligent adaptive systems. The book employs computational intelligence and fuzzy control principles to deliver a module that can adaptively monitor and optimize machine health and performance. This book covers design and performance of such systems and provides case studies and data models for fault detection and diagnosis. The contents cover everything from optimal sensor positioning to fault diagnosis. The principles laid out in this book can be applied across rotating machinery such as turbines, compressors, and aircraft engines. The adaptive fault diagnostics systems presented can be used in multiple time and safety critical applications in domains such as aerospace, automotive, deep earth and deep water exploration, and energy.

This is a comprehensive book on the theories of artificial intelligence with an emphasis on their applications. It combines fuzzy logic and neural networks, as well as hidden Markov models and genetic algorithm, describes advancements and applications of these machine learning techniques and describes the problem of causality. This book should serve as a useful reference for

practitioners in artificial intelligence.

Computer Numerical Control (CNC) controllers are high value-added products counting for over 30% of the price of machine tools. The development of CNC technology depends on the integration of technologies from many different industries, and requires strategic long-term support. "Theory and Design of CNC Systems" covers the elements of control, the design of control systems, and modern open-architecture control systems. Topics covered include Numerical Control Kernel (NCK) design of CNC, Programmable Logic Control (PLC), and the Man-Machine Interface (MMI), as well as the major modules for the development of conversational programming methods. The concepts and primary elements of STEP-NC are also introduced. A collaboration of several authors with considerable experience in CNC development, education, and research, this highly focused textbook on the principles and development technologies of CNC controllers can also be used as a guide for those working on CNC development in industry.

This book describes in detail different types of vibration signals and the signal processing methods, including signal resampling and signal envelope, used for condition monitoring of drivetrains. A special emphasis is placed on wind turbines and on the fact that they work in highly varying operational conditions. The core of the book is devoted to cutting-edge methods used to validate and process vibration data in these conditions. Key case studies, where advanced signal processing methods are used to detect failures of gearboxes and bearings of wind turbines, are described and discussed in detail. Vibration sensors, SCADA (Supervisory Control and Data Acquisition), portable data analyzers and online condition monitoring systems, are also covered. This book offers a timely guide to both researchers and professionals working with wind turbines (but also other machines), and to graduate students willing to extend their knowledge in the field of vibration analysis.

This Handbook compiles advanced methods for materials measurement and characterization from the macroscopic to the nano-scale. Materials professionals need not only handbooks of materials data but clear guidelines and standards for how to measure the full spectrum of materials characteristics of new materials and systems. Since materials science forms a bridge between the more traditional fields of physics, engineering, and chemistry, unifying the varying perspectives and covering the full gamut of properties also serves a useful purpose. This handbook is the first dedicated to these practical and important considerations. Hardbound. The need to reduce costs has generated a greater interest in condition monitoring in recent years. The Handbook of Condition Monitoring gives an extensive description of available products and their usage making it a source of practical guidance supported by basic theory. This handbook has been designed to assist individuals within companies in the methods and devices used to monitor the condition of machinery and products.

Provides Typical Abstract Representations of Different Steps for Analyzing Any Dynamic System Vibration and dynamics are common in everyday life, and the use of vibration measurements, tests, and analyses is becoming standard for various applications. Vibration Analysis, Instruments, and Signal Processing focuses on the basic understanding of vibration. This book presents the most important tools, techniques, strategy and diagnostic methods used in industrial engineering. The current widely accepted methods of diagnosis and their properties are discussed. Also, the possible fruitful areas for further research in the field are identified.

Ultrasonic methods have been very popular in nondestructive testing and characterization of materials. This book deals with both industrial ultrasound and medical ultrasound. The advantages of ultrasound include flexibility, low cost, in-line operation, and providing data in both signal and image formats for further analysis. The book devotes 11 chapters to ultrasonic methods. However, ultrasonic methods can be much less effective with some applications. So the book also has 14 chapters catering to other or advanced methods for nondestructive testing or material characterization. Topics like structural health monitoring, Terahertz methods, X-ray and thermography methods are presented. Besides different sensors for nondestructive testing, the book places much emphasis on signal/image processing and pattern recognition of the signals acquired.

In today's competitive climate the economies of production have become a critical factor for all manufacturing companies. For this reason, achieving cost-effective plant maintenance is highly important. In this context monitoring plays a vital role. The purpose of this book is to inform readers about techniques currently available in the field of condition monitoring, and the methodology used in their application. With contributions from experts throughout the world, the Handbook of Condition Monitoring addresses the four major technique areas in condition monitoring in addition to the latest developments in condition monitoring research. Significantly, the Handbook of Condition Monitoring includes the following features: comprehensive coverage of the full range of techniques and methodologies accepted knowledge and new developments both technical and managerial content. This is the essential reference book for maintenance technicians, engineers, managers and researchers as well as graduate students involved in manufacturing and mechanical engineering, and condition monitoring.

Non-Destructive Testing and Condition Monitoring Techniques for Renewable Energy Industrial Assets integrates state-of-the-art information and discusses future developments and their significance to the improvement of the renewable energy industry.

Renewable energy assets are complex systems with several critical components that require inspection and adequate maintenance in order to ensure their high availability and uninterrupted operation. This is the first book to apply NDT and condition monitoring to these complex systems. Covers inspection and condition monitoring for a broad range of renewable energy systems, including wind turbines, wave energy devices, CSP and photovoltaic plants, and biofuel/biomass power plants Includes a review of common types of NDT techniques Discusses future developments in NDT and condition monitoring for renewable energy systems

Intelligent machines are populating our social, economic and political spaces. These intelligent machines are powered by Artificial Intelligence technologies such as deep learning. They are used in decision making. One element of decision making is the issue of rationality. Regulations such as the General Data Protection Regulation (GDPR) require that decisions that are made by these intelligent machines are explainable. Rational Machines and Artificial Intelligence proposes that explainable decisions are good but the explanation must be rational to prevent these decisions from being challenged. Noted author Tshilidzi Marwala studies the concept of machine rationality and compares this to the rationality bounds prescribed by Nobel Laureate Herbert Simon and rationality bounds derived from the work of Nobel Laureates Richard Thaler and Daniel Kahneman. Rational Machines and Artificial Intelligence describes why machine rationality is flexibly bounded due to advances in technology. This effectively means that optimally designed machines are more rational than human beings. Readers will also learn whether machine rationality can be quantified and identify how this can be achieved. Furthermore, the author discusses whether machine rationality is subjective. Finally, the author examines whether a population of intelligent machines collectively make more rational decisions than individual machines. Examples in biomedical engineering, social sciences and the financial sectors are used to illustrate these concepts.

Provides an introduction to the key questions and challenges surrounding Rational Machines, including, When do we rely on decisions made by intelligent machines? What do decisions made by intelligent machines mean? Are these decisions rational or fair? Can we quantify these decisions? and Is rationality subjective? Introduces for the first time the concept of rational opportunity costs and the concept of flexibly bounded rationality as a rationality of intelligent machines and the implications of these issues on the reliability of machine decisions Includes coverage of Rational Counterfactuals, group versus individual rationality, and rational markets Discusses the application of Moore's Law and advancements in Artificial Intelligence, as well as developments in the area of data acquisition and analysis technologies and how they affect the boundaries of intelligent machine rationality

Provides an extensive, up-to-date treatment of techniques used for machine condition monitoring Clear and concise throughout, this accessible book is the first to be wholly devoted to the field of condition monitoring for rotating machines using vibration signals. It covers various feature extraction, feature selection, and classification methods as well as their applications to machine vibration datasets. It also presents new methods including machine learning and compressive sampling, which help to improve safety, reliability, and performance. *Condition Monitoring with Vibration Signals: Compressive Sampling and Learning Algorithms for Rotating Machines* starts by introducing readers to Vibration Analysis Techniques and Machine Condition Monitoring (MCM). It then offers readers sections covering: Rotating Machine Condition Monitoring using Learning Algorithms; Classification Algorithms; and New Fault Diagnosis Frameworks designed for MCM. Readers will learn signal processing in the time-frequency domain, methods for linear subspace learning, and the basic principles of the learning method Artificial Neural Network (ANN). They will also discover recent trends of deep learning in the field of machine condition monitoring, new feature learning frameworks based on compressive sampling, subspace learning techniques for machine condition monitoring, and much more. Covers the fundamental as well as the state-of-the-art approaches to machine condition monitoring guiding readers from the basics of rotating machines to the generation of knowledge using vibration signals Provides new methods, including machine learning and compressive sampling, which offer significant improvements in accuracy with reduced computational costs Features learning algorithms that can be used for fault diagnosis and prognosis Includes previously and recently developed dimensionality reduction techniques and classification algorithms *Condition Monitoring with Vibration Signals: Compressive Sampling and Learning Algorithms for Rotating Machines* is an excellent book for research students, postgraduate students, industrial practitioners, and researchers.

This book presents concepts, methods and techniques to examine symptoms of faults and failures of structures, systems and components and to monitor functional performance and structural integrity. The book is organized in five parts. Part A introduces the scope and application of technical diagnostics and gives a comprehensive overview of the physics of failure. Part B presents all relevant methods and techniques for diagnostics and monitoring: from stress, strain, vibration analysis, nondestructive evaluation, thermography and industrial radiology to computed tomography and subsurface microstructural analysis. Part C covers the principles and concepts of technical failure analysis, illustrates case studies, and outlines machinery diagnostics with an emphasis on tribological systems. Part D describes the application of structural health monitoring and performance control to plants and the technical infrastructure, including buildings, bridges, pipelines, electric power stations, offshore wind structures, and railway systems. And finally, Part E is an excursion on diagnostics in arts and culture. The book integrates knowledge of basic sciences and engineering disciplines with contributions from research institutions, academe, and industry, written by internationally known experts from various parts of the world, including Europe, Canada, India, Japan, and USA.

Sensors are used for civil infrastructure performance assessment and health monitoring, and have evolved significantly through developments in materials and methodologies. *Sensor Technologies for Civil Infrastructure Volume I* provides an overview of sensor hardware and its use in data collection. The first chapters provide an introduction to sensing for structural performance assessment and health monitoring, and an overview of commonly used sensors and their data acquisition systems. Further chapters address different types of sensor including piezoelectric transducers, fiber optic sensors, acoustic emission sensors, and electromagnetic sensors, and the use of these sensors for assessing and monitoring civil infrastructures. Developments in technologies applied to civil infrastructure performance assessment are also discussed, including radar technology, micro-electro-mechanical systems (MEMS) and nanotechnology. *Sensor Technologies for Civil Infrastructure* provides a standard reference for structural and civil engineers, electronics engineers, and academics with an interest in the field. Describes sensing hardware and data collection, covering a variety of sensors Examines fiber optic systems, acoustic emission, piezoelectric sensors, electromagnetic sensors, ultrasonic methods, and radar and millimeter wave technology Covers strain gauges, micro-electro-mechanical systems (MEMS), multifunctional materials and nanotechnology for sensing, and vision-based sensing and lasers A long required resource to turn to for reliable, up-to-date information on the continually evolving field of metrology. In two easily searched volumes, the *Wiley Handbook of Metrology* provides a clear overview of both the fundamentals of metrology and recent advances.

Today's manufacturing systems are undergoing significant changes in the aspects of planning, production execution, and delivery. It is imperative to stay up-to-date on the latest trends in optimization to efficiently create products for the market. *The Handbook of Research on Applied Optimization Methodologies in Manufacturing Systems* is a pivotal reference source including the latest scholarly research on heuristic models for solving manufacturing and supply chain related problems. Featuring exhaustive coverage on a broad range of topics such as assembly ratio, car sequencing, and color constraints, this publication is ideally designed for practitioners seeking new comprehensive models for problem solving in manufacturing and supply chain management.

Growth is one of the human body's most intricate processes: each body part or region has its own unique growth patterns. Yet at the individual and population levels, growth patterns are sensitive to adverse conditions, genetic predispositions, and environmental changes. And despite the body's capacity to compensate for these developmental setbacks, the effects may be far-reaching, even life-long. *The Handbook of Growth and Growth Monitoring in Health and Disease* brings this significant and complex field together in one comprehensive volume: impact of adverse variables on growth patterns; issues at different stages of prenatal development, childhood, and adolescence; aspects of catch-up growth, endocrine regulation, and sexual maturation; screening and assessment methods; and international perspectives. Tables and diagrams, applications to other areas of health and disease, and summary points help make the information easier to retain. Together, these 140 self-contained chapters in 15 sections [ok?] cover every area of human growth, including: Intrauterine growth retardation. Postnatal growth in normal and abnormal situations. Cells and growth of tissues. Sensory growth and development. Effects of disease on growth. Methods and standards for assessment of growth, and more. *The Handbook of Growth and Growth Monitoring in Health and Disease* is an invaluable addition to the reference libraries of a wide range of health professionals, among them health scientists, physicians, physiologists, nutritionists, dieticians, nurses, public health researchers, epidemiologists, exercise physiologists, and physical

therapists. It is also useful to college-level students and faculty in the health disciplines, and to policymakers and health economists. This utterly comprehensive work is thought to be the first to integrate the literature on the physics of the failure of complex systems such as hospitals, banks and transport networks. It has chapters on particular aspects of maintenance written by internationally-renowned researchers and practitioners. This book will interest maintenance engineers and managers in industry as well as researchers and graduate students in maintenance, industrial engineering and applied mathematics.

This book addresses a range of complex issues associated with condition monitoring (CM), fault diagnosis and detection (FDD) in smart buildings, wide area monitoring (WAM), wind energy conversion systems (WECSs), photovoltaic (PV) systems, structures, electrical systems, mechanical systems, smart grids, etc. The book's goal is to develop and combine all advanced nonintrusive CMFD approaches on a common platform. To do so, it explores the main components of various systems used for CMFD purposes. The content is divided into three main parts, the first of which provides a brief introduction, before focusing on the state of the art and major research gaps in the area of CMFD. The second part covers the step-by-step implementation of novel soft computing applications in CMFD for electrical and mechanical systems. In the third and final part, the simulation codes for each chapter are included in an extensive appendix to support newcomers to the field.

This book provides readers with a guide to the use of Digital Twin in manufacturing. It presents a collection of fundamental ideas about sensor electronics and data acquisition, signal and image processing techniques, seamless data communications, artificial intelligence and machine learning for decision making, and explains their necessity for the practical application of Digital Twin in Industry. Providing case studies relevant to the manufacturing processes, systems, and sub-systems, this book is beneficial for both academics and industry professionals within the field of Industry 4.0 and digital manufacturing.

This book is an introduction to health care as a complex adaptive system, a system that feeds back on itself. The first section introduces systems and complexity theory from a science, historical, epistemological, and technical perspective, describing the principles and mathematics. Subsequent sections build on the health applications of systems science theory, from human physiology to medical decision making, population health and health services research. The aim of the book is to introduce and expand on important population health issues from a systems and complexity perspective, highlight current research developments and their implications for health care delivery, consider their ethical implications, and to suggest directions for and potential pitfalls in the future.

This concise, user-oriented and up-to-date desk reference offers a broad introduction to the fascinating world of medical technology, fully considering today's progress and further development in all relevant fields. The Springer Handbook of Medical Technology is a systemized and well-structured guideline which distinguishes itself through simplification and condensation of complex facts. This book is an indispensable resource for professionals working directly or indirectly with medical systems and appliances every day. It is also meant for graduate and post graduate students in hospital management, medical engineering, and medical physics.

Leading the way in this field, the Encyclopedia of Quantitative Risk Analysis and Assessment is the first publication to offer a modern, comprehensive and in-depth resource to the huge variety of disciplines involved. A truly international work, its coverage ranges across risk issues pertinent to life scientists, engineers, policy makers, healthcare professionals, the finance industry, the military and practising statisticians. Drawing on the expertise of world-renowned authors and editors in this field this title provides up-to-date material on drug safety, investment theory, public policy applications, transportation safety, public perception of risk, epidemiological risk, national defence and security, critical infrastructure, and program management. This major publication is easily accessible for all those involved in the field of risk assessment and analysis. For ease-of-use it is available in print and online.

It is with great pleasure that we welcome you to the inaugural World Congress on Engineering Asset Management (WCEAM) being held at the Conrad Jupiters Hotel on the Gold Coast from July 11 to 14, 2006. More than 170 authors from 28 countries have contributed over 160 papers to be presented over the first three days of the conference. Day four will be host to a series of workshops devoted to the practice of various aspects of Engineering Asset Management. WCEAM is a new annual global forum on the various multidisciplinary aspects of Engineering Asset Management. It deals with the presentation and publication of outputs of research and development activities as well as the application of knowledge in the practical aspects of: strategic asset management risk management in asset management design and life-cycle integrity of physical assets asset performance and level of service models financial analysis methods for physical assets reliability modelling and prognostics information systems and knowledge management asset data management, warehousing and mining condition monitoring and intelligent maintenance intelligent sensors and devices regulations and standards in asset management human dimensions in integrated asset management education and training in asset management and performance management in asset management. We have attracted academics, practitioners and scientists from around the world to share their knowledge in this important emerging transdiscipline that impacts on almost every aspect of daily life.

During the last two decades, computer and information technologies have forced great changes in the ways businesses manage operations in meeting the desired quality of products and services, customer demands, competition, and other challenges. The Handbook of Computational Intelligence in Manufacturing and Production Management focuses on new developments in computational intelligence in areas such as forecasting, scheduling, production planning, inventory control, and aggregate planning, among others. This comprehensive collection of research provides cutting-edge knowledge on information technology developments for both researchers and professionals in fields such as operations and production management, Web engineering, artificial intelligence, and information resources management.

Global health is a rapidly emerging discipline with a transformative potential for public policy and international development. Emphasizing transnational health issues, global health aims to improve health and achieve health equity for all people worldwide. Its multidisciplinary scope includes contributions from many disciplines within and beyond the health sciences, including clinical medicine, public health, social and behavioral sciences, environmental sciences, economics, public policy, law and ethics. This large reference offers up-to-date information and expertise across all aspects of global health and helps readers to achieve a truly multidisciplinary understanding of the topics, trends as well as the clinical, socioeconomic and environmental drivers impacting global health. As a fully comprehensive, state-of-the-art and continuously updated, living reference, the Handbook of Global Health is an important, dynamic resource to provide context for global health clinical care, organizational decision-making, and overall public policy on many levels. Health workers, physicians, economists, environmental and social scientists, trainees and medical students as well as professionals and practitioners will find this handbook of great value.

Condition modelling and control is a technique used to enable decision-making in manufacturing processes of interest to researchers and practising engineering. Condition Monitoring and Control for Intelligent Manufacturing will be bought by researchers and graduate students in manufacturing and control and engineering, as well as practising engineers in industries such as automotive and packaging manufacturing.

Mass production companies have become obliged to reduce their production costs and sell more products with lower profit margins in order to survive in competitive market conditions. The complexity and automation level of machinery are continuously growing. This development calls for some of the most critical issues that are reliability and dependability of automatic systems. In the future, machines will be monitored remotely, and computer-aided techniques will be employed to detect faults in the future, and also there will be unmanned factories where machines and systems communicate to each other, detect their own faults, and can remotely intercept their faults. The pioneer studies of such systems are fault diagnosis studies. Thus, we hope that this book will contribute to the literature in this regard.

Condition Monitoring Using Computational Intelligence Methods promotes the various approaches gathered under the umbrella of computational intelligence to show how condition monitoring can be used to avoid equipment failures and lengthen its useful life, minimize downtime and reduce maintenance costs. The text introduces various signal-processing and pre-processing techniques, wavelets and principal component analysis, for example, together with their uses in condition monitoring and details the development of effective feature extraction techniques classified into frequency-, time-frequency- and time-domain analysis. Data generated by these techniques can then be used for condition classification employing tools such as: • fuzzy systems; rough and neuro-rough sets; neural and Bayesian networks; hidden Markov and Gaussian mixture models; and support vector machines. Acoustic emission (AE) techniques have successfully been used for assuring the structural integrity of large rocket motorcases since 1963, and their uses have expanded to ever larger structures, especially as structural health monitoring (SHM) of large structures has become the most urgent task for engineering communities around the world. The needs for advanced AE monitoring methods are felt keenly by those dealing with aging infrastructures. Many publications have appeared covering various aspects of AE techniques, but documentation of actual applications of AE techniques has been mostly limited to reports of successful results without technical details that allow objective evaluation of the results. There are some exceptions in the literature. In this Special Issue of the Acoustics section of Applied Sciences, we seek contributions covering these exceptions cited here. Here, we seek contributions describing case histories of AE applications to large structures that have achieved the goals of SHM by providing adequate technical information supporting the success stories. Types of structures can include aerospace and geological structures, bridges, buildings, factories, maritime facilities, off-shore structures, etc. Experiences with AE monitoring methods designed and proven for large stru

[Copyright: a30a79e662e32b64292cb78b2d05004c](#)