31st International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering Management (COMADEM 2018)

Rustenburg, South Africa 2-5 July 2018

Editors:

P. S. Heyns G. van Schoor P. A. van Vuuren R. B. K. N. Rao

ISBN: 978-1-5108-7038-3

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© (2018) by North-West University All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact North-West University at the address below.

North-West University Potchefstroom Campus Private Bag X6001 Potchefstroom 2520 South Africa

Phone: 0860 169698 (0860 1mynwu)

Fax: (+27 18) 299-2767

studies@mynwu.info

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

1.	Fore	word	viii
2.	Key	note lecture Driving the digital enterprise Leinen	1
3.	Pres	ented papers	
	3.1. Me	echanical systems	
	3.1.1	Modelling and Simulation of a Two Stage Reciprocating Compressor for Condition Monitoring Based on Motor Current Signature Analysis Haba, Brethee, Alabied, Mondal, Gu, Ball	2
	3.1.2	Experimental Study on Vibration Reduction Characteristics of a Helical Gear Coupling System Based on ISFD Zhang, He, Lu	12
	3.1.3	Modelling the Vibration Response of a Journal Bearing for Condition Monitoring Hassin, Ma, Gu, Ball	20
	3.1.4	A Study of the Influence of Time-varying Meshing Stiffness on Dynamic Response in Gear Transmission Systems Liu, Zhang, Wang, Zhen, Zhang, Shi	29
	3.1.5	An Outer Ring Fault Quantitative Diagnosis Method of Ball Bearing Based on the Detail Impact Characteristic Cui, Huang, Wang, Wang	38
	3.2.	Electrical Systems	
	3.2.1		44
	3.2.2	Measurement and Visualization of the Corona Inception Gradient on an HVDC Transmission Line under the Effect of Wet Conditions Djeumen, Walker, West	53
	3.2.3	A New Fuzzy Logic-based Approach to Predict Fault in Transformer Oil Based on Health Index using Dissolved Gas Analysis Mulyodinoto, Suwarno, Abu-Siada	61
	3.2.4	Condition monitoring thermal properties of a 20A hydraulic-magnetic MCB Kleynhans, Van Vuuren, Thomas	69

3.2.5.	A Comparative Study of Partial Discharge Measurement using Electrical and Inductive Coupling Sensors Kyere, Becker, Walker	79
3.2.6.	Review of Transmission Line Fault Location using Travelling Wave Method Wijaya, Suwarno, Abu-Siada	86
3.2.7.	Off Line Partial Discharge as an essential Condition Based Monitoring (CBM) Tool for busbar insulation monitoring on Air Insulated Switchgear (AIS) Bisset, Van Vuuren	95
3.3. Integr 3.3.1.	rated Maintenance Management A Condition Based Reliability Simulator Framework based on a Heuristic Fault Model Swanepoel, Wichers	107
3.3.2.	Cloud based Real-time Condition Monitoring Model for Effective Maintenance of Machines Dhandapani, Veilumuthu	118
3.3.3.	Arc Tangent Failure Rate Distribution Method Hu, Yang, Zhang, Qiu, Liu, Li	125
3.4. Renev 3.4.1.	wable energy systems and energy storage systems Deep online analysis of dielectric parameters for lubricants and insulation oils with an innovative oil sensor system: Identification of critical operation conditions of industrial gearboxes and high voltage transformers for reduction of failure rates and live time enhancement Mauntz, Peuser	132
3.4.2.	Real-Time Monitoring of Temperature Distribution in a Lithium-Ion Battery Pack Aucamp, Janse van Rensburg	140
3.5. Asset 3.5.1.	Management A perspective on rotating equipment technology trends and maintenance in mining Amadi-Echendu, Matheta	148
3.5.2.	A Policy Framework for Integrating Smart Asset Management within Operating Theatres in a Private Healthcare Group to Mitigate Critical System Failure Hirschowitz, Jooste	155
3.5.3.	Identifying current challenges of data-based maintenance management: a case study Marttonen-Arola, Baglee	165

3.5.4.	Investigations on augmented reality based maintenance practices within SMEs Müller, Stegelmeyer, Mishra	173		
3.6. Sig 3.6.1.	nal processing and pattern recognition Discrepancy analysis for gearbox condition monitoring: A comparison of different healthy data models Schmidt, Heyns, Gryllias	181		
3.6.2.	A Generalized Synchroextracting Transform for Fast and Strong Frequency Modulated Signal Analysis Chen, Wang, Zuo	189		
3.6.3.	A Deep Statistical Feature Learning Method Based on Stacked Auto-Encoder for Intelligent Diagnosis of Rolling Bearing Han, Long, Liu, Jiang	197		
3.6.4.	Research and Application of Weak Fault Diagnosis Method Based on Asymmetric Potential Stochastic Resonance in Strong Noise Background Li, Wang, Han, Kang, Li, Shi, Liu	205		
3.6.5.	Fault diagnosis method of rolling element bearing based on relative wavelet packet energy and Hilbert envelope analysis Guo, Li, Zhen, Zhang, Shi, Gu	213		
3.6.6.	Application of Adaptive Variable Scale Stochastic Resonance in Bearing Fault Diagnosis Wang, Zhang, He, Zhu	221		
3.6.7.	Characterization and modelling of a customs operation Hoffman	226		
3.6.8.	The Improvement of Instantaneous Angular Speed Estimation using Signals from a Dual Read Head for Monitoring Planetary Gearboxes Zang, Alqataweh, Xu, Shao, Gu, Ball	234		
3.6.9.	Novel Bearing Fault Detection using Generative Adversarial Networks Baggeröhr, Booyse, Heyns, Wilke	243		
3.7. Diagnosis and prognosis				
3.7.1.	Condition Monitoring of a Fan using Neural Network Passi, Zhang, Timusk	251		
3.7.2.	Time-frequency domain analysis of varying speed vibration response of dual- rotor system Yang, Liu, Jiang, Yang	259		

3.7.3.	Remaining Useful Life Prediction and Uncertainty Modelling with Bayesian Deep Learning Louw, Heyns	267
3.7.4.	Rolling Element Bearings Prognostics Using High-Frequency Spectrum of Offline Vibration Condition Monitoring Data Behzad, Arghand, Bastami	276
3.8. Struct 3.8.1.	tural health monitoring Investigation of Infrared Thermography as a Dual Online Diagnostic Tool for Dynamic Structural Health Monitoring Dasai, Talai, Heyns	285
3.8.2.	Experimentally validated numerical simulation of prediction of structural vibration frequencies from interfacial frictional temperature signature Talai, Desai, Heyns	293
3.8.3.	Corrosion monitoring with Acoustic Emission of steel embedded in concrete that is subjected to different environmental conditions Sigoba, Howse, Sikakana	301
3.8.4.	Variations in vibration responses of an ice-going vessel during wave slamming Van Zijl, Bekker	312
3.8.5.	Remote Monitoring of Wind Turbine Blades based on High-speed Photogrammetry Li, Wang, Liu, Tang, Gu, Ball	321
3.8.6.	An improved resonance demodulation technique based on spectral kurtosis and fault characteristic harmonic-to-noise ratio Yan, Lin, Zhao, Zeng	330
3.9. Fault	detection and localization	
3.9.1.	A vision of energy-based visualisation of large scale industrial systems for the purposes of condition monitoring Van Schoor, Uren	337
3.9.2.	A low-cost condition monitoring solution for industrial bakery equipment Marais, Black	347
3.9.3.	Online performance monitoring of discrete legs in a convective heat exchanger of a coal fired power plant boiler Prinsloo, Rousseau, Gosai	355
3.9.4.	Simulation Based LOX/Methane Rocket Engine Fault Features Analysis Xiong, Wu, Cheng	363

3.9.5.	Pipe network leak detection: Sensor placement optimization using Support Vector Machines and a model-based leak detection technique Van der Walt, Heyns, Wilke	370
3.9.6.	Performance visualisation of a transcritical CO2 heat pump under fault conditions De Bruin, Uren, Van Schoor, Van Eldik	380