Guest editorial

The twenty-first century saw the extensive application of information and communication technology with emerging technologies like, information technology integrated with operational and engineering technologies with big data, predictive and prescriptive analytics are bringing in dynamic and revolutionary changes in the area of e-Maintenance. e-Maintenance is improving continuously for exploitation in almost all industrial domains. The e-Maintenance concept is exploited to support the operation and maintenance processes to achieve the organizational objectives.

The fourth International Workshop and Congress was organized during 14-16 June 2016, in the Luleå University of Technology. The theme of this Congress was challenges in future decision making. Some of the topics presented and discussed during e-Maintenance 2016 were; industrial big data and data management analytics, intelligent asset management, data science and industrial maintenance, emerging trends and disruptive technologies.

There are seven papers included in this special issue covering the following multi-disciplinary areas of e-Maintenance. The first paper is dealing with missing data which are quite important for data analytics and data-based decision support system. The next two papers are dealing with condition monitoring and extracting quality indicators from physical-based systems. The next papers on application of e-Maintenance technologies in railway infrastructure, manufacturing and road infrastructure.

At first, in paper "Dealing with missing data as it pertains of e-Maintenance"; P. Loukopoulos, G. Zolkiewski, I. Bennett, P.F Duan and D. Mba, have proposed imputation techniques, a methodology to recover data. The authors have reviewed the most widely used techniques and presented a case study with the use of actual industrial centrifugal compressor data, in order to identify the most suitable one.

The paper "Effective vibration-based condition monitoring (eVCM) of rotating machines" by Akilu Kaltungo and Jyoti Sinha, proposes an effective vibration-based condition monitoring (eVCM) approach for effective fault detection and classification of rotating machine without the need for repetitive analysis of measured data. eVCM permits sharing of historical vibration data between identical rotating machines irrespective of their foundation structures and speed differences which can potentially contribute towards optimization cost-effectively streamlining the faults' diagnosis.

The paper "Simulation-based study on improving the transient response quality of turbocharged diesel engines" by Syed Saad and Rakesh Mishra provides a way to minimize harmful emissions by developing quality indicators to quantify the performance of turbocharged diesel engine. The quality indicators developed provide a quantitative measure of turbo-lag phenomena and problems.

S.M. Famurewa, L. Zhang and M. Asplund, in paper "Maintenance analytics for railway infrastructure decision support" presents a method for rail data analytic for the assessment of rail condition with respect to wear phenomenon. The method is demonstrated with a historical profile measurement data collected between 2008 and 2015 for nine sharp curves on the heavy haul line in Sweden. The results show that the approach can be used for the identification of curves having anomalous wear rate over a specific period of time.

The Editors would like to thank all authors, who have contributed their articles to this special issue, and all reviewers for their supports in getting the papers reviewed.

Journal of Quality in Maintenance Engineering
Vol. 23 No. 3, 2017
pp. 258-259

1355-2511
DOI 10.1108/JQME-05-2017-0039

T. Nilsen and P. Söderholm in paper "Systematic risk analysis to support a living maintenance programme for railway infrastructure" discussed and used the barrier modelling approach that complement the standard IEC 60300-3-1. The barrier modelling approach is applied on switches and crossings at one Iron ore line in northern Sweden, to gain experience for the infrastructure manager to apply the approach to support a living maintenance programme and continuous dependability improvement.

In paper "Context preparation for predictive analytics – a case from manufacturing industry" authors B. Schmidt, D. Bennett, P. Pilidis, F. Duan and D. Mba, discuss the context aspect for predictive analytics where in parallel with condition monitoring measurements data and information related to the context are gathered and analysed. This paper shows the outcomes from case study in real word industrial setup. A new visualization method for data collection is proposed to support decision-making process.

The paper "Industrial internet applications for efficient road winter maintenance" by J. Odelius, S.M. Famurewa, L. Forslöf, J. Casselgren and H. Konttaniemi, presents some aspects of industrial internet application as required for integrating weather information and floating road condition data from vehicle mounted sensors to enhance effective and efficient winter maintenance. The concept of floating data and industrial internet applications can be used for efficient road maintenance for improvement in winter maintenance for dependable, safe and sustainable transportation of goods and people. The Editors hope that the readers and researchers will find this issue informative and interesting.

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