

Table of Contents

Preface, Committees and Sponsors

A One Stage Damage Detection Technique Using Spectral Density Analysis and Parallel Genetic Algorithms M. Varmazyar, N. Haritos, M. Kirley and T. Peterson	1
Application of Wavelet Parameters for Impact Damage Detection in Plates T.J. Shelley and C.K. Liew	12
Damage Identification and Assessment in Tapered Sandwich Structures Using Guided Waves S. Mustapha and L. Ye	25
A Framework for Reliability Assessment of an In-Service Bridge Using Structural Health Monitoring Data X.H. Chen and P. Omenzetter	39
Modeling of Environmental Effects for Vibration-Based SHM Using Recursive Stochastic Subspace Identification Analysis C.H. Loh and M.C. Chen	52
Modal Acoustic Emission Investigation for Progressive Failure Monitoring in Thin Composite Plates under Tensile Test M.H. Zohari, J.A. Epaarachchi and K.T. Lau	65
Laser Lock-In Thermography for Fatigue Crack Detection Y.K. An, J.M. Kim and H. Sohn	76
In Situ Blade Deflection Monitoring of a Wind Turbine Using a Wireless Laser Displacement Sensor Device within the Tower P. Giri and J.R. Lee	84
Guided Wavefield Images Filtering for Damage Localization W. Ostachowicz, P. Kudela and M. Radzienski	92
Strain as Damage Indicator for Truss and Frame Structures S. Opoka, L. Murawski, T. Wandowski, P. Malinowski and W. Ostachowicz	99
Guided Waves for Aircraft Panel Monitoring P. Malinowski, T. Wandowski and W. Ostachowicz	107
Time-Domain Hybrid Global-Local Prediction of Guided Waves Interaction with Damage M. Gresil and V. Giurgiutiu	116
A Robust Procedure for Damage Detection from Strain Measurements Based on Principal Component Analysis A. Guemes, J. Sierra-Pérez, J. Rodellar and L. Mujica	128
Prediction and Measurement of Lamb Wave from Debondings at Structural Features in Composite Laminates C.T. Ng and M. Veidt	139
Substructure Damage Detection Method for Shear Structure Using Sub-Time Series and ARMAX L. Mei, A. Mita and Z.H. Xing	149
Structural Design and Verification of Composite Pressure Vessels for Submarine External Stowage D.J. Miller	160
Verification of Structural Health Assessment Method Using Full-Scale Collapse Test of Four-Story Steel Building Y. Shinagawa and A. Mita	174
Damage Characterisation of Carbon Fibre Reinforced Composite Plate Using Acoustic Emission B.Y. Mohammed, C.K. Tan, S.J. Wilcox and A.Z.S. Chong	184
Nonlinear Properties of Lamb Waves under Modulation of Fatigue Damage: <i>Finite Element Simulation with Experimental Validation</i> M. Hong, C. Zhou, Z.Q. Su, L. Cheng and X.L. Qing	195
Single Transducer Pair Lamb Wave Time Reversal for Damage Detection in Composite Laminates B. Normandin and M. Veidt	205

Development of the Damage Detection Method for CFRP Structures Using Distributed BOFDA Optical Fiber Sensor	218
N. Saito, T. Yari, K. Nagai and K. Enomoto	
Dynamic Displacement Estimation from Acceleration Measurements Using a Wireless Smart Sensor	227
J.W. Park, S.H. Sim, H.J. Jung and B.F. Spencer	
Optimal Structural Health Monitoring Feature Selection via Minimized Performance Uncertainty	235
Z. Mao and M.D. Todd	
Imaging Damage Using Mixed Passive and Active Sensors	244
C.H. Wang and L.R. Francis Rose	
Distributed Strain Monitoring for Damage Evolution in CFRP Bolted Structures with Embedded Optical Fibers	252
N. Takeda, S. Minakuchi and T. Nadabe	
Lamb Wave Based Monitoring of Fatigue Crack Growth Using Principal Component Analysis	260
Y. Lu, M.Y. Lu, L. Ye, D. Wang, L.M. Zhou and Z.Q. Su	
Structural Health Monitoring of Space Vehicle Thermal Protection Systems	268
N. Hoshcke, D.C. Price, D.A. Scott and W.L. Richards	
Active Evacuation Guidance and Structural Health Monitoring System for Buildings Using Sensor Agent Robots	281
A. Mita and D. Ise	
Sensor Agent Robot with Servo-Accelerometer for Structural Health Monitoring	289
T. Akiba, N. Lee and A. Mita	
Damage Assessment Methodology for Nonstructural Components with Inspection Robot	297
Y. Nitta, A. Nishitani, A. Iwasaki, M. Watakabe, S. Inai and I. Ohdomari	
Flight Tests Performed by EMBRAER with SHM Systems	305
R. Pinheiro Rulli, F. Dotta and P.A. da Silva	
Scattering Matrix Approach to Informing Damage Monitoring and Prognosis in Composite Bolted Connections	314
C. Haynes, T. Nadabe, N. Takeda and M.D. Todd	
EMBRAER Perspective on the Challenges for the Introduction of Scheduled SHM (S-SHM) Applications into Commercial Aviation Maintenance Programs	323
L.G. dos Santos	
Locating Point of Impact on an Anisotropic Cylindrical Surface Using Acoustic Beamforming Technique	331
H. Nakatani, T. Hajzargarbashi, K. Ito, T. Kundu and N. Takeda	
Analysis of Vibro-Acoustic Modulations in Nonlinear Acoustics Used for Impact Damage Detection - Numerical and Experimental Study	341
Ł. Pieczonka, A. Klepka, W.J. Staszewski, T. Uhl and F. Aymerich	
Investigation of the Effectiveness of Different Thermographic Testing Modalities in Damage Detection	349
Ł. Pieczonka, M. Szwedko and T. Uhl	
Recent Progress in Intelligent Vehicle Health Monitoring	357
I.S. Cole, P. Corrigan, W.D. Ganther and S.C. Galea	
Structural Health Monitoring of Research-Scale Wind Turbine Blades	364
S.G. Taylor, K.M. Farinholt, G.H. Park, C.R. Farrar, M.D. Todd and J.R. Lee	
An Enhanced Experimental Facility for Durability and Performance Characterisation of Piezoelectric Transducers for Structural Health Monitoring	374
G. Jung, S. van der Velden, K. Tsoi and N. Rajic	
Experimental Testing of Vibration Analysis Methods to Monitor Recovery of Stiffness of a Fixated Synthetic Pelvis: A Preliminary Study	386
L.C.Y. Wong, W.K. Chiu, M. Russ and S. Liew	
Understanding of the Scattering of Incident Stress Waves by Defects on the Blind Side of Fuel Vent Hole	400
C. Doherty and W.K. Chiu	
Designing for Lamb Wave Based <i>In Situ</i> Structural Health Monitoring	411
W.H. Ong and W.K. Chiu	

Distributed Optical Fibre Sensors and their Applications in Pipeline Monitoring P. Rajeev, J. Kodikara, W.K. Chiu and T. Kuen	424
Novel Transducer for Characterization of Low-Impedance Materials R. Dugnani	435
Acoustic Emission for Tank Bottom Monitoring G. Martin	445
Dynamically Reconfigurable Multivariable MEMS Sensor Array for Unattended Systems S. van der Velden, I. Powlesland, S.C. Galea and J. Singh	456
Multiphysics Modelling and Experimental Validation of a Bi-Axial Magnetoelectric Vibration Energy Harvester J.E. McLeod and S.D. Moss	465
Optimal Coil Transducer Geometry for an Electromagnetic Nonlinear Vibration Energy Harvester L.A. Vandewater, S.D. Moss and S.C. Galea	477
Interaction of High Frequency Lamb Waves with Surface-Mount Sensor Adhesives P. Norman, C. Davis, C. Rosalie and N. Rajic	489
Thermoelastic Stress Analysis - Emerging Opportunities in Structural Health Monitoring N. Rajic, S.C. Galea and D. Rowlands	501
Strain Measurements Using Fibre Bragg Gratings during Full-Scale Structural Testing of an F/A-18 Centre Barrel T. Schembri, S. Tejedor and C. Davis	510
Optical Fibres for Distributed Corrosion Sensing - Architecture and Characterisation R. Kostecki, H. Ebendorff-Heidepriem, S.C. Warren-Smith, G. McAdam, C. Davis and T.M. Monro	522
Development and Validation Roadmap for <i>In Situ</i> Structural Health Monitoring of ADF Aircraft S.C. Galea and N. Rajic	534
Prediction of Obsolete FBG Sensor Using ANN for Efficient and Robust Operation of SHM Systems G.C. Kahandawa, J.A. Epaarachchi, H. Wang and K.T. Lau	546
Structural Seismic Damage Detection Using Fractal Dimension of Time-Frequency Feature D.W. Tao, D.Y. Zhang and H. Li	554
Applications of Compressive Sensing Technique in Structural Health Monitoring Y.Q. Bao, H. Li and J.P. Ou	561