11th International Conference on Condition Monitoring and Machinery Failure Prevention Technologies

(CM 2014/MFPT 2014)

Manchester, United Kingdom
10-12 June 2014

09.20 09.50	**Plenary Keynote Lecture - Non-destructive testing and condition monitoring with mobile wall climbing and swimming robots**
	Author - Prof T Sattar, UK Chair - Prof L Gelman
	N/A

Session 1A – Experimental and simulation models for monitoring and diagnostics *Chair: Prof A Lucifredi   Room A*

10.30	**[102] Analytical investigation, development and experimental validation of vibroacoustic models with BEM and FEM approaches and applications for the simulation of car door slamming phenomenon**
	Authors - A Lucifredi[1], P Silvestri[1], P Cavasotto[1], F Denevi[1] and A Camia[2] *[1]University of Genova [2]Fiat Auto*
	1

10.50	**[106] Analysis of the vibration behaviour and evaluation of the fatigue life consumption of the structural elements of a tele-diagnostics device of an underground rail vehicle**
	Authors - A Lucifredi, P Giribone, M Ghirelli and P Silvestri University of Genova 13

11.10	**[110] Preliminary design of a mechanism for flapping flight-durability analysis and vibration modes**
	Authors - F Negrello, P Silvestri, A Lucifredi, J E Guerreo and A Bottaro *University of Genova*
	22

11.40	**[114] Gauge enlargement effects on depots curves**
	Authors - S Farina, A Lucifredi, S Rubino and P Silvestri University of Genova 34

12.00	**[118] A practical approach for a vibration monitoring expert system – first part: algorithm description**
	Authors - A Bongiovì, S Picerno and M Barabino ABB – PSPG
	42

12.20	**[122] Effective accuracy control for CBM applications**
	Author - T Lago QirraSound Technologies Europe AB 50

Session 1B – OPTIMUS: Diagnosis and prognosis for wind turbines
Chair: Dr M Papaelias Room B

10.30 **[103] A redundancy model applied to the wind turbine power converter by engaging the planned intervention maintenance policy for offshore wind farms**

Authors - A Karyotakis[1] and R W G Bucknall[2] [1]Terna Energy SA
[2]University College London

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10.50 **[107] A novel health probability-based engineering system condition and health monitoring method**

Authors - X Y Zhao and Z Q Lang University of Sheffield

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11.10 **[111] Reliable wind turbine condition monitoring with the aid of a non-dimensional criterion**

Authors - W Yang[1], C H Ng[2] and P McKeever[2]
[1]Newcastle University [2]National Renewable Energy Centre

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11.40 **[115] Fault-tree dynamic analysis**

Authors - A Pliego Marugán and F P García Márquez
University of Castilla-La Mancha

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12.00 **[119] Accurate diagnosis of the condition of industrial wind turbine gearboxes using integrated acoustic emission and vibration analysis**
Authors - S Kerkyras[1], V Karakassidis[2], A Karyotakis[3] and M Papaelias[3]
[1]Feldman Enterprises Limited [2]TERNA Energy [3]The University of Birmingham

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12.20 **[123] An integrated approach to monitoring the structural health of offshore wind turbine towers**
Author - G Edwards TWI Ltd

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Session 1C – Condition monitoring of wind energy system
Chair: Prof T-H Gan   Room C

10.30 **[104] Novel torque sensor design and enhanced envelope method of acoustic emission signals in condition monitoring of the nacelle in wind turbines**

Authors - V Kalinin[1], A Stopps[1], J F Chacon[2], E Artigao[2], V Kappatos[2], C Selcuk[2], T-H Gan[2], D Lekou[3] and A Garcia Ruiz[4]   [1]Transense Technologies plc [2]Brunel Innovation Centre (BIC), Brunel University [3]CRES Consultant [4]InnoTecUK   97

10.50 **[108] Development of a baseline as a novel strategy for a condition monitoring system for the assessment of wind turbine generators**

Authors - E Artigao, J L Ferrando, B Wang, V Kappatos, C Selcuk and T-H Gan   Brunel Innovation Centre   113

11.10 **[112] Development of condition monitoring system of tidal stream generators**

Authors - V Dimlaye[1], A Camacho[1], S Soua[1], T-H Gan[1] and M Papaelias[2]   [1]TWI Ltd [2]University of Birmingham   125

11.40 **[116] Characterisation of failure mechanism in train doors using vibration analysis**

Authors - A Romero, V Dimlaye, S Soua and T-H Gan   TWI Ltd   126

12.00 **[120] Development of acoustic emission signature for the assessment of wind turbine drive train**

Authors - J A Jimenez, S Soua, A Romero and T-H Gan   TWI Ltd   136

12.20 **[124] Detection of gearbox failures by combined acoustic emission and vibration sensing in rotating machinery**

Author - S Rafael[1], A Romero[1], S Soua[1], T-H Gan[1], J Neasham[2] and G Goodfellow[2]   [1]TWI Ltd [2]Newcastle University   143

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Session 1D – Advanced diagnostic and prognostic methods
Chair: Dr R Klein Victoria Conference Room

14.00 **Plenary Keynote Lecture -**
14.30 **[126] Advances in predictive maintenance systems**
Author - Prof A Starr, UK   Chair - Prof L Gelman

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Session 2A – Trained structures and statistical methods in
condition monitoring   *Chair:* **Prof L Kuravsky   Room A**

14.30 **[127] Practical applications of the oculomotor activity measurement
technique for testing professional skills and competencies in
condition monitoring**

Authors -   L S Kuravsky[1], P A Marmalyuk[2], S N Baranov[2] and G A Yuryev[2]
[1]Moscow State University of Psychology and Education [2]Russian Aviation Co

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14.50 **[131] Inverse problems in stochastic dynamics – a road to online
internal condition monitoring for machines and structures**

Author - M Dimentberg Worcester Polytechnic Institute

207

15.10 **[135] On the approach to optimisation of testing CM personnel
professional skills**

Authors -   L S Kuravsky[1], A A Margolis[1], G A Yuryev[2], P A Marmalyuk[2] and P N Dumin[2]
[1]Moscow State University of Psychology and Education [2]Russian Aviation Co

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Session 2B – Asset integrity management
Chair: Prof S Heyns Room B

14.30   **[128] Finite element modelling of bladed rotor torsional dynamics**

Authors - R Scheepers and P S Heyns University of Pretoria

216

14.50   **[132] Multi-model updating and probabilistic concepts in structural health monitoring on composite wings**

Authors - T Prinsloo and P S Heyns University of Pretoria

227

15.10   **[136] Damage detection of an air-cooled condenser fan gearbox**

Authors -   A J Oberholster[1], P S Heyns[1], M Newby[2] and H Goldschagg[3]
[1]University of Pretoria [2]Eskom Research Testing & Development
[3]Eskom Matimba Power Station

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Session 2C – Condition monitoring of wind energy system
Chair: Prof T-H Gan   Room C

14.30   **[129] Detection of gearbox defects using acoustic measurements for tidal applications**

Authors - V Dimlaye, S Soua and T-H Gan TWI Ltd

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14.50   **[133] Blade damage prognosis based on Mahalanobis distance and improved GM (1,1) model**

Authors - C Zhongsheng, Y Yongmin, G Bin and H Zheng
National University of Defense Technology

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15.10   **[137] Advancement in structural health monitoring of wind turbine blades**

Authors - O Adewale, A De Silva, B Alkali and D Harrison
Glasgow Caledonian University

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Session 2D – Condition monitoring of machinery
Chair: Dr I Petrunin Victoria Conference Room

14.30   **[130] Identification of a stochastic system from its observed intermittent response**

Author - M Dimentberg Worcester Polytechnic Institute

256

14.50   **[146] Intelligent fault prognostics for wind turbine pitch system based on wind-induced vibration analysis**

Authors - A Govahianjahromi and D Lee Kyungpook National University

257

15.10   **[138] Onboard condition monitoring of cold corrosion in two-stroke marine diesel engines**

Author - D Atkinson Parker Kittiwake

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Session 3A – Trained structures and statistical methods in condition monitoring
Chair: Prof L Kuravsky   Room A

16.30   **[139] Rotary machinery condition monitoring technique based on stochastic methods of vibration signal analysis**

Author - V Sizarev[1], A Sokolova[2] and F Balitsky[2]
[1]Open Joint – Stock Company [2]Research Institute for Machine Science

270

16.50   **[142] Use of artificial neural networks in monitoring generators**

Author - M Singh and S Muthuraman SSE

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17.10   **[145] Remote monitoring allows new operating practices in condition monitoring**

Author - H Mikkonen[1] and S Lahdelma[2]
[1]Oy SKF Ab [2]Insinööritoimisto Mitsol Oy

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Session 3B – Condition monitoring of machinery
Chair: *Prof D Galar* Room B

16.30   **[140] Non-linear response of rolling element bearings with local defects**

Author - U Leturiondo[1], O Salgado[1], M Mishra[2] and D Galar[2]
[1]IK4-Ikerlan [2]Luleå University of Technology

286

16.50   **[143] A novel test-rig for research in wind turbine technology and diagnostics**

Authors - S Ganeriwala Spectra Quest inc

298

17.10   **[134] A comparison of techniques to determine the nominal life (L_{10}) on railway bearings**

Author - N Perales, A Hernandez, D Galar and R Villarejo
Division of Operation and Maintenance Engineering,
Lulea University of Technology

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Session 3C – Condition monitoring of machinery
Chair: Prof K Bortman   Room C

16.30   **[141] Steam turbine last stage blade vibration monitoring**

Author - S Muthuraman[1] and J Twiddle[2]
[1]SSE [2]Ferrybridge C Power Station

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16.50   **[144] Condition monitoring of power electronic in wind turbine**

Authors - S Hajiabady, M Papaelias and S Hillmansen
The University of Birmingham

314

17.10   **[147] Novel procedure for supporting maintenance of mobile work machines using R&D simulators**

Author - J-P Hietala, T Krogerus, P Multanen, M Hyvönen and K Huhtala
Tampere University of Technology

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09.00
09.20 **Plenary Keynote Lecture - [201] BINDT strategy and the CM community** *Author - Mr C Sinclair, CEO of BINDT Chair - Prof L Gelman*
324

Session 4A – Signal processing: identification, fault diagnosis and reliability for complex system monitoring
Chair: **Dr N Martin Room A**

09.30 **[202] On the extraction of rolling-element bearing fault signature in speed-varying conditions**

Authors - M Eltabach[1], D Abboud[1], S Sieg-Zieba[1] and J Antoni[2]
[1]CETIM 2University of Lyon
325

09.50 **[206] Lifespan modelling of low-voltage machine insulation**

Author - M Chabert, F Salameh, A Picot and P Maussion
University of Toulouse
338

10.10 **[210] Assigning weights to alarms as a means to learn information and assist supervision operators during alarm avalanches**

Author - S Charbonnier[1], N Bouchair[2] and P Gayet[2] [1]Gipsa-lab [2]CERN
348

11.15 **[214] Method for computing efficient electrical indicators for offshore wind turbine monitoring**

Authors - G Cablea, P Granjon and C Bérenguer Gipsa-lab
359

11:35 **[218] Non-biased estimation of modal parameters of multi-component ambient vibrations in high-rise buildings using a self-governed random decrement technique**

Authors - F Nasser[1], Z Li1, N Martin[1] and P Gueguen[2]
[1]Gipsa-lab [2]ISTerre
371

11.55 **[222] Low-cost monitoring of partial discharge activity by means of Sub-Nyquist sampling**

Authors - P V Vuuren North-West University
383

Session 4B – Advanced signal processing in condition monitoring
Chair: *Prof S Lahdelma*   Room B

09.30   **[203] Advanced fault diagnosis by means of complex order derivatives**

Authors - J Laurila1 and S Lahdelma[2]
[1]University of Oulu [2]Insinööritoimisto Mitsol Oy

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09.50   **[207] Condition monitoring of the front axle of a load haul dumper with real order derivatives and generalised norms**

Authors - J Päivärinta[1], J Nissilä[1], S Lahdelma[2] and J Laurila[1]
[1]University of Oulu [2]Engineering Office, Mitsol Oy

407

10.10   **[211] Detecting cavitation and simultaneously-occurring mechanical faults**

Authors - K Karioja[1] and S Lahdelma[2]
[1]University of Oulu [2]Insinööritoimisto Mitsol Oy

427

11.15   **[215] Signal processing methods for detecting misalignment of a claw clutch**

Authors - K Karioja[1], J Laurila[1], S Lahdelma[3] and J Strackeljan[2]
[1]University of Oulu [2]Otto von Guericke University [3]Insinööritoimisto Mitsol Oy

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11:35   **[219] Damage identification using displacement vibration signal extracted by double integration methods**

Authors - O Cardona-Morales, C A Aguirre-Echeverry and G Castellanos-Dominguez
Universidad Nacional de Colombia Manizales

456

11.55   **[223] Bearing and gear failure detection for brushless DC motors with adaptive feature extraction and classification**

Authors - J F Zubizarreta-Rodriguez and S Vasudevan
The University of Sydney

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Session 4C – Condition monitoring of machinery
Chair: Dr M Papaelias   Room C

09.30   **[204] The effect of loading on induction motor air-gap eccentricity fault signature using vibration and motor current signature analysis (MCSA)**

Author - S Ganeriwala SpectraQuest Inc

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09.50   **[208] Wayside detection of axle bearing faults in rolling stock through correlation signal processing**

Authors - Z Huang1, M Papaelias[1] and Z Q Lang[2]
[1]The University of Birmingham [2]University of Sheffield

480

10.10   **[212] Experimental comparison of acoustic and vibration-based analysis techniques for condition monitoring of roller bearings**

Authors - M Entezami, E Stewart, S Kent, C Roberts, P Weston and L Saade
The University of Birmingham

489

11.15   **[216] Structural health monitoring for concentrated solar plants**

Authors - C Q G Muñoz, J R T Arenas and F P G Márquez
University of Castilla-La Mancha

506

11:35   **[220] Structural health monitoring of e-glass fibre bundles using acoustic emission**

Authors - N Angelopoulos, S Ojo, M Papaelias and G F Fernando
The University of Birmingham

516

11.55   **[224] Online evaluation of railway axle bearing faults using acoustic emission and vibration analysis**

Authors - Z Huang[1], A Amini1, L Wang[1], S Kerkyras[2] and M Papaelias[1]
[1]The University of Birmingham [2]Krestos Limited

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Session 4D – Condition monitoring of machinery
Chair: Prof V N Kostyukov   Victoria Conference Room

09.30 **[205] Diagnosis of manufacturing defects in gear pair using wavelet analysis of vibration and acoustic signals and ANN-based inference technique**

Author - V Havalea[1] and S Narayanan[2]
[1]TVS Motors, Hosur   [2]Indian Institute of Technology

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09.50 **[209] Real-time health monitoring systems of machinery – risk assessment**

Author - V N Kostyukov SPC Dynamics

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10.10 **[213] Real-time diagnostics and monitoring of pump unit cavitation mode**

Authors - V N Kostyukov and S Boichenko SPC Dynamics

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11.15 **[217] Research of vibration in railway rolling stock mechanical parts**
Authors - V Al Kostyukov, A E Tsurpal and V V Basakin SPC Dynamics

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11:35 **[221] Technology of piston compressors real-time diagnostics and monitoring**

Authors - V N Kostyukov and A P Naumenko SPC Dynamics

580

11.55 **[225] A comprehensive study of shaft/coupling misalignment signature using vibration analysis**

Authors - M Toth and S Ganeriwala Spectra Quest inc

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14.00 **Plenary Keynote Lecture - [226] Computational fluid dynamics and multi-scale methods for condition monitoring**

Author - Prof D Drikakis, UK Chair - Prof L Gelman

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Session 5A – Concepts and methods for effective NDT and CM
Chair: *Prof T Lago   Room A*

14.30   **[227] New E-learning, MOOC and MOOL approaches for CBM applications**

Author - T Lago Telia

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14.50   **[230] Diagnosis of impeller faults in a centrifugal pump based on spectrum analysis of vibration signals**

Authors - A Al-braik, O Hamomd, F Gu and A D Ball   University of Huddersfield

603

15.10   **[233] The fault detection and severity diagnosis of rolling element bearings using modulation signal bispectrum**

Authors - I Rehab, X Tian, F Gu and A Ball   University of Huddersfield

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Session 5B – Advanced reasoning and diagnosis in condition monitoring
Chair: Dr E Juuso   Room B

14.30   **[228] Comparison of frequency domain methods in feature extraction**
Authors - R-P Nikula[1], K Karioja[1] and G Peršin[2]
[1]University of Oulu [2]Cranfield University

625

14.50   **[231] Intelligent indices for online monitoring of stress and condition**
Author - E K Juuso University of Oulu

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15.10   **[234] Information theoretic feature extraction for stress analysis**
Authors - M Ruusunen and E K Juuso University of Oulu

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Session 5C – Structural health monitoring
Chair: Dr A Belitskaya Room C

14.30   **[229] Condition monitoring of aerospace and marine composite materials using THz radiation**

Authors - A Belitskaya, A Baryshev, A Khudchenko and H van der Linden SRON

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14.50   **[232] Analytical modelling of interferogram for stress optimisation and structural fatigue analysis of aerospace components**

Author - M Abdulhassan Cochin University of Science and Technology

661

15.10   **[235] Influence of dimensions of the transducers on guided wave mode identification in structural health monitoring of composite objects**

Authors - V Samaitis[1] and L Mažeika[2]
[1]Ultrasound Research Institute of Kaunas
[2]Kaunas University of Technology

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Session 6A – NDT and CM
Chair: Dr T Patel Room A

16.45   **[239] Novel HOS technique for condition monitoring of machinery**

Authors - L Gelman and I Petrunin Cranfield University

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17.05   **[236] Free slot available for a late submission**

N/A

17.25   **[242] Synthetic data for Hybrid prognosis**

Authors - M Mishra[1],U Leturiondo[2] , and D Galar[2]
                    [1]SKF-University Technology Centre Luleå University of Technology Luleå
                    [1],[2]Division of Operation and Maintenance Engineering
                    Luleå University of Technology

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Session 6B – Advanced reasoning and diagnosis in condition monitoring
Chair: Dr E Juuso   Room B

16.45 **[237] Gear pitting detection based on spectral kurtosis and adaptive denoising filtering**

Authors - G Peršin[1], J Vižintin[2] and D Juričič[3]
[1]University of Cranfield [2]University of Ljubljana [3]Institute Jozef Stefan

673

17.05 **[240] System for automated online oil analysis**

Authors - J Vižintin[1], G Peršin[1,2], J Salgueiro[1] and D Juričič[1]
[1]University of Ljubljana [2]Cranfield University

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17.25 **[243] Free slot available for a late submission**

N/A

Session 6C – Condition monitoring of machinery
Chair: Mr N Sedgwick   Room C

16.45   **[238] The effect of external dynamic loads on the lifetime of rolling element bearings: results of accelerated lifetime tests**

Authors - W Jacobs, R Boonen, P Sas and D Moens   KU Leuven

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17.05   **[241] Diagnostics of worm gears with vibration analysis**

Authors - F Elasha[1], D Mba[1], C Ruiz-Cárcel[1], G Kiat[1], I Nze[2] and G Yebra[2]

[1]Cranfield University   [2]London Transport   710

17.25   **[244] Investigation of the vibration synchronous response in a series-type centrifugal compressor due to liquid carry-over**

Authors - M Al Yahyai and D Mba   Cranfield University

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17.45   **Lecture for the conference - [245] From research for SMEs in FP7 to innovation for SMEs in Horizon 2020**

Author - Dr N Avdelidis, UK   Chair - Prof L Gelman

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09.00   **Plenary Keynote Lecture - [301] Materials and structural integrity assessment using infrared thermography approaches**

Author - Dr N Avdelidis, Canada   Chair - Prof L Gelman   730

Session 7A – Advanced signal processing for MCM and NDT
Chair: Prof Radislav Smid   Room A

09.30   **[302] HVAC test-bed for research and development of virtual sensors for condition monitoring**

Authors - V Horyna and R Smid   Czech Technical University   731

09.50   **[305] Virtual sensors for HVAC condition monitoring**

Authors - R Smid   Czech Technical University

                                                                                736

10.10   **[308] An online digital signal processing method for extracting and tracking dominant frequencies and their magnitudes from the power spectral density**

Authors - M Jamal-Ahmad Atomic Weapons Establishment (AWE)   742

Session 7B – Vibration condition monitoring
Chair: *Prof L Gelman* Room B

09.30 **[303]** The new second and higher order spectral techniques for non-linearity damage monitoring of structures and machinery

Author - L Gelman Cranfield University

754

09.50 **[306]** Novel techniques for vibration monitoring of rolling element bearings

Authors - L Gelman[1], B Murray[2], T Patel[1] and A Thomson[2]

[1]Cranfield University   [2]SKF

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10.10 **[309]** Estimation of stress for turbomachinery

Authors - L Gelman and G Mahalingam Cranfield University

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Session 7C – Decision support
Chair: Dr C Kar   Room C

09.30   **[304] Probabilistic reasoning in service of condition monitoring**

Authors - P Ettler[1] and K Dedecius[2]
[1]COMPUREG Plzen, s r o   [2]Academy of Sciences of the Czech Republic

757

09.50   **[307] An Importance measure approach to system level condition monitoring of ship machinery systems**

Authors - G Manno, K E Knutsen and B J Vartdal   DNV GL

766

10.10   **[310] Design parameters in decision support system for condition monitoring: a case study**

Authors - H Abdullah Al-Abdulbagi and C Kar   Reliability Section, SAFCO, SABIC

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17.45   **Plenary Keynote Lecture - [311] Perspectives on condition monitoring in an asset integrity management context**

Author - Prof S Heyns, South Africa   Chair - Prof L Gelman

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Session 8A – Vibration analysis working session
Chair: Prof T Hope   Room A

11.30   **[312] Detecting rolling element bearing defects (failure progression)**
Author - D Whittle   RMS Ltd

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11.50   **[315] Update on ISO standards in condition monitoring and vibration**
Authors - S Mills MD, Spectrum CBM Ltd and Director of Training Services, AV Technology Ltd

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12.10   **[318] VA case study**
Authors - H Harper VCI

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12.30   **[321] Vibration analysis of complex gearboxes and wind turbines**
Author - D Whittle   RMS Ltd

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Session 8B – Acoustic emission working session
Chair: Mr T Bradshaw Room B

11.30 **[313] Application of AE technology to monitoring slug speeds in multi-phase flow**

Author - Dr Addali Cranfield University

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11.50 **[316] Title to be confirmed**

Author - T Bradshaw MISTRAS Ltd

818

12.10 **[319] AE Working Group**

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Session 8C – Lubrication analysis working session
Chair: Mr R Cutler Room C

11.30   **[314] Fundamentals of oil debris detection and reporting**

Author - S Greenfield Eaton

820

11.50   **[316] Title to be confirmed**

Author - D Shorten Lloyd's Register

821

12.10   **[320] Oil condition monitoring in gas engines**

Author - B M Monse ALcontrol Laboratories

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12.50   **Panel session - Future directions in condition monitoring**

Chair - Prof L Gelman

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9.20 **Plenary Keynote Lecture - [101] Non-destructive testing and condition monitoring with mobile wall climbing and swimming robots**

Author - Prof T Sattar, UK Chair - Prof L Gelman N/A