Structural Health Monitoring 2013: A Roadmap to Intelligent Structures

Description:

Original research on SHM sensors, quantification strategies, system integration and control for a wide range of engineered materials
New applications in robotics, machinery, as well as military aircraft, railroads, highways, bridges, pipelines, stadiums, tunnels, space exploration and energy production

Continuing a critical book series on structural health monitoring (SHM), this two-volume set (with full-text searchable CD-ROM) offers, as its subtitle implies, a guide to greater integration and control of SHM systems. Specifically, the volumes contain new research that will enable readers to more efficiently link sensor detection, diagnostics/quantification, overall system functionality, and automated, e.g., robotic, control, thus further closing the loop from inherent signal-based damage detection to responsive real-time maintenance and repair. SHM performance is demonstrated in monitoring the behavior of composites, metals, concrete, polymers and selected nanomaterials in a wide array of surroundings, including harsh environments, under extreme (e.g., seismic) loading and in space.

New information on smart sensors and network optimization is enhanced by novel statistical and model-based methods for signal processing and data quantification. A special feature of the book is its explanation of emerging control technologies.

Research in these volumes was initially presented in September 2013 at the 9th International Workshop on Structural Health Monitoring (IWSHM), held at Stanford University and sponsored by the Air Force Office of Scientific Research, the Army Research Laboratory, and the Office of Naval Research.

Contents:

VOLUME 1
Preface

KEYNOTE SPEAKER
- The Need for Guidance on Integrating SHM Within Military Aircraft Systems
- Industrial Age NDE to Information Age SHM
- On the Search for Optimal Damage Precursors
- A Vision on Stretchable Bio-Inspired Networks for Intelligent Structures
- Robust Sensors for Structural Health Monitoring within Harsh Environments

ADVANCED DIAGNOSTICS FOR DAMAGE ASSESSMENT
- Damage Detection at an Aluminum Beam from Discrete and Continuous Strain Measurements
- Detecting and Locating Fatigue Cracks in a Complex Wing-Box Structure Using the Acoustic Emission Technique: A Verification Study
- Oriented Wireless Sensing for Structural Health Monitoring
- Smart, Tough and Successful: Three New Innovative Approaches for Diagnosis and Prognosis of Technical Systems
- A Novel Approach for Quantitative Assessment of Delamination Damage Based on Vibrational Response
- Detection of Instability for Civil Large-Scale Space Structures
- Crack Detection in Metallic Plate Elements Using a Point-Based Thermal Measurement Strategy
- Detection, Localization and Quantification of Anomalies in Mass, Stiffness and Damping Based on Time Series Modelling Using Output-Only Data
- Detection and Quantification of a Disbonded Aluminum Honeycomb Panel Using Nonlinear Superharmonic Frequencies
- Bayesian Inference Based Model Calibration for the Dynamic Analysis of Seismic Isolated Bridges
- Curing Strength Monitoring of Early-Age Concrete Using Embedded Piezoelectric Sensors for Ubiquitous Construction Process Management
- Bridge Pier Scour Prediction by Multi-Objective Optimization Using the Genetic Algorithm
- Corrosivity Sensor Suite for Measuring Damage Accumulation from Corrosion in Aircraft Applications
- Statistical Based Decision Making for Damage Localization with Influence Lines
- Characterisation of Part-Through Damage in a Stiffened Panel by a Time-Reversal Based Imaging Method
- Distortion Index for Assessment of Damage Growth in a Composite Structures Using Spectral Distortion of Embedded FBG Sensors
- Supervised and Unsupervised Machine Learning Approaches for Bridge Damage Prediction
- Damage Characterization by Model Updating Techniques Using a Derivative-Free Global Optimization Method
- High Resolution Localization with Lamb Wave Sparse Wavenumber Analysis
- Damage Location of Civil Large-Scale Space Structures Based on Average Axial-Strain Mode Shapes
- Baseline-Free Estimation of the Residual Fatigue Life Using a Modulated Nonlinear Ultrasound Method
- Performance Comparison of Different Autoregressive Damage Features Using Acceleration Measurements from a Truss Bridge
- Distinguishing Between Sensor Performance Degradation and Structural Damage Using Generalized Likelihood Ratio Test (GLRT) and Statistical Process Control
- Application of Local Defect Resonance Method to Structural Damage Detection
- Auto-Association and Novelty Detection: Truths and Myths?
- Laser-Based Automatic Cross-Sectional Change Detection for Steel Frames
- Detection of Impact Damage Using a Nonlinear Ultrasound Approach
- An Application of Near Infra-Red Fibre Bragg Grating as Dynamic Sensor in SHM of Thin Composite Laminates
- A Novel Reduced Model for Damage Detection of Frame Structures
- Development and Validation of a Tree-Ring Bio-Inspired Wireless Fatigue Monitoring System
- Comparative Assessment of Static and Dynamic Damage Identification Indices Based on Distributed Macro-Strain Responses

ADVANCED MONITORING FOR LOAD/ENVIRONMENTS

- Development of Self-Compensated Long-Gage Carbon Sensor for Structural Health Monitoring
- Implementing the Surface Response to Excitation Method (SuRE) with Non-Contact Sensor at Hard to Reach Locations
- Design and Characterization of Fiber-Optic Interferometric Sensor for Deflection and Damage Detection of Morphing Wing Structures
- Online Simultaneous Reconstruction of Wind Load and Structural Responses for High-Rise Structures
- Sensor Capability Enhancement of PPP-BOTDA for Dynamic Distributed Strain Monitoring of Bridge Structures
- Verification of Joint Input-State Estimation by In Situ Measurements on a Footbridge
- Bayesian Regression Trees as Surrogate Models for the Health Monitoring of Civil Infrastructure
- Proton Radiation Sensitivity of Fiber Bragg Gratings for Particle Colliders
- Vibration Data as a Tool for Continuous Monitoring of Cable Tensile Loads
- Vibration Monitoring of Operational Wind Turbine
- An Imaging Method for Impact Damage Localization Using Metal-Core Piezoelectric Fiber Rosettes
- Reconstruction of Impact on Textile Composite Plate Using Piezoelectric Sensors

AEROSPACE STRUCTURES: LABORATORY DEMONSTRATION

- An Experimental Comparison of Modal-Based SHM Techniques Using Strain or Acceleration Measurements
- Acoustic Wave Propagation and Scattering for Fault Detection in Honeycomb Composite Panels
- Structural Health Monitoring as an Enabling Technology for Active Compliant Systems
- Development of SHM System Using Multiple FBG Sensors for Solid Rocket Motor Composite Chamber
- Proof-of-Concept Study of Smart Panel for Space Structures
- Nonlinear Dynamic Behavior of Impact Damage in a Composite Skin-Stiffener Structure
- Reconfigurable Architecture Based on Programmable System on Chip and Versatile Interface for Multi Sensors Instrumentations Applied to SHM: Case of an ATR72 Wing Panels
- Structural Health Monitoring-Based Methodologies for Managing Uncertainty in Aircraft Structural Life Assessment
- Assessment of Fibre Optic Sensor Architectures for Structural Health Monitoring
- Simulation Studies of Spectral Subtraction Based Temperature Compensation of FBG Sensor for Structural Health Monitoring
- Research on Spatial Filter Based Structural Imaging Method and the Evaluation Research on Complex Composite Structures
- Application of the Triple Correlation Technique to Damage Detection of Structures
- Fiber-Optic-Based Quality Control of Aerospace CFRP Structures

AEROSPACE STRUCTURES—STANDARDS AND V&V

- Aerospace Industry Steering Committee on Structural Health Monitoring (AISC-SHM): Efforts to Standardize and Streamline SHM Utilization Sensors
- Validation and Verification Processes to Certify SHM Solutions for Commercial Aircraft Applications
- Large Scale Monitoring of CFRP Structures by Acousto-Ultrasonics—A Flight Test Experience
- Reliability of Co-Bonded Piezoelectric Sensors on CFRP Structures
- Method for Real-Time Health Monitoring of Large Polymer Composite Structures Using Carbon Nanotube Networks

AUTONOMOUS SENSING: MONITORING TO CONTROL

- Application of Incremental Gaussian Mixture Models for Characterization of Wind Field Data
- Wireless Active Sensing Platform for Structural Infrastructure Monitoring
- Unmanned Robot System for Structure Health Monitoring and Non-Destructive Building Inspection, Current Technologies Overview and Future Improvements
- Wireless Chipless Passive Electromagnetic Transducers for SHM Applications
- Structural Health Monitoring During Assembly of Aerospace Structures
- A Wireless Data Acquisition System for Acoustic Emission Monitoring
- On Development of a Fully Operative Piezoelectric-Based Vibration Energy Harvesting System

CIVIL STRUCTURES: FIELD EVALUATION AND VALIDATION

- In Field Application of Rapid Roadway Inspection System Using Vehicle-Mounted Multi-Modal Sensing
- Applied Element Method Framework for Vibration-Based Condition Assessment
- The Importance in Load Positioning During Experimental Load Testing of Highway Bridges
- Quantifying Bridge Deck Corrosion with Ground Penetrating Radar
- Pavement Assessment Using a Dynamic Pressure Sensor System
- Verification of the Slope Stability of Flood Prevention Dams with Fiber Optic Sensors
- Validation of the Rotation Algorithm for Earthquake Damage Estimation
- RAPID System for Crack Detection in Riser Pipes
- Implementation of Digital Image Correlation for Structural Health Monitoring of Bridges
- Dynamic Strain Measurements Using Digital Image Correlation
- Reporting the Results of Two Experimental Campaigns on a Pedestrian Timber
- Health Monitoring of a Cable-Stayed Bridge from Traffic-Induced Vibrations
- Applications of New Sensing Technologies for Reinforced Concrete Related to Nuclear Facilities: Considerations and Potentials
- Method of Structural Monitoring for Systems with an Imperfect Sensor Network
- A Complementary Approach to Condition Assessment of Highway Bridges Using a Quantitative Index Measure
- Vibration Monitoring and Live Load Tests of Civil Infrastructure with Interferometric Radar
- SHM of a Masonry Chimney after a Lightning Accident
- Visualized Steel Cable NDE Technique Using Multi-Channel MFL Sensor
- Online Real-Time Corrosion Monitoring Technology Selection for a SHM Pilot in Gathering Lines: A Case Study at Ecopetrol's Oil Production Facilities

CIVIL STRUCTURES: LABORATORY DEMONSTRATION

- Integration of Fiber Optic Platform and Electro-Mechanical Sensors to Enhance Damage Detection Process
- A Structural Health Monitoring Approach for Damage Detection in Wind Turbine Blades Based on Compressed Sensing Acquisition of Acoustic Emission Events
- Probabilistic Risk Prediction for Aircraft Fatigue Life Management Using SHM Systems Considering the Effect of Inspection Correlation
- Selection and Identification of a Shape Function for Modeling Degradation as a Gamma Process
- Continuous Monitoring of an Aging PC Bridge by Using Fiber-Optic Strain Sensors Based on Time-Series Analysis in Considering Environmental Effects
- Fatigue Damage Prognosis of Single-Edged Notch Beam Using Piezoelectric Transducers
- Identifying Pipe Degradation in a Highly Dynamic Environment Using Singular Value Decomposition
- A Proposal for Exteriori-Interiori Integrated Structural Health Monitoring Framework
- Multi-Sensing Strategy for SHM in Civil Engineering: Case Study of a Structural Element with Carbon Fiber
Reinforcement
- Development of Smart Pultruded Composite Materials with Embedded Fiber Bragg Gratings for In-Situ Strain Monitoring
- Multidisciplinary Health Monitoring of a Steel Bridge Deck Structure
- Application of SHM Using an Autonomous Sensor Network
- An Experimental Study on Damage Detection of a Building Structure Model
- Global Assessment of a Cable-Stayed Bridge Model Using SNLSE Approach
- Numerical Simulation of PZT Bonded Reinforcement for Health Monitoring of Reinforced Concrete Structure

GUIDED WAVES IN STRUCTURES FOR SHM
- Advancements on the Inspection of Underwater Plates by Means of Guided Waves
- Damage Detection and Localization Using Lamb Waves in Highly Anisotropic Structures with Multiple Curvatures
- Opportunities for Structural Health Monitoring of Composite Material Structures with Novel Microstructured Optical Fiber Sensors
- Guided Waves in a Disbonded Honeycomb Composite Structure
- Compressive Sensing for Damage Detection in Composite Aircraft Wings
- Ultrasonic Guided Wave Based SHM of a Steel Shell Structure Under Different Operating Conditions
- Continuous Mode Conversion of Lamb Waves in Carbon Fibre Composite Plates—Occurrence and Modelling
- Ultrasonic Guided Wave Propagation in Cellular Composite Plates
- In-Situ Guided-Wave-Based Health Monitoring for Train Bogie Structures: Technique Development and Application to Beijing-Shanghai High-Speed Railway
- On the Structural Health Monitoring of Repaired Aerospace Structures
- Signal Processing System for Guided Wave-Based SHM Technique
- Nonlinear Guided Waves for Thermal Stress Measurement in Constrained Solids
- Analysis of Wave Propagation in Rib-Stiffened and Isogrid Panels for Structural Health Monitoring
- Progress in Structural Health Monitoring Technology and System for the Large Crane in China
- A Novel Time-Domain Technique for Damage Detection Applied to SHM Using Savitzky-Golay Filter
- Quantitative Crack Monitoring Using Diffracted Lamb Waves

MECHANICAL SYSTEMS/OFFSHORE/MARINE STRUCTURES
- Active Structural Integrity Monitoring of the Aircraft Based on the PZT Sensor Network—The SYMOST Project
- Improved Sensitivity of Condition Monitoring Features via Holder Exponent Analysis
- Multi-Sensing SMART Layer® Technology for Vehicle Protective Systems
- Substructure Model Updating Through Modal Dynamic Residual Approach

MODELLING/SIMULATION
- Hybrid Global Matrix/Local Interaction Simulation Approach for Damage Modeling in Composites
- Modeling Dislocation Mechanisms of the Acoustic Nonlinearity in Metallic Crystals
- 2D Numerical Modeling of Pipeline Structures with Non-Axisymmetric Loads and Spectral Elements for Identifying Reliable Sensor Spacing
- Condition Monitoring for Hydraulic Systems in Rolling Mills Using Unscented Kalman Filter
- Development of Data-Driven Reduced-Order Models for Complex Nonlinear Systems from Experimental Data
- Time Domain Response Surface Model Updating for Nonlinear Structures
- Adaptive Multi-Scale Modeling of Structures Under Earthquake Loads
- Model Updating of Aero-Elastic Spinning Finite Elements for SHM of HAWT Blades
- Contribution of Fundamental Lamb Wave Modes to the Voltage Signal Output of a Piezoelectric Transducer
- Analytical and Spectral Methods for Lamb Wave Simulations
- Identification and Monitoring of Structural Parameters as Damage Indicators for Plates in the Post-Buckling Regime
- Elastic Constants Identification for Laminated Composites Based on Lamb Waves Propagation
- Finite Element Simulation of a Beam with Closed Crack and Breathing Crack Based on Subharmonic Detection Method
- Modeling of Lamb Waves in Composites Using a New Third-Order Plate Theory
NOVEL SIGNAL PROCESSING TECHNIQUES

- A Vibro-Haptic Human-Machine Interface for Structural Health Monitoring
- Automated Near-Optimal Feature Extraction Using Genetic Programming with Application to Structural Health Monitoring Problems
- High-Speed, Non-Contact, Baseline-Free Imaging of Hidden Defects Using Scanning Laser Measurements of Steady-State Ultrasonic Vibration
- Blind Identification of Structural Damage via Independent Component Analysis
- Design of Observer Based Crack Detection Filters and Their Application to Crack Detection and Isolation
- Embedded Modal Analysis Algorithms on the Smart Wireless Sensor Platform PEGASE
- Application of Acoustic Emission Technique for Online Evaluation and Classification of Wear State
- Detection of Structural Damage Using the Exponential Sine Sweep Method
- A Non-Dispersive Signal Construction Method for High Resolution Lamb Wave Damage Imaging
- Sparse Signal Processing Technique in Multimodal Dispersive SHM
- Identification of Bending Stiffness Distribution in RC Plate Using Distributed Fiber Optics
- Temperature Compensation Based on Hilbert Transform and Instantaneous Phase for Lamb Waves-Based SHM Systems of Aircraft Structures

OPERATIONAL EFFECTS CONSIDERATION IN SHM

- Effect of Applied Load on Guided Wave Monitoring of a Composite Bolted Joint
- Adaptive Regression for Damage Detection in Bridges Under Environmental Influence
- Structural Damage Detection Using Ultrasonic Guided Waves Under Varying Ambient Temperature and Loading Environments
- Characterizing Variability in Strain Measurements Resulting from Temperature Changes Affecting Data Acquisition Equipment
- Critical Issues Affecting the Performance of PWAS Based SHM Systems for Corrosion Detection of Aluminum Structures
- Long-Term Monitoring of Modal Parameters for SHM at a 5 MW Offshore Wind Turbine
- Influence of External Excitation on Electromechanical Impedance Signatures
- Accurate Temperature Compensation and Characterization of Overall System Thermal Response Using Total Measured Strain in FBG Sensors

PROGNOSTICS AND DATA MINING FOR HEALTH MANAGEMENT

- A Notional Framework and Model to Improve Monitoring of Structural Health Systems
- Non-Destructive Detection of Crack Initiation Using Acoustic Emission
- Bayesian Updating of Detection Capability with Frequency Response Function Related Structural Health Monitoring Features
- Modular Signal-Based Condition Monitoring of a Hydraulic Servo-System
- Fatigue Damage Prognosis in FRP Composites by Combining Multi-Scale Degradation Fault Modes in an Uncertainty Bayesian Framework
- Triboluminescent Optical Nerves for Smart Concrete Structures

VOLUME 2

SENSOR NETWORK OPTIMIZATION

- Beamforming in Plates Using Embedded Acoustic Metamaterial Lenses
- New Proposal for Improvements in Communication and Power Systems for SHM Aircraft Networks
- Structural Condition Monitoring of Helicopter Components
- Decentralized Health Monitoring for Beam-Like Truss Structure Using Wireless Acceleration Lab Measurements

SHM FOR ROTOCRAFT & AEROSPACE STRUCTURES: FIELD EVALUATION AND VALIDATION

- Wireless Sensing Systems for Rotorcraft SHM
- Flight Demonstration of a SHM System on an OH-58 Aircraft
- An SHM System for Detecting Corrosion Damage in Aging Aircraft
- Prediction of Landing Gear Loads from Flight Test Data Using Gaussian Process Regression
- Structural Airframe Maintenance Strategy Comparison: A New Approach
- Damage Sensitive Features of a Repaired Helicopter Tail

SHM-BASED STRUCTURAL DESIGN/INTELLIGENT STRUCTURES

- Optimizing Mode Tuning of Guided Waves and PWAS Electromechanical Impedance for Power Efficient SHM Systems
- Effect of Bonding Layer on Admittances of PWASs Bonded on Thin Slender Substrates: Correlation Between Measurements and Simulation
- Analytical Modeling of Proof-Mass Piezoelectric Wafer Active Sensor for Symmetric Lamb Waves Tuning
- Integration of Health Monitoring and Control of Building Structures Due to Earthquake
- FEM Model Calibration of Sports Arena Stand, Using Monitoring Data
- Scenario Based Approach to Structural Damage Detection and its Value in a Risk and Reliability Perspective
- Leakage Detection in Water Pipe Networks Using Electromechanical Impedance (EMI) Based Technique

SMART SENSORS/ACTUATORS AND ENERGY HARVESTING

- Electrospun Nanofiber Based Strain Sensors for Structural Health Monitoring
- Screen Printed Piezoceramic Actuators/Sensors Microfabricated on Organic Films and Stretchable Networks
- A Four-Channel, +-36 V Piezo Driver Chip for a Densely Integrated SHM System
- Exploration of Ultrasonic Guided Wave Detection with Optical Fiber Sensors and Piezoelectric Transducers
- Embedded Data Processing in Wireless Sensor Networks for Structural Health Monitoring
- Intelligent Material Actuators and Their Applications for Structural Dynamic Control
- Multiple PAMELA SHMTM System for Automated SHM Control During Fatigue Tests of Aircraft Structures
- Optical Fiber Sensor for Corrosion Detection and Evolution Monitoring in Reinforced Concrete Structures
- Multichannel Energy Harvesting Electronic Device for Structural Health Monitoring Systems
- Using Wireless Sensor to Solve the False Alarm of Earthquake Early Warning System
- Characterization of Gallium Nitride Heterostructures for Strain Sensing at Elevated Temperatures
- A Case-Study for Structural Health and Propellant Monitoring Technologies
- A 915 MHz Wireless Correlator Multi-Sensor System for SHM
- 3D Photovoltaic Sensors for In-Situ Structural Health Monitoring of Advanced Composites
- Wireless Acoustic Emission Sensor Powered by Microwave Energy
- Damage Detection in Composites by LAI-PZT Transducer

SPECIAL SESSION: DATA INTERPRETATION AND MODELING FOR SHM

- Input Force Reconstruction Using Response Measurements
- Displacement of a Skyscraper Using Various Types of Field Monitoring Data
- Influence Line-Based Damage Detection Technique for Long-Span Bridges
- A Novel Bayesian Extreme Value Distribution Model of Vehicle Loads: Application to Nanjing 3rd Yangtze River Bridge
- Design of Structure Health Monitoring System for Nanjing 4th Yangtze River Bridge

SPECIAL SESSION: IMPAIRMENT DETECTION

- Vehicle-Bourne Autonomous Railroad Bridge Impairment Detection Systems
- Structural Impairment Detection of Tunnel Linings Using Ultrasonic Sensors
- Implementation of a Structural Impairment Detection System on a 100 Year-Old Bascule Bridge
- Structural Health Monitoring on Cracked Railway Axle Journals Using Ultrasonic Phased Array Technique
- SHM System of the Roof Structure of Sports Arena “Olivia”
- A Competitive Array of Artificial Neural Networks for Use in Structural Impairment Detection

SPECIAL SESSION: MATERIAL STATE AWARENESS AND DAMAGE PRECURSORS

- Characterization of CFRP Laminates: Linear and Nonlinear Acoustic Measurements of As-Fabricated Materials
- Uncertainty Quantification of Multiscale Composite Damage Initiation and Progression
- Damage Precursor Investigation of Fiber Reinforced Composite Materials Under Dynamic Cyclic Loads
- Overview of the Use of Acoustic Emission and Electrical Resistivity for Damage Detection in Ceramic and Polymer Matrix Composites
- Monitoring Transverse Matrix Cracking in Composite Laminates Using Ultrasonic Guided Waves
- Nonlinear Ultrasonic Time Reversal Imaging for Closed Crack Location in Metallic Structures

SPECIAL SESSION: MONITORING ON MANUFACTURING

- Monitoring of Friction Condition Using a System Identification Technique
- Dynamic Monitoring and Study of Shaft Rotating Deviation Error Using Developed MEMS Gyroscope-Based Sensing Module
- Development of AE Signal Based Tool Breakage Prognosis System in Micro Gun Drilling
- Development of an Intelligent Shaft Fault Diagnosis System for Machine Tools
- Ball Screw Health Monitoring Using Ball Pass Frequency Spectra

SPECIAL SESSION: NEXT-GEN SENSING SYSTEM FOR SHM

- Multi-Physics Modeling and Simulation of a Slotted Patch Antenna for Wireless Strain Sensing
- Characterizing the Self-Sensing Properties of Photoactive P3HT-Based Nanocomposites
- Dual Mode Sensing on Grout Structures with Piezoelectric Sensors
- Mobile Sensors in Bridge Health Monitoring
- Quadrotor-Based Wall-Climbing Robot for Structural Health Monitoring
- Performance Analysis for CNT-Based SHM in Composite Structures
- Experiments on Structural Displacement Monitoring Using VISP (Visually Served Paired Structured Light System)

SPECIAL SESSION: NOVEL SHM/NDE TECH. FOR MATERIAL DAMAGE QUANTIFICATION

- Quantifying Damage Precursor Using Microcontinuum Physics
- Reference-Free Fatigue Crack Detection Using Nonlinear Wave Modulation
- Nondestructive Detection of Nonlinear Behavior of Plain and Polymer Concrete Under Cycling Loading
- Correlation-Based Imaging Algorithm for Bolt Loosening Monitoring on Realistic Aerospace Structure
- Multimodal Non-Destructive Evaluation Approach for Damage Quantification
- Non-Collinear Inspection for the Detection of Damage Precursors
- A Hybrid Data Driven Technique for Long Term Monitoring of Structures
- Damage Inspection of Structures by Space-Wavenumber and Time-Frequency Analyses
- Non-Contact Nonlinear Ultrasound Scan of a CFRP Plate with Manufactured Damages
- Effect of Localized Plastic Deformation on Higher Harmonic Guided Wave Mode Generation in Plate

SPECIAL SESSION: OPTICAL FIBER SENSING BASED SHM

- Development of Scour Monitoring Methods Based on Scour Effect Analysis
- Developmental Status of SHM Applications for Aircraft Structures Using Distributed Optical Fiber
- Development Status of Optical Fiber Sensor Based Impact Damage Detection System for Composite Airframe Structures
- Damage Detection Technology for CFRP Structure Using MFC/FBG Hybrid Sensor System
- Distributed Fiber-Optic Vibration Sensor for Gas Pipeline Leak Detection Using Hybrid Interferometer
- Outline of the Japanese National Project on Structural Health Monitoring System for Aircraft Composite Structures and JASTAC Project
- Fabrication and Test of a Low-Cost Intensity-Based Optical Fibre Accelerometer for Wind Turbine Blade Monitoring Application
- Evaluation of the SDDLV Method for Damage Detection on a Full-Scale Highway Sign Support Truss
- Ultrasensitive Optical-Fiber Ultrasonic Sensor Based on Phase-Shifted Fiber Bragg Gratings
- Identification of Structural Damage Based on a "Weak" Formulation of Locally Perturbed Structural Vibration
- Investigation of Shear Force Mechanism in Electro-Mechanical Impedance (EMI) Technique for Structural Health Monitoring
- Efficient Detection Methods on a Composite Plate with Interior Embedded Fiber Optic Sensors via Impact Test
- Damage Mode Analysis in Composite Structures Using Lamb Waves for SHM Purposes

SPECIAL SESSION: POD AND RELIABILITY OF SHM FOR AEROSPACE STRUCTURES

- Understanding Probability of Detection (POD) in Structure Health Monitoring Systems
- A Novel Approach for Structural Health Monitoring Using In Situ Thermoelastic Stress Analysis
- Development and Validation of Acoustic Emission Structural Health Monitoring for Aerospace Structures
- Structural Health Monitoring Using Percolation Sensors—New User Cases from Operational Airliners and Chemical Plants
- Feasibility Analyses of Carbon Nanotubes for the Design of a New Hair Flow Sensor
- Sensor Network Configuration Effect on Detection Sensitivity of an Acousto-Ultrasound-Based Active SHM System
- Optimization of Bio-Inspired Piezoelectric Composite Hair Sensor—Mechanical Impedance Matching

SPECIAL SESSION: SENSING STRATEGY FOR WAVE-BASED SHM

- Quantitative Detection of Shallow Corrosion Damage by Targeted Use of the Dispersive Behavior of Guided Wave Modes
- Scattering Measurements and In Situ Imaging with Sparse Guided Wave Arrays
- Damage Identification for Composite Structures Using a Cross-Correlation Reverse-Time Migration Technique
- Continuous Thickness Monitoring—Experience from the Field and Lessons Learned
- Long Term Stability of Guided Wave Structural Health Monitoring Using Distributed Adhesively Bonded Piezoelectric Transducers
- Beamforming of Lamb Waves Using 2D Arrays: A Comparative Study
- A Small, Light, and Low-Power Passive Node Sensor for SHM of Composite Panels
- Embedded Inductively Coupled Sensors for Composite SHM
- Guided Wave Scattering for In Situ Health Monitoring of Slotted Fuel Flow Vents in Integral Stiffeners
- Cognitive Structural Health Monitoring and Its Key Technology
- Minimum Sensor Density for Quantitative Damage Imaging
- Monitoring Impact Online with a Miniaturized Device for Composite Structures

SPECIAL SESSION: SHM FOR HARSH ENVIRONMENTS

- Aluminum Nitride High Temperature Strain Sensors
- MEMS Piezoelectric Energy Harvesters for Harsh Environment Sensing
- Optical MEMS Pressure Sensors for Geothermal Well Monitoring
- Development of High Performance BS-PT Based Piezoelectric Transducer for Structural Health Monitoring of High Temperature Polymer-Matrix Composite Structures
- Development and Verification of an Aerothermal Thermal Protection System Heat Shield Instrumentation Plug for Flight on Mars Science Laboratory
- Health Monitoring of Composite Structures Using Carbon Nanotubes

SPECIAL SESSION: SHM FOR SPACE SYSTEMS

- Structural Health Monitoring in Near-Space Environment, a High Altitude Balloon Test
- Hybrid Passive/Active Impact Detection & Localization for Aerospace Structures
- Damage Detection in Large Scale Composite Rocket Structures Using Modal Acoustic Emission and Phased Array Sensing Techniques
- NASA Prototype All Composite Tank Cryogenic Pressure Tests to Failure with Structural Health Monitoring
- Life Cycle Monitoring of Thick CFRP Pipes for Spacecraft Structures

SPECIAL SESSION: SHM TECHNOLOGY IN WIND TURBINES

- Using Diffused Fields for Monitoring the Structural Health of Wind Turbine Blades
- Validation of Vibro-Acoustic Modulation of Wind Turbine Blades for Structural Health Monitoring Using Operational Vibration as a Pumping Signal
- Approaches to Acoustic Emission Monitoring with Applicability to Key Components in Wind Turbines
- Virtual Assessment of Structural Health Monitoring Techniques for Wind Turbines Using Vibration Data
- Cointegration for the Removal of Environmental and Operational Effects Using a Single Sensor
- Composite Bonds Assessment Using EMI Technique
- Structural Health Monitoring of Offshore Wind Turbines Using Automated Operational Modal Analysis
- Optimizing the Information Needed for Wind Turbine Health Monitoring
- Structural Health Control—A Comprehensive Concept for Observation and Assessment of Damages Applied on a Darrieus Wind Turbine
- A Study Investigating the Inter-Correlation of Wind Speed and Turbulence on the Accuracy of SCADA Based Wind Turbine Blade Load Reconstructions
- Monitoring the Structural Integrity of Wind Turbine Blades Subcomponents Using Advanced Signal Processing Techniques
- Structural Health Monitoring of Major Wind Turbine Components
- Ultrasonic Fields and Inspection of Huge Complex Composites
- Inspection and Monitoring of Wind Turbine Blade Embedded Defects During Fatigue Testing
- Novel Method for Simulation of Lamb Wave Propagation Generated by an Interdigital Transducer
- Reduction of Model Complexity in Aerospace Structures with the Help of Approximated Stiffeners
- Advanced Optimal Modal Reduction and Optimal Sensors Location Procedures for Structural Damage Identification

SPECIAL SESSION: SHM/NDE FOR CIVIL INFRASTRUCTURES

- On the Use of Solitary Waves for the Prediction of Structural Buckling of Simple Structures
- Crack Pattern Quantification for Advanced Visual Inspection of Concrete Structures
- Leakage of Guided Waves in Embedded Waveguides of Arbitrary Cross Section
- Bragg Grating and BOTDR Fiber Optic Principles Applied for Real-Time Structural Monitoring—The MONICO Project
- Structural Condition Assessment of Bridges: Past, Present, and Future—A Portuguese Perspective
- The Role of SHM in Infrastructure Management
- Combined MEMS Acoustic Emission and Strain Sensors for On Chip Data Fusion
- Non-Contact Ultrasonic Guided Wave Inspection of Rails
- Hyperbolic Signature Extraction of Deeper Rebar Layer in Concrete Bridge Decks Using GPR
- Air-Coupled Ultrasonic NDT of Solids Using a Focused Electrical Spark Source
- Multiple Cross Validated Sensing System for Damage Monitoring in Civil Structural Components
- Feasibility for Energy Harvesting from Surface Bonded/Embedded Piezo-Patches in Addition to Structural Health Monitoring
- Dual Mode Sensing on Grout Structures with Piezoelectric Sensors

SPECIAL SESSION: SOURCE LOCALIZATION

- Impact Sensing in Sandwich Structures Using Highly Nonlinear Solitary Waves
- Acoustic Emission Source Localization in Anisotropic Structures Through Nonlinear Kalman Filtering Estimation
- Piezoelectric Rosettes for Acoustic Source Location in Composite Structures: Results from "Blunt" Impact Tests
- Novel Approach for Acoustic Source Localization Using Spiral Sensing
- Difficulties Associated with the Acoustic Source Localization in Anisotropic Plates and Its Solution
- Near-Field 2D-MUSIC Algorithm Based Impact Localization Using Linear Array

SPECIAL SESSION: STATISTICAL METHODS FOR SHM

- A Sequential Statistical Time Series Framework for Vibration Based Structural Health Monitoring
- Probabilistic Damage Detection in Beam Structures Based on the Neutral Axis
- On the Impact of Prior Engineering Perception on Structural Health Diagnosis: Analysis of a Case Study
- Dynamic Bayesian Network for Operational Modal Identification
- Nonlinear Model-Data Fusion for Post-Earthquake Assessment of Structures
- Quantification of Pavement Condition by Tire/Road Noise Measurement
- Probabilistic Learning and Planning for Optimal Management of Wind Farms
- Reliability-Oriented Optimization of Replacement Strategies for Monitored Composite Panels for Aircraft Structures
- Reliability-Based Condition Assessment of Bridge Deck Using Long-Term Monitoring Data
- Understanding Environmental Effect on Building Vibration for Structural Health Monitoring Using Event Detection and Causal Analysis
- An Approach to Fault Detection Using a Unified Linear Gaussian Framework
- Automatic Damage Classification Based on Wave Cluster and Principal Component Analysis

SPECIAL SESSION: VERY DENSE ARRAYS OF SENSORS

- Energy Harvesting and Power-Management for Sensing Skins in SHM Applications
- Patterned Carbon Nanotube Sensing Skins for Strain Sensing
- Towards Sensing Sheets Based on Large Area Electronics
- Sensing Skin for Condition Assessment of Civil Structures
- The Use of Localized Sensor Networks for Damage Detection: A Likelihood Ratio Test Control Chart
Author Index for Volumes 1 and 2

Ordering:

Order Online - http://www.researchandmarkets.com/reports/2669923/

Order by Fax - using the form below

Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

Product Name: Structural Health Monitoring 2013: A Roadmap to Intelligent Structures
Web Address: http://www.researchandmarkets.com/reports/2669923/
Office Code: SCEJDPYJ

Product Format
Please select the product format and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Copy (Hard Back) and CD-ROM:</td>
<td>USD 310 + USD 28 Shipping/Handling</td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

Title: [ ] Mr [ ] Mrs [ ] Dr [ ] Miss [ ] Ms [ ] Prof

First Name: ___________________________ Last Name: ___________________________
Email Address: * ___________________________
Job Title: ___________________________
Organisation: ___________________________
Address: ___________________________
City: ___________________________
Postal / Zip Code: ___________________________
Country: ___________________________
Phone Number: ___________________________
Fax Number: ___________________________

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: 

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World