Lecture Notes in Mechanical Engineering

Joseph Mathew · C. W. Lim · Lin Ma
Don Sands · Michael E. Cholette
Pietro Borghesani *Editors*

Asset Intelligence through Integration and Interoperability and Contemporary Vibration Engineering Technologies

Proceedings of the 12th World Congress on Engineering Asset Management and the 13th International Conference on Vibration Engineering and Technology of Machinery

Springer

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Preface

WCEAM VETOMAC 2017—from 2 to 4 August 2017, Brisbane, Australia

The 12th World Congress on Engineering Asset Management was held jointly with the 13th Vibration Engineering and Technology of Machinery on 2–4 August 2017 at the Brisbane Convention and Exhibition Centre. It was organised by the Asset Institute and hosted annually by the International Society of Engineering Asset Management (ISEAM).

The event shared two themes: "Asset Intelligence through Integration and Interoperability: From Research to Industry" and "Creative and Novel Research for Contemporary Vibration Engineering Technologies" and attracted 244 delegates from 28 countries.

The offerings were rich and diverse. The Opening Ceremony hosted the following speakers:

- Adjunct Professor Joseph Mathew, Asset Institute CEO and Congress Chair, Queensland University of Technology, Australia.
- Professor Joe Amadi-Echendu, ISEAM Chair, University of Pretoria, South Africa.
- Professor C. W. Lim, City University of Hong Kong, China.
- Professor John Bell on behalf of Prof. Arun Sharma, Deputy Vice Chancellor, Queensland University of Technology.
- The Opening Address by the Lord Mayor Graham Quirk, Lord Mayor of Brisbane, Australia.
- The Opening Address by the Platinum Sponsor, Mr. Darren Covington of Mainpac who spoke on, "Delivering Operational Effectiveness in Asset-Intensive Industries through Asset Intelligence".

The event hosted seven keynotes, a dinner speaker, 14 special sessions on several application and discipline streams, three minicourses, three workshops and three-panel discussions.

Our keynotes this year were:

1. Alan Johnston, MIMOSA and Standards Leadership Council, USA; Jess B. Kozman, Professional Petroleum Data Management (PPDM) Association, Singapore. “Intelligent Integration and Interoperability of Critical Infrastructure and Assets”.
2. Professor Kerry Brown, Edith Cowan University, Australia, “Engineering Asset Management: Understanding the Management Element”.
3. Associate Professor Marco Macchi, Politecnico di Milano, Italy, “The 4th Industry Revolution: Reflecting on the Opportunities, Barriers and Risks for Asset Management”.
4. Professor Romuald Rzadkowski, Airforce Institute of Technology, Poland, “Asset Management Through Life Estimation”.
5. Professor Tang Loon Ching, National University of Singapore, “Systems Resilience: a Unifying Framework and Associated Measures”.
6. Professor Klaus Blache, University of Tennessee, USA, “Technologies and Asset Management: What is really going on in Industry”.
7. Professor J. P. Liyanage, Cluster for Industrial Asset Management, University of Stavanger, Norway, “High Risk Assets Under Uncertain Conditions: Strategic Imperatives and New Initiatives Towards Defensive Solutions in a Rapidly Changing Environment”.

The dinner speaker was Dr. Paul Simshauser, Director General, Department of Energy and Water Supply, Queensland Government, who spoke on “Energy industry—challenges ahead”.

One hundred and fifty management and technical presentations reported on outputs of research and development activities as well as the application of knowledge to industry and government in the practical aspects of the various themes that comprises Engineering Asset Management and Vibration Engineering. These papers and presentations were made available for the personal reference of delegates only via an eProceedings Dropbox repository at the Congress, and not for distribution.

Full papers were further peer-reviewed by two members of the Scientific Committee and this e-book contains the final selection of these papers.

The Congress was augmented with a series of three interactive workshops.

The first of these workshops was entitled “**The Long Future Sustainability for Asset Managers**” in which David Hood and Guy Lane encouraged participants to think about and discuss their individual mindsets and roles as asset managers in influencing and creating a sustainable future for our planet. At the workshop, David remarked that the principle of sustainability is often confined to the financial sense rather than encompassing a more holistic and long-term sense by including environmental sustainability.

Jess Kozman, a Regional Representative of the Professional Petroleum Data Management Association and independent data management practitioner, lead a workshop on the “**Evaluation of data management maturity in relation to**

engineering assets". The workshop took participants through a short exercise in which a range of survey questions was used to establish the data management maturity of the participant's organisations. The workshop was attended by participants from a broad range of industries and backgrounds. Some practical ideas in relation to the application of maturity surveys were given by Jess.

"**Fostering the development of Engineering Asset Management Programs at Higher Educational Institutions via Recognition**" was the subject of the final workshop. A highly interactive discussion was led by Prof. Joe Amadi-Echendu, Chair of ISEAM. Participants discussed the merits of recognition rather than accreditation of programs, the development and custodianship of the Asset Management Body of Knowledge and made comparisons between Asset Management and the Project Management Institute and their development path.

Three minicourses were conducted on the final day of the Congress. Alan Johnston from MIMOSA led the training session entitled "**The open industrial interoperability ecosystem, a supplier-neutral digital ecosystem, enabling critical infrastructure and industrial asset management**". Professor Romuald Rzadkowski from the Polish Academy of Sciences conducted the course "**Life estimation and exact time of failure of last stage steam turbine blades**". Dr. Carla Boehl from Curtin University held a training session on "**Mine Autonomous Haul System: Assessing the Impact in Asset Management**". Each of the minicourses was well attended.

The generous support of our Sponsors is acknowledged. They were our Platinum Sponsor, Mainpac, our Silver Sponsors, Brisbane City Council, Schneider Electric and the Fredon Group. Bronze Sponsors: QUT, Synengco, NMEMS Japan, K2Fly and Redeye, as well as our Exhibitors, Asset Finda, SAVTek, Springer and Request Direct.

Also acknowledged were our partners who assisted us in organising this event and providing some of our key speakers, i.e. MIMOSA, PPDM, the Vibration Institute of India, the IFAC A-MEST Working Group, the 2017 Global Business Challenge and NCCARF, Australia (Fig. 1).

This year ISEAM gave out two awards for the Best Paper Award, one for the management category and the other for the technical category and acknowledged the runner-ups as well. These were:

Management

Winner: "Analysing an Industrial Safety Process through Process Mining: A Case Study"

Authors: Anastasiia Pika, Arthur H. M. ter Hofstede, Robert K. Perrons, (QUT) and Georg Grossmann, Markus Stumptner, (University of South Australia), and Jim Cooley (Origin Energy).

Runner-up: "Semiparametric valuation of heterogenous assets".

Authors: Roar Adland and Sebastian Köhn, Norwegian School of Economics (NHH), Norway.

Fig. 1 Associate Professor Rob Perrons receiving the award from Adjunct Professor Mathew with Prof. Markus Stumptner on left

Fig. 2 Mr. Norihiko Ogura receiving the award from the Congress Chair

Technical

Winner: "Efficient Evaluation of Internal Concrete Damage of Steel Plate-bonded RC Slabs".

Authors: Norihiko Ogura, CORE Institute of Technology Corp, Hitoshi Yatsumoto, Hanshin Expressway Company Ltd. and Takahiro Nishida and Tomoki Shiotani, Kyoto University (Fig. 2).

Runner-up: Joint Optimization of Preventive Maintenance and Spare Parts Logistics for Multi-echelon Geographically Dispersed System.

Authors: Keren Wang and Dragan Djurdjanovic, University of Texas at Austin, USA.

The 2017 ISEAM Lifetime Achievement Award was presented to Emeritus Prof. Robert B Randall, University of New South Wales, Australia.

ISEAM's Lifetime Achievement Award recognises and promotes individuals who have made a significant contribution to research, application and practice of a discipline or in engineering asset management over a continued period of time (Fig. 3).

The Congress Chair was especially honoured by ISEAM at the Congress with a Lifetime Achievement Award. He is the 5th recipient of this award since the formation of the society in 2006.

In addition, ISEAM further honoured the Congress Chair with a Pioneer Award in recognition of his foundational contributions to ISEAM as its Founder and Chair

Fig. 3 Professor Randall receiving the Lifetime Achievement Award from the ISEAM Chair

Fig. 4 Professor Mathew receiving the Lifetime Achievement Award from the ISEAM Chair

of the Board in its first 11 years. The awards were presented by the ISEAM Chair, Prof. Joe Amadi-Echendu, University of Pretoria, South Africa.

The event was a resounding success judging from the feedback of the delegates and the program may be used in future WCEAMs' as a template for transnational, trans-sectoral and transdisciplinary knowledge sharing events in asset management going into the future (Fig. 4).

We are grateful for all the voluntary assistance provided by members of the International Scientific Committee, the Organisation Committee and the Conference Secretariat who are all acknowledged in the following sections.

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Congress Chair: Adjunct Professor Joseph Mathew, Asset Institute, Queensland University of Technology, Australia

Co-chairs: Dr. Trudy Curtis, Professional Petroleum Data Managers (PPDM) Association, Canada
Alan Johnston, MIMOSA, USA
Professor C. W. Lim, City University of Hong Kong, Hong Kong
Associate Professor Marco Macchi, Politecnico di Milano, Italy

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Associate Professor Zhongxiao Peng, Australia
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Highgate Hill, Australia	Don Sands
Brisbane, Australia	Michael E. Cholette
Brisbane, Australia	Pietro Borghesani

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