

14th IMEKO TC10 Workshop on Technical Diagnostics 2016

**New Perspectives in Measurements, Tools
and Techniques for Systems Reliability,
Maintainability and Safety**

**Milan, Italy
27 - 28 June 2016**

ISBN: 978-1-5108-2620-5

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© (2016) by the International Measurement Confederation (IMEKO)
All rights reserved.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the International Measurement Confederation (IMEKO)
at the address below.

IMEKO Secretariat
Dalszinhaz utca 10, 1st floor, Office room No. 3
H-1061 Budapest (6th district)
Hungary

Phone/Fax: +36 1 353 1562

imeko@t-online.hu

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Method for Temperature Measuring Inside a Cylindrical Body Based on Surface Measurements	8
<i>N. Yaparova, A. Shestakov</i>	
Reconstructing Sunshine Duration and Solar Radiation Long-term Evolution for Italy: a Challenge for Quality Control and Homogenization Procedures	13
<i>V. Manara, M. Brunetti, M. Maugeri</i>	
Effect Of Short Pulsed Program/Erase Cycling On Flash Memory Devices	19
<i>P. Chiquet, J. Postel-Pellerin, C. Tuninetti, S. Souiki-Figuigui, P. Masson</i>	
Wireless Sensor Acceleration of Moving Elements for Condition Monitoring of Mechanisms	24
<i>V. Sinitzin, A. Shestakov</i>	
Automatic Design of Classification Systems for Visual Quality Control of Metallic Surface	27
<i>D. Garten, K. Anding, G. Polte, K. Trambitckii</i>	
Characterization and Volume Test of the AM06 Chip	32
<i>S. Shojaii, A. Annovi, D. Banfi, M. Bareta, F. Crescioli, L. Frontini, V. Liberali, L. Marcellino, A. Stabile</i>	
Image Processing of Light-Scattering Images for the Qualitative Surface Analysis	36
<i>L. Haar, K. Anding, S. Schroder, M. Hauptvogel, G. Notni</i>	
On-line Vehicle Condition Monitoring Based on Probability Approach	42
<i>M. Kepka, J. Vaclavik</i>	
Test Rig Model Development and Validation for the Diagnosis of Rolling Element Bearings	46
<i>U. Leturiondo, O. Salgado, D. Galar</i>	
Optimized Vein Pattern Recognition for Biometric Applications – A Modern Approach	50
<i>S. Crisan, B. Tebrean, S. Emerich</i>	
Drug Under Skin Meter (DUSM): A Portable Bio-impedance Spectroscopic for Assessing Transdermal Drug Delivery	56
<i>P. Arpaia, P. Cimmino, U. Cesaro, N. Moccaldi</i>	
Live Demonstration: Measuring Transdermal Drug Delivery in Mesoporation	62
<i>P. Arpaia, U. Cesaro, N. Moccaldi</i>	
Live Demonstration: Precise Time Protocol Tester	63
<i>J. Breuer, J. Roztocil, V. Vigner</i>	
Live Demonstration: Time and Frequency Standard Based on GPS Receiver	64
<i>J. Roztocil, V. Vigner</i>	
Live Demonstration: Cloud Based Rotating Machinery Fleet Wide Condition Monitoring	65
<i>L. Menozzi</i>	
Cumulative Statistical Monitoring and Fault Forecasting for PV Plants	66
<i>S. Vergura</i>	
High-Resolution Optical Rangefinder for Industrial Monitoring	72
<i>M. Norgia, F. Cavedo, A. Pesatori</i>	
Laser Flow Sensor for Lubricating Oil	76
<i>M. Norgia, A. Pesatori</i>	
Er:glass Microlaser for Coherent OTDR Diagnostic	80
<i>A. Pniov, A. Zhirnov, D. Shelestov, V. Karassik, P. Laporta, G. Galzerano, M. Norgia, A. Pesatori, C. Svelto</i>	
Simulation and Modeling of Self-powered Wireless Sensor Node for Railway Vehicles	84
<i>G. Acciani, F. Modugno, G. Gelao, V. Marziani</i>	
The Control System of Primary Oscillation for Micromechanical Gyroscope	90
<i>P. Baranov, T. Nesterenko, E. Tsimbalist, E. Barbin, A. Koleda, S. Vtorushin</i>	
An E-maintenance Platform Based on SOA and Smart Sensors	96
<i>L. Fumagalli, M. Macchi</i>	
A Performance Model for Medium Voltage Equipment	102
<i>S. Turrin, M. Marelli, L. Fumagalli</i>	
Magnetic Field Mapper Based on Rotating Coil	107
<i>P. Arpaia, M. Buzio, O. Dunkel, E. Matteis</i>	
Flexible Firmware Architecture for Smart Transducers Networks	112
<i>P. Arpaia, P. Cimmino</i>	
A diagnostic tool for Condition-Based Maintenance of Circuit Breaker	118
<i>V. Campagnoni, S. Ierace, F. Floreani</i>	
Availability Comparison Between Distributed and Concentrated UPS Control Systems	124
<i>F. Bertocci, A. Fort, M. Mugnaini, V. Vignoli</i>	

Optical Sensors for Railway Infrastructure Monitoring	129
<i>M. Brenna, F. Foiadelli, M. Longo, D. Zaninelli</i>	
Reliability and Availability of Industrial Bakery Plant: Modeling and Analysis. A Case Study	135
<i>F. Bertocci, M. Mugnaini, A. Fort, V. Vignoli, L. Spicciarelli</i>	
Characterisation of a Wood Pole Tester	141
<i>L. Benetazzo, M. Bertocco, U. Bovo, G. Frigo, M. Genovese, C. Narduzzi</i>	
Evaluation of Taylor Coefficients in Pade-Laplace Method Using Cubic Splines	145
<i>I. Olga</i>	
Methods, Techniques and Algorithms for Condition Based Maintenance of Railway Vehicles	151
<i>A. Caviglia, M. Magro, P. Pinceti, M. Antonelli, E. Paola, E. Marino</i>	
On Line Control of Optimal Setup of a Laser Sheet System for Real Time Monitoring of Welding	158
<i>G. D'Emilia, D. Gasbarro, E. Natale</i>	
Interfacing External Sensors with Android Smartphones Through Near Field Communication	164
<i>T. Leikanger, J. Hakkinen, C. Schuss</i>	
Delamination Monitoring Using Low Frequency Stress Wave for Laminated Composites	170
<i>P. Zhu, Z. Yang, W. Shi, Y. Li</i>	
Non-Contact Techniques for the Quality Analysis of PET Bottles	175
<i>M. Tarabini, L. Cornolti, B. Saggin, H. Giberti, D. Scaccabarozzi</i>	
Metrological Self-check As a Perspective Trend of Technical Diagnostics	181
<i>K. Sapozhnikova, A. Pronin, I. Druzhinin, R. Taymanov</i>	
A Probabilistic Method to Assess Uncertainty in Vision Based Modal Analysis Techniques	187
<i>A. Lavatelli, E. Zappa</i>	
Traceable Torque Calibration for Nacelle Test Benches in the MN m Range	193
<i>C. Schlegel, H. Kahmann, R. Kumme</i>	
Measurement-uncertainty As an Innovative Management Tool in Modern Engineering Systems	197
<i>G. D'Emilia, A. Gaspari</i>	
Metrological Characterization of the Bunch Length System Measurement of the ELI - NP Electron Linac	203
<i>L. Sabato, D. Alesini, P. Arpaia, A. Giribono, A. Liccardo, A. Mostacci, L. Palumbo, C. Vaccarezza, A. Variola</i>	
Uncertainty-based Combination of Signal Processing Techniques for the Identification of Rotor Imbalance	209
<i>M. Tarabini, R. Panzeri, D. Scaccabarozzi, B. Saggin</i>	
Analysis of the Spectral Degradation of LEDs' Emissions Under Temperature Stress Conditions	215
<i>G. Mazzanti, G. Pasini, L. Peretto, R. Tinarelli</i>	
Analysis of Failure Rates of AC and DC Micro-Grids	220
<i>S. Grillo, E. Tironi, G. Ubezio</i>	
Rules Induction-supported Random Forest for the Non-intrusive Electrical Appliances Identification	226
<i>P. Bilski, W. Winieki</i>	
Practical Analysis of Various Techniques Used in Inrush Blocking and Restraining of Differential Relays for Transformer Protection	232
<i>E. Alabbasi, E. Shameer</i>	
Effects of Extended Operating Conditions in Pump-turbines	238
<i>E. Egusquiza, C. Valero, M. Egusquiza, A. Presas, D. Valentin</i>	
Reliability Assessment of Photovoltaic Balance of System	242
<i>L. Cristaldi, M. Khalil, P. Soulantantork</i>	
In-situ Monitoring of Metal Additive Manufacturing Processes: Sensing and Intelligent Data Analysis	248
<i>B. Colosimo, M. Grasso</i>	
Aquivion® Ionomer Based Electrochemical Sensor for Ammonia Detection	254
<i>L. Ferrari, V. Marona, S. Ieffa, M. Sansotera, W. Navarrini, G. Nano, L. Magagnin</i>	
Using Ambient Light Sensors in Smartphones for Evaluating Indoor Lighting Conditions	258
<i>C. Schuss, T. Leikanger, B. Eichberger, T. Rakkonen</i>	
Non-contact Measurement of the Temperature Profile of PET Preforms	264
<i>B. Saggin, L. Buzzi, L. Cornolti, H. Giberti, M. Tarabini, D. Scaccabarozzi</i>	
Diagnostics Preventive Evaluation, The Role of IEC 61709	270
<i>G. Turconi, J. Jones</i>	
Data Acquisition, Transmission, Collection and Analysis for a Fleet of Railway Vehicles in Search of Diagnostic Rules for CBM	274
<i>M. Magro, P. Pinceti, E. Paola, P. Firpo, E. Marino</i>	
An Application of the Remote Maintenance Paradigm to Semi-automated Machines	285
<i>F. Previdi, M. Mazzoleni, A. Cologni, M. Ermidoro</i>	

Reliability and Safety Considerations Affecting the Design of a Radar Based Railway Crossing Level Passage Monitoring System	290
<i>T. Addabbo, A. Fort, M. Mugnaini, A. Toccafondi, V. Vignoli</i>	
Ambiguity Groups Detection in Analog Systems Diagnostics Using Self-organizing Maps	294
<i>P. Bilski</i>	
Production Trend Identification and Forecast for Shop-floor Business Intelligence	300
<i>Z. Viharos, J. Csanaki, J. Nacsá, M. Edelenyi, C. Pentek, K. Kis, A. Fodor, J. Csépész</i>	
Metal Surface Quality Assessment Using 2D Texture Features	307
<i>K. Trambitckii, K. Anding, G. Polte, D. Garten, V. Musalimov, P. Kuricyn</i>	
Contactless Measurement of PET Bottles' Thickness	312
<i>D. Scaccabarozzi, B. Saggin, L. Cornolti, M. Tarabini, H. Gilberti</i>	
VIBROMOD – An Experimental Model for Change Detection and Diagnosis Problems	317
<i>D. Aiordachioae, T. Popescu</i>	
Vibration Based Diagnostic of Cracks in Hybrid Ball Bearings	323
<i>M. Seimert, C. Guhmann</i>	
On the Effects of Motion Blur in Vision Based 3D Vibration Monitoring	327
<i>A. Lavatelli, E. Zappa</i>	
Long-term Monitoring of Strains in a Real Operation of Structures	333
<i>V. Chmelko, M. Garan</i>	
Experimental Strain Modal Analysis for Beam-like Structure by Using Distributed Fiber Optics	338
<i>L. Cheng, G. Busca, A. Cigada</i>	
Fourier-based Image Shift for Periodic Effect Compensation in Displacement Monitoring Using Vision Systems	342
<i>E. Zappa, R. Liu</i>	
Increasing Performance of Supervised Machine Learning Methods by Analysis of Construction and Demolition Waste	348
<i>P. Kuricyn, K. Anding, G. Notni</i>	
A Review on Silicon Carbide and Gallium Nitride Features, Reliability and Behaviour in the Presence of Radiations	353
<i>A. Carbone</i>	
A MATLAB Framework for Measurement System Analysis based on ISO 5725 Standard	357
<i>G. D'Aucelli, N. Giaquinto, S. Mannatrizio, M. Savino</i>	
Discrete Multi-Layer Estimator Implementation for Sensorless Control of Elastic Drive Systems – An Industrial Case Study	363
<i>M. Rossi, M. Mauri, F. Castelli-Dezza, M. Carmeli</i>	
An Architecture for a Mitigated FPGA Multi-Gigabit Transceiver for High Energy Physics Environments	370
<i>M. Brusati, A. Campiani, M. Cannon, H. Chen, M. Citterio, M. Lazzaroni, H. Takai, M. Wirthlin</i>	
IGBT Testing: a Revised Approach from a Metrological Perspective	377
<i>R. Ottoboni, S. Packiam</i>	
Markov Process Reliability Model of PV Inverter	383
<i>M. Khalil</i>	
Reliability Assessment of PV Inverters	389
<i>M. Khalil, P. Soulantantork</i>	
Improvement in the Efficiency of DC/DC Power Converters by Controlling the Switching Frequency	394
<i>M. Faifer, M. Khalil, L. Piegari, P. Soulantantork, S. Toscani</i>	
Reliability Issues in Elementary Particle Physics Experiments	400
<i>M. Citterio, M. Lazzaroni, G. Tartarelli</i>	
Surface Quality Monitoring in Micromilling: A Preliminary Investigation on Microfeatures	406
<i>P. Parenti, M. Camagni, M. Annoni</i>	
A Compact Monitoring System for Patients Affected by Neurodegenerative Diseases	412
<i>A. Bramanti, A. Sciva, G. Campello, P. Capra, S. Marino, P. Bramanti, N. Donato</i>	
A Data-Driven Prognostic Approach Based on Sub-Fleet Knowledge Extraction	417
<i>G. Leone, L. Cristaldi, S. Turrin</i>	
Towards a Novel Approach to the On-Line Diagnosis of the Instrument Transformer	423
<i>T. Lei, M. Faifer, R. Ottoboni, S. Toscani</i>	
A Nonlinear Predictor for the Supervision of Photovoltaic Strings Performances	429
<i>G. Leone, L. Cristaldi</i>	
Credible Improvement Potential index for Reliability Importance Assessment	436
<i>M. Catelani, L. Ciani, M. Venzi</i>	
Parameter Estimation Methods for Failure Rate Distributions	441
<i>M. Catelani, L. Ciani, G. Guidi, M. Venzi</i>	

Outage Severity Analysis on Italian Overhead Transmission Lines from a Regional Perspective	446
<i>C. Laurano, G. Leone, M. Zanoni</i>	
Automated Parameter Optimization for Feature Extraction for Condition Monitoring	452
<i>M. Gerdes, D. Galar, D. Scholz</i>	
Author Index	