

Invited session: “Maintenance and Circular Economy 4.0”
4th IFAC Workshop on Advanced Maintenance Engineering, Services and Technologies, 10-11 September 2020, Cambridge, UK

Session proposers:

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Description and topics:

Circular Manufacturing is considered among the six disruptive manufacturing trends according to the World Manufacturing Forum. While Maintenance Engineering and Management has been studied extensively and recently its relationship with production, supply chain management, and logistics has received increased attention, it is still considered in many fields as a cost source, rather than a value adding activity. This session aims to highlight the critical role of Maintenance in the Circular Economy. Linked with production, as well as with forward and reverse logistics supply chains, predictive and proactive approaches to maintenance now need to be integrated into holistic considerations. Industry 4.0 technologies, as well as integrated modelling of different production, maintenance, and supply chain processes within extended Digital Twin concepts can play a key role in establishing the sustainability and business impact benefits of such an approach. Hence the integrated research area of the Circular Economy and Industry 4.0, Circular Economy 4.0 (CE4.0), is now a key target and research needs to focus on how maintenance activities and CE4.0 can be aligned to maximise the delivered value of products and services associated with them. From resource-aware predictive maintenance approaches to performance indicators within asset management, the need for including sustainability considerations has become a key requirement, already recognised at the outset of the A-MEST WG together with other communities, such as IFIP WG5.7 and IMS through the initiative “Maintenance for Sustainable Manufacturing”. It is of particular importance now to revisit this agenda by jointly considering the contribution of the maturing and emerging Industry 4.0 technologies to it. The Session Maintenance and the Circular Economy 4.0 remit provides a wide scope for the application of data related practices and digital systems. In particular the use of Digital Twins for holistic system visualisation and control, IoT-enabled sensor networks used for condition monitoring within sustainable operation and/or KPI parameters and real-time monitoring of assets for whole lifecycle assessment are of particular interest.

To discuss these aspects, this invited session calls for high-quality contributions that investigate main research challenges, technology developments and advancements, case studies, and applications related to the following topics (but not limited to):

- Real Time Asset Monitoring with IoT/Edge Computing to Satisfy Environmental KPI Measures
- Digital Twin for Maintenance Visualisation in Circular Economy 4.0
- Predictive Maintenance to Support Sustainable Production
- Model Building for Holistic Maintenance Scenario Experimentation
- Data Formats and Maintenance Methodologies for Circular Economy 4.0
- Simulation modelling and optimisation applications for Circular Economy 4.0

Contributions consisting either of empirical studies, collaborative projects and action researches in an industrial context are particularly welcome.

INVITED SESSION CODE: t4544

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IMPORTANT DATES:

31st Jan 2020: Paper submission
15th Mar 2020: Author notification
10th May 2020: Final paper submission
09th Jun 2020: Early bird registration
10th-11th Sept 2020: Workshop