

25th International Congress on Condition Monitoring and Diagnostic Engineering

(COMADEM 2012)

Journal of Physics: Conference Series Volume 364

**Huddersfield, United Kingdom
18-20 June 2012**

Volume 1 of 2

Editors:

**Rakesh Mishra
Andrew Ball**

**Fengshou Gu
B K N Rao**

**ISBN: 978-1-62276-781-6
ISSN: 1742-6588**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by the Institute of Physics
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Volume 1

AEROSPACE ENGINEERING

012001 Testability Requirement Uncertainty Analysis in the Sensor Selection and Optimization Model for PHM	1
<i>S M Yang, J Qiu, G J Liu, P Yang, Y Zhang</i>	
012002 Modeling and Fault Simulation of Propellant Filling System	12
<i>Y Jiang, W Liu, X Hou</i>	

AUTOMOTIVE & RAIL ENGINEERING

012003 CargoCBM – Feature Generation and Classification for a Condition Monitoring System for Freight Wagons	20
<i>C Gericke, M Hecht</i>	
012004 Estimation of the Friction Coefficient Between Wheel and Rail Surface Using Traction Motor Behaviour	30
<i>Y Zhao, B Liang, S Iwnicki</i>	
012005 Haul Truck Tire Dynamics Due to Tire Condition	38
<i>R Vaghar Anzabi, D S Nobes, M G Lipsett</i>	
012006 Developing RCM Strategy for Hydrogen Fuel Cells Utilizing On Line E-Condition Monitoring	48
<i>D Baglee, M J Knowles</i>	
012007 Condition Management of Marine Lube Oil and the Role of Intelligent Sensor Systems in Diagnostics	59
<i>M Knowles, D Baglee</i>	
012008 Enhanced Massive Visualization of Engines Performance	69
<i>N D Rostand, H Eglantine, L Jérôme</i>	
012009 Optical Strain Measurement for Fault Detection in Haul-truck Tires	85
<i>A Kotchon, D S Nobes, M G Lipsett</i>	
012010 Influences of the Chemical Structure of Entrainers on the Activity Coefficients in Presence of Biodiesel	93
<i>A Mäder, A Fleischmann, Ye Fang, W Ruck, J Krahl</i>	
012011 Design of Mine Ventilators Monitoring System Based on Wireless Sensor Network	103
<i>S Fu, H Song</i>	
012012 Utilization of a Hardware-in-the-loop-system for Controlling the Speed of an Eddy Current Brake	109
<i>V Kramer, R Mishra, P Brauneis, K Schmidt</i>	
012013 A Modern Diagnostic Approach for Automobile Systems Condition Monitoring	123
<i>M Selig, Z Shi, A Ball, K Schmidt</i>	
012014 The Influence of Tyre Contact Patch and on the Stopping Distance of Automotive Vehicles	129
<i>M Selig, A Ball, J Ash, K Schmidt</i>	
012015 An Investigation of the Acoustic Characteristics of a Compression Ignition Engine Operating with Biodiesel Blends	135
<i>D Zhen, B Tesfa, X Yuan, R Wang, F Gu, A D Ball</i>	
012016 Modern Techniques for Condition Monitoring of Railway Vehicle Dynamics	146
<i>R W Ngigi, C Pislaru, A Ball, F Gu</i>	
012017 Emissions from Diesel Engines Using Fatty Acid Methyl Esters from Different Vegetable Oils As Blends and Pure Fuel	158
<i>O Schröder, A Munack, J Schaak, C Pabst, L Schmidt, J Büniger, J Krahl</i>	
012018 Concentration Measurements of Biodiesel in Engine Oil and in Diesel Fuel	167
<i>A Mäder, M Eskiner, C Burger, W Ruck, M Rossner, J Krahl</i>	
012019 Fallback Level Concepts for Conventional and By-wire Automotive Brake Systems	174
<i>H Retzer, R Mishra, A Ball, K Schmidt</i>	
012020 Automated Misfire Diagnosis in Engines Using Torsional Vibration and Block Rotation	181
<i>J Chen, R B Randall, B Peeters, H Van Der Auweraer, W Desmet</i>	

012021 A Clamping Force Measurement System for Monitoring the Condition of Bolted Joints on Railway Track Joints and Points.....	192
<i>B Tesfa, G Horler, F Al Thobiani, F Gu, A D Ball</i>	

BEARING TECHNOLOGY

012022 Pump Coupling & Motor Bearing Damage Detection Using Condition Monitoring at DTPS.....	208
<i>H M Bari, A A Deshpande, P S Jalkote, S S Patil</i>	
012023 Failure Diagnosis and Prognosis of Rolling - Element Bearings using Artificial Neural Networks: A Critical Overview.....	225
<i>B K N Rao, P Srinivasa Pai, T N Nagabhushana</i>	
012024 Application of Statistics Filter Method and Clustering Analysis in Fault Diagnosis of Roller Bearings.....	253
<i>L Y Song, H Q Wang, J J Gao, J F Yang, W B Liu, P Chen</i>	
012025 Application of Phase Space Warping on Damage Tracking for Bearing Fault.....	260
<i>B Fan, N Hu, L Hu, F Gu</i>	
012026 Intelligence Diagnosis Method for Roller Bearings Using Features of AE Signal.....	268
<i>J Pan, H Q Wang, F Wang, J F Yang, W B Liu</i>	
012027 Research of Two Different Impulsive Faults of Rolling Element Bearing.....	276
<i>Z Jiang, C Xing, K Feng, J Gao</i>	
012028 Bearing Performance Degradation Assessment Using Linear Discriminant Analysis and Coupled HMM.....	284
<i>T Liu, J Chen, X N Zhou, W B Xiao</i>	
012029 Enhanced Fault Detection of Rolling Element Bearing Based on Cepstrum Editing and Stochastic Resonance.....	296
<i>X Zhang, N Hu, L Hu, B Fan, Z Cheng</i>	
012030 Experimental Study on Bearing Preload Optimum of Machine Tool Spindle.....	304
<i>T Xu, G Xu, Q Zhang, C Hua, H Zhang, K Jiang</i>	
012031 Online Adaptive Learning of Left-right Continuous HMM for Bearings Condition Assessment.....	310
<i>F Cartella, T Liu, S Meganck, J Lemeire, H Sahli</i>	
012032 Stability Analysis of a Turbocharger Rotor System Supported on Floating Ring Bearings.....	321
<i>H Zhang, Z Q Shi, D Zhen, F S Gu, A D Ball</i>	
012033 The Research of Optimal Selection Method for Wavelet Packet Basis in Compressing the Vibration Signal of a Rolling Bearing in Fans and Pumps.....	338
<i>W Hao, G Jinji</i>	
012034 Development of Acoustic Emission (AE) Based Defect Parameters for Slow Rotating Roller Bearings.....	351
<i>K Nienhaus, F D Boos, K Garate, R Baltes</i>	
012035 A Comparative Study of the Monitoring of a Self Aligning Spherical Journal using Surface Vibration, Airborne Sound and Acoustic Emission.....	361
<i>P Raharjo, B Tesfa, F Gu, A D Ball</i>	
012036 Bearing Defect Detection and Diagnosis Using a Time Encoded Signal Processing and Pattern Recognition Method.....	374
<i>S Abdusslam, P Raharjo, F Gu, A Ball</i>	
012037 The Effect of External Dynamic Loads on the Lifetime of Rolling Element Bearings: Accurate Measurement of the Bearing Behaviour.....	386
<i>W Jacobs, R Boonen, P Sas, D Moens</i>	
012038 Spectral Kurtosis Applied to Acoustic Emission in Bearings.....	396
<i>B Eftekharnjad, M Alssayh, A Addali, D Mba</i>	
012039 Investigation Into Various Techniques of Cyclic Spectral Analysis for Rolling Element Bearing Diagnosis Under Influence of Gear Vibrations.....	406
<i>G Dong, J Chen</i>	
012040 Diagnostic Evaluation of Rolling Behavior in Ball Bearings by Ultrasonic Technique.....	420
<i>T Wakabayashi</i>	
012041 Electrical Pitting of Grease-lubricated Rolling and Sliding Bearings: A Comparative Study.....	427
<i>S Raadnui, S Kleesuan</i>	
012042 An Intelligent Fault Diagnosis Method of Rolling Bearings Based on Regularized Kernel Marginal Fisher Analysis.....	437
<i>L Jiang, T Shi, J Xuan</i>	

ELECTRONIC APPLICATIONS

012043 Development of the Task-Based Expert System for Machine Fault Diagnosis	444
<i>B Ma, Z Jiang, Z Wei</i>	
012044 Tolkku - A Toolbox for Decision Support from Condition Monitoring Data	459
<i>O Saarela, M Lehtonen, J Halme, A Aikala, K Raivio</i>	
012045 Study of the Influence Factors on the Accuracy of Sound Field Reconstruction Based on Wave Superposition Method	468
<i>R Wang, J Chen, J Q Li</i>	
012046 Enhancement Detection of Characteristic Signal Using Stochastic Resonance by Adding a Harmonic Excitation	477
<i>N Hu, L Hu, X Zhang, F Gu, A Ball</i>	
012047 A New Method of Reliability Evaluation Based on Wavelet Information Entropy for Equipment Condition Identification	487
<i>Z J He, X L Zhang, X F Chen</i>	
012048 Investigation of Doppler Effects on High Mobility OFDM-MIMO Systems with the Support of High Altitude Platforms (HAPs)	495
<i>H A Mohammed, M J N Sibley, P J Mather</i>	
012049 A Comparative Study of Misalignment Detection Using a Novel Wireless Sensor with Conventional Wired Sensors	507
<i>L Arebi, F Gu, A Ball</i>	
012050 Electrical Motor Current Signal Analysis using a Modulation Signal Bispectrum for the Fault Diagnosis of a Gearbox Downstream	518
<i>M Haram, T Wang, F Gu, A D Ball</i>	
012051 Adaptive Redundant Multiwavelet Packet and Its Application for Compound Faults Detection of Mechanical Equipment	531
<i>J L Chen, Y Y Zi, Z J He, X D Wang</i>	
012052 Design of an Iterative Auto-tuning Algorithm for a Fuzzy PID Controller	541
<i>B I Saeed, B Mehrdadi</i>	
012053 Partial Discharge Location using Unsynchronized Radiometer Network for Condition Monitoring in HV Substations - A Proposed Approach	555
<i>J M R De Souza Neto, E C T De Macedo, J S Da Rocha Neto, E G Da Costa, S A Bhatti, I A Glover</i>	
012054 Wavelet Transform Processing Applied to Partial Discharge Evaluation	566
<i>E C T Macedo, D B Araújo, E G Da Costa, R C S Freire, W T A Lopes, I S M Torres, J M R De Souza Neto, S A Bhatti, I A Glover</i>	
012055 the Development of an Electronic System to Continually Monitor, Indicate and Control, 'Belt Slippage' in Industrial Friction 'V' Belt Drive Transmission Systems	582
<i>R E Brown</i>	
012056 Interactive Graphics on Large Datasets Drives Remote Condition Monitoring on a Cloud	591
<i>S Hickinbotham, J Austin, J McAvoy</i>	
012057 A New Method to Detect and Correct the Critical Errors and Determine the Software-Reliability in Critical Software-System	601
<i>O Krini, J Börsök</i>	
012058 Data Transmission Via Erasure Type Channels Protected by Linear Codes	610
<i>H D Wacker, P Pendli, J Börsök</i>	
012059 Sophisticated Calculation of the 1004-architecture for Safety-related Systems Conforming to IEC61508	618
<i>A Hayek, M Al Bokhaiti, M H Schwarz, J Boercoek</i>	
012060 Modelling and Simulation of Dynamic Wheel-rail Interaction Using a Roller Rig	634
<i>A Anyakwo, C Pislaru, A Ball, F Gu</i>	
012061 Case-based Reasoning Combined with Statistics for Diagnostics and Prognosis	646
<i>T Olsson, P Funk</i>	
012062 Smart Technique for Induction Motors Diagnosis by Monitoring the Power Factor Using Only the Measured Current	655
<i>R A Shnibha, A S Albarabar</i>	
012063 Remaining Useful Life Estimation using Time Trajectory Tracking and Support Vector Machines	663
<i>D Galar, U Kumar, J Lee, W Zhao</i>	
012064 The In-service Inspection of Coated Steel Welds Using Eddy-current Techniques	673
<i>B J Brown, M Zaid, P D Picton, S J Mabbutt</i>	
012065 Instruction based Built-in-Testing of Instruction Select Multiplexer in Arithmetic Logic Unit	690
<i>P Tsoozol, J Börsök, M Schwarz</i>	

012066 A Comparison of Different Techniques for Induction Motor Rotor Fault Diagnosis	697
<i>A Alwodai, F Gu, A D Ball</i>	

FLOW DIAGNOSTICS

012067 Magnitude and Sign Correlations in Conductance Fluctuations of Horizontal Oil Water Two-phase Flow	708
<i>L Zhu, N D Jin, Z K Gao, Y B Zong, L S Zhai, Z Y Wang</i>	

Volume 2

012068 Pressure Drop in Capsule Transporting Bends Carrying Spherical Capsules	715
<i>T Asim, R Mishra, I Ido, K Ubbi</i>	
012069 Effect of the Length and Diameter of a Cylindrical Capsule on the Pressure Drop in a Horizontal Pipeline	726
<i>T Asim, R Mishra, A Nearchou, K Ubbi</i>	
012070 Optimal Design of Capsule Transporting Pipeline Carrying Spherical Capsules.....	738
<i>T Asim, R Mishra, K Ubbi</i>	
012071 Optimisation of a Horizontal Capsule Transporting Pipeline Carrying Cylindrical Capsules	746
<i>T Asim, R Mishra, L Kollar, K Ubbi</i>	
012072 A Study on Optimal Sizing of Pipeline Transporting Equi-sized Particulate Solid-Liquid Mixture	754
<i>T Asim, R Mishra, S Pradhan, K Ubbi</i>	
012073 Experimental Verification of the Four-sensor Probe Model for Flow Diagnosis in Air Water Flow in Vertical Pipe	763
<i>S Pradhan, R Mishra</i>	
012074 Validation of CFD Predictions Using Process Data Obtained from Flow Through an Industrial Control Valve	773
<i>J Green, R Mishra, M Charlton, R Owen</i>	
012075 Local Analysis of Flow Conditions within a Geometrically Complex Control Valve Trim using CFD.....	779
<i>J Green, R Mishra, M Charlton, R Owen</i>	

GEAR BOX DIAGNOSTICS

012076 Crack Level Estimation Approach for Planetary Gear Sets Based on Simulation Signal and GRA	786
<i>Z Cheng, N Hu, M Zuo, B Fan</i>	
012077 Optimising Sensor Location for an Enhanced Gearbox Condition Monitoring System	795
<i>H Alkhadafe, A Al-Habaibeh, S Daihzong, A Lotfi</i>	
012078 Combined Failure Acoustical Diagnosis Based on Improved Frequency Domain Blind Deconvolution	804
<i>N Pan, X Wu, Y L Chi, X Liu, C Liu</i>	
012079 Design of Embedded Wireless Sensor and its Soft Encapsulation for Embedded Monitoring of Helicopter Planetary Gear Set.....	811
<i>G Qin, N Hu</i>	
012080 Fault Detection of Gearbox from Inverter Signals Using Advanced Signal Processing Techniques.....	818
<i>C Pislaru, M Lane, A D Ball, F Gu</i>	
012081 A Hybrid Prognostic Model for Multistep Ahead Prediction of Machine Condition.....	825
<i>D Roulias, T H Loutas, V Kostopoulos</i>	
012082 Gearbox Bearing Fault Simulation Using a Finite Element Model Reduction Technique	834
<i>L Deshpande, N Sawalhi, R B Randall</i>	
012083 Two Stage Helical Gearbox Fault Detection and Diagnosis based on Continuous Wavelet Transformation of Time Synchronous Averaged Vibration Signals	845
<i>F Elbarghathi, T Wang, D Zhen, F Gu, A Ball</i>	

MANUFACTURING SYSTEMS DIAGNOSTICS

012084 From Time Series Measurements to Rules of Causality	856
<i>K J Raivio</i>	
012085 The Technique of Entropy Optimization in Motor Current Signature Analysis and Its Application in the Fault Diagnosis of Gear Transmission.....	866
<i>X Chen, L Liang, F Liu, G Xu, A Luo, S Zhang</i>	
012086 Implementing Wavelet Packet Transform for Valve Failure Detection Using Vibration and Acoustic Emission Signals	875
<i>H Y Sim, R Ramli, M A K Abdullah</i>	
012087 Between "Ferrogram" and "Filtergram" Makers is the Multiple Centrifiltergram Maker: A New Technique for Solid Debris Separation	889
<i>S Raadnui</i>	
012088 Thermal Analysis for Condition Monitoring of Machine Tool Spindles	896
<i>D Clough, S Fletcher, A P Longstaff, P Willoughby</i>	
012089 Implementation of a Digital Data Readout System for Double-sided Silicon Strip Detectors for Ion and Alpha Particle Spectroscopy	909
<i>R R Mändl, D Ackermann, F P Heßberger, K Schmidt, L Zimmermann</i>	
012090 Investigation of AE Features in Grinding	915
<i>X Chen, A Mohammed, A Oluwajobi</i>	
012091 Five-Axis Machine Tool Condition Monitoring Using dSPACE Real-Time System	923
<i>S Sztendel, C Pislaru, A P Longstaff, S Fletcher, A Myers</i>	
012092 Auto-positioning Mount System for Stereoscopic Imaging on Variable Distances	934
<i>Zh Yordanov, E Fuchs, S Löser, J Börcsök</i>	
012093 Vibration Characteristics Analysis of a 20-high Sendzimir Mill with Localized Defect on the Working Roller	940
<i>R Y He, J Liu, Y L Yuan, Y M Shao, H F Xiao</i>	

DIAGNOSTIC MANAGEMENT

012094 A Generic Approach for Reliability Predictions Considering Non-uniformly Deterioration Behaviour	947
<i>J Krause, K Kabitzsch</i>	
012095 Obsolescence Risk Assessment Process Best Practice	958
<i>F J Romero Rojo, R Roy, S Kelly</i>	
012096 Development of Plant Condition Measurement - The Jimah Model	968
<i>R F Evans, M Syuhaimi, M Mazli, N Kamarudin, F M Othman</i>	
012097 Criteria and Model for Assessing and Improving Information Technology Maturity Within Maintenance	979
<i>M Kans, K Ehsanifard, A Moniri</i>	
012098 TOMCAT: An Obsolescence Management Capability Assessment Framework	989
<i>F J Romero Rojo, P Baguley, N Shaikh, R Roy, S Kelly</i>	
012099 Using Heuristic Search for Optimizing Maintenance Plans	1000
<i>T Mutanen</i>	
012100 An Improved Segmentation-based HMM Learning Method for Condition-based Maintenance	1010
<i>T Liu, J Lemeire, F Cartella, S Meganck</i>	
012101 Product Quality Modelling Based on Incremental Support Vector Machine	1022
<i>J Wang, W Zhang, B Qin, W Shi</i>	
012102 Fault Tree Analysis for Maintenance Needs	1031
<i>J Halme, A Aikala</i>	
012103 Valuing the Human Asset - The Impact of University Placements on Academic Performance and Graduate Employment Amongst Management Students.....	1042
<i>R Brooks</i>	
012104 Condition Monitoring of the SSE Generation Fleet.....	1050
<i>J Twiddle, S Muthuraman, N Connolly</i>	
012105 Practical Implementation of Machine Tool Metrology and Maintenance Management Systems.....	1062
<i>C Perkins, A P Longstaff, S Fletcher, P Willoughby</i>	
012106 Developing a "Research Test Bed" to Introduce Innovative Emission Testing Technology to improve New Zealand's Vehicle Emission Standards.....	1072
<i>S J Cox</i>	

012107 A Real-time Monitoring System for the Pipeline Network of Coalmine	1079
<i>H L Zhao, J K Wang, X Jiang</i>	
012108 Development and Displacement in India: Reforming the Economy towards Sustainability	1085
<i>K Siddiqui</i>	
012109 State of Offsite Construction in India-Drivers and Barriers.....	1097
<i>M Arif, D Bendi, A Sawhney, K C Iyer</i>	
012110 E-Learning and Context Aware e-Support Software for Maintenance.....	1105
<i>N Papathanasiou, C Emmanouilidis, P Pistofidis, D Karampatzakis</i>	
012111 O&M Efficiency Model: A Dependability Approach.....	1115
<i>D Galar, U Kumar, P Sandborn, A Morant</i>	
012112 The Measurement of Maintenance Function Efficiency Through Financial KPIs.....	1124
<i>D Galar, A Parida, U Kumar, D Baglee, A Morant</i>	

MISCELLANEOUS

012113 Applying an Innovative Educational Program for the Education of Today's Engineers.....	1138
<i>M Kans</i>	
012114 Review of Artificial Neural Networks (ANN) Applied to Corrosion Monitoring	1151
<i>S Mabbutt, P Picton, P Shaw, S Black</i>	
012115 The Optimum Font Size and Type for Students Aged 9-12 Reading Arabic Characters on Screen: A Case Study	1158
<i>A A Abubaker, J Lu</i>	
012116 BREEAM Excellent: Business Value Vs Employee Morale	1172
<i>N Turner, M Arif</i>	
012117 The New School-Based Learning (SBL) to Work-Based Learning (WBL) Transition Module: A Practical Implementation in the Technical and Vocational Education (TVE) System in Bahrain	1180
<i>M Alseddiqi, R Mishra, C Pislaru</i>	
012118 An Evaluation Quality Framework for Analysing School-Based Learning (SBL) to Work-Based Learning (WBL) Transition Module.....	1189
<i>M Alseddiqi, R Mishra, C Pislaru</i>	

RENEWABLE ENERGY

012119 Intelligent System for a Remote Diagnosis of a Photovoltaic Solar Power Plant.....	1203
<i>M A Sanz-Bobi, A Muñoz San Roque, A De Marcos, M Bada</i>	
012120 Experimental Research on Vibration Reduction of High-rise Petrochemical Equipment.....	1215
<i>W Hao, L D He, J Chang, W F Han, L X Wang</i>	
012121 Implementation of an On-line Monitoring System for Transmitters in a CANDU Nuclear Power Plant.....	1224
<i>A Labbe, G Abdul-Nour, R Vaillancourt, D Komljenovic</i>	
012122 Solar Power Plant Performance Evaluation: Simulation and Experimental Validation	1233
<i>E M Natsheh, A Albarbar</i>	

STRUCTURAL HEALTH MONITORING

012123 Dynamic Modelling and Experimental Study of Cantilever Beam with Clearance	1246
<i>B Li, W Jin, L Han, Z He</i>	
012124 Response of Shrink Fitted Assemblies to the Dynamic Torsion.....	1250
<i>D R Rajakumar</i>	
012125 Risk Based Inspection Methodology and Software Applied to Atmospheric Storage Tanks	1258
<i>P Topalis, G Korneliussen, J Hermanrud, Y Steo</i>	
012126 Prediction of Presence and Severity of Damages Using Experimental Mode Shape	1271
<i>R Shanker, S Bhalla, A Gupta</i>	
012127 Fatigue Life Assessment of Structures Using Electro-Mechanical Impedance Technique	1280
<i>S Bhalla</i>	

TURBOMACHINERY

012128 Application of Novelty Detection Methods to Health Monitoring and Typical Fault Diagnosis of a Turbopump	1289
<i>L Hu, N Hu, B Fan, F Gu</i>	
012129 A Remote Condition Monitoring System for Wind-turbine Based DG Systems	1300
<i>X Ma, G Wang, P Cross, X Zhang</i>	
012130 The Piston Compressor: The Methodology of the Real-Time Condition Monitoring	1306
<i>A P Naumenko, V N Kostyukov</i>	
012131 Real-time Condition Monitoring of Thermal Power Plants Feed-pumps by Rolling Bearings Supports Vibration	1312
<i>V N Kostyukov, E V Tarasov</i>	
012132 Statistical and Time Domain Signal Analysis of the Thermal Behaviour of Wind Turbine Drive Train Components Under Dynamic Operation Conditions	1319
<i>K Nienhaus, M Hilbert, R Bales, C Bernet</i>	
012133 Fault Detection of Reciprocating Compressors using a Model from Principles Component Analysis of Vibrations	1330
<i>M Ahmed, F Gu, A D Ball</i>	
012134 A New Application of Support Vector Machine Method: Condition Monitoring and Analysis of Reactor Coolant Pump	1338
<i>Qinghu Meng, Qingfeng Meng, W Feng</i>	
012135 Fault Diagnosis using Audio and Vibration Signals in a Circulating Pump	1350
<i>P Henríquez, J B Alonso, M A Ferrer, C M Travieso, G Gómez</i>	
012136 Improved Blade Tip Timing in Blade Vibration Monitoring with Torsional Vibration of the Rotor	1362
<i>C Liu, D Jiang</i>	
012137 Risk Assessment of Failure Modes of Gas Diffuser Liner of V94.2 Siemens Gas Turbine by FMEA Method	1370
<i>H M Rafsanjani, A R Nasab</i>	
012138 Computational Fluid Dynamics based Fault Simulations of a Vertical Axis Wind Turbines	1377
<i>K-S Park, T Asim, R Mishra</i>	
012139 Diagnosis of Centrifugal Pump Faults Using Vibration Methods	1386
<i>A Albraik, F Althobiani, F Gu, A Ball</i>	

OTHER PAPERS

012140 Bearing Fault Detection in Induction Motor-Gearbox Drivetrain	1398
<i>J Cibulka, M K Ebbesen, K G Robbersmyr</i>	
012141 Comparison of Flow Characteristics at Rectangular and Trapezoidal Channel Junctions	1419
<i>A K Pandey, R Mishra</i>	
012142 Identification of Critical Speeds of Rotating Machines Using On-Shaft Wireless Vibration Measurement	1430
<i>M E Elnady, J K Sinha, S O Oyadiji</i>	
Author Index	