

Table of Contents

Preface

Smart Materials in Damage Detection and Prognosis D.J. Inman	3
Damage Assessment of the Z24 Bridge by FE Model Updating A. Teughels and G. De Roeck	19
An Automatic Damage Detection Methodology for Structural Health Monitoring during Fatigue Tests S. Vanlanduit, P. Guillaume and G. Van der Linden	27
Damage Detection in Large-Scale Laboratory Bridge Models J.S. Owen and N. Haritos	35
Lifetime Prediction for Fatigue Damage in Bonded Joints M.M. Abdel Wahab, I.A. Ashcroft, A.D. Crocombe and L. Jousot	43
Leak Monitoring in Pipeline Networks Using Wavelet Analysis I. Al-Shidhani, S.B.M. Beck and W.J. Staszewski	51
Damage Detection in Boundary Conditions. Comparison Benchmark J. López-Díez, C. Cuerno-Rejado, R. Atienza and A. Güemes	59
The Frequency Domain Assurance Criterion as a Tool for Damage Detection R.P.C. Sampaio, N.M.M. Maia and J.M.M. Silva	69
Identification of Crack-Tip Parameters Using Thermoelastic Isopachics and Differential Evolution J.M. Dulieu-Barton and K. Worden	77
A Strain-Flexibility-Based Approach to Damage Location D. Zonta, A. Lanaro and P. Zanon	87
The Effect of Damping on the Non-Linear Dynamic Behaviour of a Cracked Beam at Resonance and Super-Resonance Vibrations A.P. Bovsunovsky, C. Surace and R. Ruotolo	97
Damage Detection on Automotive Components using Variations in Modal Parameters F. Garesci, L. Catalano and F. Petrone	107
A Genetic Algorithm based Inverse Problem Approach for Pedestal Looseness Identification in Rotor-Bearing Systems Y.Y. He, Z.Y. Chen, D. Guo and F.L. Chu	115
A Model for Studying Properties of the Mode-Coupling Type Instability in Friction Induced Oscillations on 4-h Cold Rolling Mills Y. Chen, T.L. Shi and S.Z. Yang	123
Structural Health Monitoring and Damage Assessment Using Measured FRFs from Multiple Sensors, Part I: The Indicator of Correlation Criteria C. Zang, M.I. Friswell and M. Imregun	131
Structural Health Monitoring and Damage Assessment Using Measured FRFs from Multiple Sensors, Part II: Decision Making with RBF Networks C. Zang, M.I. Friswell and M. Imregun	141
Hybrid-Knowledge-Models-Based Intelligent Fault Diagnosis Strategies for Liquid-Propellant Rocket Engines J.J. Wu, H.G. Liu and Q. Chen	149
Estimation of Rotational Frequency Responses J.E. Mottershead, A. Kyprianou and H.J. Ouyang	157
Use of Response Surface Metamodels for Damage Identification of a Simple Nonlinear System A.L. Cundy, F.M. Hemez, D.J. Inman and G. Park	167
Higher Order Time-Frequency Analysis as a Tool for Health Monitoring S.K. Lee	175
A Time-Frequency Distribution based on a Moving and Combined Kernel and its Application in the Fault Diagnosis of Rotating Machinery G. Yang and B. Shi	183

Structural Damage Detection and Localization Using FRF-Based Model Updating Approach	
C. Zang and M. Imregun	191
Where Next for Condition Monitoring?	
A.W. Lees	203
Extraction Methods of Multi - Fault Information in Machine Condition Monitoring	
C. Cempel, M. Tabaszewski and M. Krakowiak	215
Simplified Modelling of Rotor Cracks	
J.E.T. Penny and M.I. Friswell	223
Dynamics and Control of a Rotor Using an Integrated SMA/Composite Active Bearing Actuator	
A.J. Żak, M.P. Cartmell and W.M. Ostachowicz	233
Research on Fault Mechanism of Rotor to Stator Rub Nonlinear Vibration in High-Speed Turbo Machinery	
J.J. Gao and Z. Jiang	241
Gearbox Condition Monitoring Based on Curvilinear Component Analysis	
G.L. Liao, T.L. Shi and S.Y. Liu	249
Model Identifiability of Fault Rotor-Bearing System	
Z.Y. Chen, D. Guo, Y.Y. He and F.L. Chu	257
Fractal Geometry and its Application to Vibration Faults Diagnosis for Rotating Machinery	
D.X. Jiang, C. E and W.D. Ni	265
Detection of Rotor Cracks Based on Multi-Scale Singular Spectrum Analysis	
Y.F. Liu and M. Zhao	273
Nonlinear Signatures in the Transient Dynamics of Turbo-Machinery	
S. Roberts and J.A. Brandon	279
A Coupled Approach to Developing Damage Prognosis Solutions	
H. Sohn, C.R. Farrar, F.M. Hemez, G. Park, A.N. Robertson and T.O. Williams	289
Monitoring the Degradation of Reinforced Concrete Beams under Cyclic Loading	
J.S. Owen	307
Measurement of Low-Amplitude Hysteresis Behaviour of Concrete by High-Precision Vibrating Wire Strain Gauges	
S.A. Neild, M.S. Williams and P.D. McFadden	315
Acoustic Emission Assessment of Concrete Hinge Joints	
R. Pullin, K.M. Holford, R.J. Lark and P. Beck	323
Diagnosis of Structural Damage from Non-Stationary Output-Only Measurements	
D. Bernal and A. de Stefano	331
Advances in Identification and Fault Detection in Bridge Structures	
E. Bonisoli, A. Fasana, L. Garibaldi, S. Marchesiello and D. Sabia	339
An Investigation into the Mechanism of a Crankshaft Failure	
F.S. Silva	351
Risk-Based Residual Life Assessment - A Case Study	
J.R. Maguire	359
A Web-Based Remote Intelligent Expert System for Ferrography Diagnosis	
J.D. Wang, D.R. Chen and X. Kong	367
Simplified Method to Predict Elastic-Plastic Behaviour of Aeroengine Casings	
R. Sabesan, S.B. Leen and T.H. Hyde	373
Mechatronics in Design of Monitoring and Diagnostic Systems	
T. Uhl, T. Barszcz and A. Hanc	381
Health Monitoring of Reciprocating Compressor in Refrigerator Based on the Artificial Neural Network	
S.K. Lee and K. Rho	391
A Study of Fault Mechanisms in a Rotor-Seal System	
L.D. He and J.J. Gao	399
Certification of Condition Monitoring Personnel in the UK	
S. Roe and R. Newport	407
Modelling and Accident Reconstruction of Head Impact Injuries	
M.D. Gilchrist	417

An Audio-Frequency Wave Technique for Damage Detection in Beams M. Rousseau, T.P. Waters and B.R. Mace	433
Moment Tensor Analysis of Acoustic Emission in Concrete Specimens Failed in Four-Point Bending P. Beck, R.J. Lark and K.M. Holford	443
Online Detection of Subsurface Distress by Acoustic Emissions E.D. Price, A.W. Lees, M.I. Friswell and B.J. Roylance	451
A Quantitative Study of the Relationship between Concrete Crack Parameters and Acoustic Emission Energy Released during Failure P. Beck, T.P. Bradshaw, R.J. Lark and K.M. Holford	461
The Role of Surface Waves in Assessing Structural Damage P.R. Armitage and J.M. Horwood	467
Acoustic Emission Monitoring of Field Tests of an Operating Wind Turbine M.J. Blanch and A.G. Dutton	475
Detection of Delamination in Multilayer Composite Beams W.M. Ostachowicz, M. Krawczuk and M. Palacz	483
Effect of Damage on the Energy Absorption of Prismatic Thin-Walled Polymer Composite Structures N. Warrior and M. Ribeaux	491
Damage Assessment in Bonded Composite Joints I.A. Ashcroft, S. Erpolat and J. Tyrer	501
Damage Detection in Composite Structures Based on Optical Fibre Strain Sensing and Finite Element Model Updating G. Nosenzo, M.P. Whelan and T. Dalton	509
Damage Detection and Health Monitoring Based on Vibration Measurements and Recognition Algorithms in Real-Scale Aeronautical Structural Components I. Bovio, E. Monaco, M. Arnese and L. Lecce	519
Fault Detection in Rotor-Bearing System Using Measured Vibration Data D. Guo, Z.Y. Chen, Y.Y. He and F.L. Chu	527
Life Damage of Shaft and Spider in Hydraulic Generator Unit Based on Vibration Signal F.Z. Feng, B. Yang, F.L. Chu and D. Guo	537
State Space Modelling and Representation for Vibration-Based Damaged Assessment I. Trendafilova	547
Damage Assessment in Concrete Beams Using Non-Linear Analysis of Vibration Measurements S.A. Neild, P.D. McFadden and M.S. Williams	557
Wavelet Multifractal Approaches for Singularity Analysis of Vibration Signals Z. Peng, Y. He, D. Guo and F.L. Chu	565
Online Vibration-Based Crack Detection during Fatigue Testing B. Peeters, L. Mevel, S. Vanlanduit, P. Guillaume, M. Goursat, A. Vecchio and H. Van der Auweraer	571
Identifying the Foundation Stiffness of a Partially Buried Post from Vibration Measurements T.P. Waters, M.J. Brennan and S. Sasananan	579