J Intell Manuf (2010) 21:175–176
DOI 10.1007/s10845-008-0199-9

Guest Editorial

Nidhal Rezg · Kondo H. Adjallah

Accepted: 10 June 2008 / Published online: 4 December 2008

This special Issue is dedicated to Intelligent and Cooperative Maintenance in Manufacturing Systems (ICMMS). The papers exhibited in this issue come from a long reviewing process of the extended versions of 12 papers, which were sampled from a set accepted for a regular presentation at the INCOM'2006. The symposium INCOM'2006 was organized by the *Division for Industrial Engineering and Computer Sciences* (G2I Division) of the *Ecole des Mines de Saint Etienne* (ENSM.SE), Saint Etienne, France.

It must be noted that this symposium was sponsored by IFAC, IFIP, IFORS, IEEE, IMS, EURO, ROADEF, GDR MACS/CNRS (French National Council for Scientific Research) and by several European scientific projects and networks. 603 papers have been submitted from 57 countries. 783 attendees: 544 academics and 239 industrial representatives, 98 sessions in the final program, 42 industrial exhibitors, 2665 pages of symposium proceedings with 950 authors. For more information see www.emse.fr/incom06.

Today, intelligent maintenance systems and related approaches have opened new perspectives to more intelligent manufacturing. But due to the market competitions, the decision makers must cope with new problems among which the optimal resources management decision making (extension of the production equipments life for instance), and problems related to the integration of the production and maintenance activities, for better performances of the production facilities (from technical and financial view points for instance).

N. Rezg (✉)
Université de Metz, LGIPM Ile du Saulcy, 57012
Metz Cedex 01, France
e-mail: rezg@univ-metz.fr

K. H. Adjallah
Ecole Nationale d'Ingénieurs de Metz, LGIPM Ile du Saulcy,
57001 Metz Cedex 01, France
e-mail: adjallah@enim.fr

New methods of cooperative maintenance in intelligent manufacturing systems are then required. Those methods include the cooperative decision making methods based on diagnosis, prognosis, reliability and/or production planning simulation. Preventive maintenance strategies, synchronized with relevant production plans and schedules, must be associated with an appropriate maintenance logistics in order to hope reducing equipments' downtimes. This issue shows a sample of these methods.

One will notice through all the papers introduced in this special issue that all the introduced methods implicitly invite to implementing proactive approaches of maintenance that may enable to avoid excessive downtimes, and may help reducing maintenance cost. This global vision is formulated in the first sampled paper dedicated to a decision support system of proactive maintenance. The second sample introduces cooperative controls of a stochastic process of production and supply in three levels flexible manufacturing systems. The third sample outlines the production and maintenance integration problem and a solution approach through a cooperative method and strategy of quality control and preventive maintenance, using simulation and experimental design. Both (third and second) approaches aim at reducing the manufacturing global costs related to supplies, inventories, quality control and downtimes. The fourth sample copes with an approach of decision support for the design of a production line, using simulation based on the standard stochastic timed Petri-nets, with singling out of the most relevant maintenance policy. This sample provides also an offline and online maintenance decision support tool. Then comes through the fifth sample, a decision making tool of predictive maintenance, based on a diagnosis device that combines a technical hardware and an artificial intelligence software. The proposed solution is applied to tool wear monitoring as illustration.

Then, to enhance maintenance decision making methods' effectiveness in agreement with the preceding paragraphs, the reliability theory is used in the following contributions. The sixth sample shows an approach, which derives an optimal inspection strategy for improving the availability of equipments subjected to shock stresses with cumulative damage. The last sample deals with near-misses and related hazards, in relation to degradations and accidents, very few considered in the literature. It proposes a classification algorithm useful to identify and understand the near-misses' properties, and to help reducing their impacts.

For their contributions to this special issue, we are very grateful to all the reviewers and we thank the authors. Also, a warm acknowledgement is made to Professor Alexandre Dolgui and Professor Gerard Morel for their kind support to the organization of the conference and the special issue. Lastly, a great acknowledgement is made to the Editors of the Journal of Intelligent Manufacturing for having accepted to publishing the selected papers.