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The ‘Internet of Things’ enabled real-time scheduling for
remanufacturing of automobile engines

Yingfeng Zhang, Sichao Liu, Yang Liu, Haidong Yang, Miao Li, Donald Huisingh, Lihui Wang

*Key Laboratory of Contemporary Design and Integrated Manufacturing Technology, Ministry of Education, Northwestern Polytechnical University, Shaanxi, P. R. China, 710072

bDepartment of Production Engineering, KTH Royal Institute of Technology, Stockholm, Sweden
cDepartment of Management and Engineering, Linköping University, SE-581 83 Linköping, Sweden
dDepartment of Production, University of Vaasa, Vaasa, Finland

eSchool of Mechanical Engineering, Guangdong University of Technology, Guangzhou, China

fInstitute for a Secure and Sustainable Environment, University of Tennessee, Knoxville, TN, USA

*Corresponding author. E-mail addresses: zhangyf@nwpu.edu.cn (Y. Zhang), yang.liu@liu.se (Y. Liu)

Abstract: Typical challenges that managers of remanufacturing face are composed of the lack of timely, accurate, and consistent information of remanufacturing resources. Therefore, it is difficult to implement real-time production scheduling for the shop floor. To address this problem, the authors applied the concept of the ‘Internet of Things’ to the remanufacturing of automobile engines to form an Internet of Manufacturing Things environment. Under the Internet of Manufacturing Things, an identification technology for disassembled engine parts was designed, and the real-time status of the remanufacturable resources can be monitored. Based on the captured remanufacturing information, a real-time production scheduling method was developed, and a mathematical model was developed to achieve cost reduction, dynamic management of remanufacturable resources, and energy consumption decrease. To obtain an optimal solution, a Pareto-based optimization method was used. Finally, a case study was performed to analyze the effectivity of the proposed method. The results showed that the remanufacturing cost and energy consumption were reduced by 34% and 34% respectively, and the worker load rate was more balanced. These improvements can contribute to more sustainable development and greener production within the remanufacturing industry, especially for remanufacturing of automobile engines.

Keywords: Remanufacturing; Internet of Things; Production optimization; Real-time scheduling
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