

Sustainable Performance Indicators in Process Planning for Combined Additive and Subtractive Manufacturing Technologies in a Remanufacturing Context

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Abstract

Combined additive and subtractive (i.e. CNC machining) technologies is demonstrated as a solution to inherent problems of additive manufacturing, such as poor surface quality, limited dimensional accuracy, and lengthy production time when compared to CNC machining. Researchers already identified that combining additive and subtractive manufacturing would be promising for remanufacturing application (Le, V.T, H. Paris, and G. Mandil, 2017). Remanufacturing sector has substantial promises towards sustainable future. In this study, our goal is to identify and categorize a list of applicable sustainable performance indicators (PI) to use during process planning to combine additive and subtractive manufacturing. Finally, the efficacy of the proposed approach is demonstrated through a case study. This study will assist product designers and (re)manufacturers to choose alternatives to model their combined manufacturing processes towards sustainability.

Keywords

Additive Manufacturing, Subtractive Manufacturing, Sustainable Performance Indicators, Remanufacturing

References

Le, V.T, H. Paris, and G. Mandil, Process planning for combined additive and subtractive manufacturing technologies in a remanufacturing context, *Journal of Manufacturing Systems*, Vol. 44, pp. 243-254, 2017.

Biography / Biographies

Dr. Fouzia Baki is an Assistant Professor in Industrial Engineering in the Department of Mechanical, Automotive, and Materials Engineering at the University of Windsor. She is a professional engineer in Ontario. Her research and teaching interests are in the area of sustainable product development, manufacturing processes, business integration, and operations management. She has been engaged in pedagogical research with a focus on finding tools and techniques to engage students in large quantitative classes.

Dr. M. Fazle Baki is a Professor and Associate Dean at the Odette School of Business. He joined the Odette School of Business in the year 2000. He is cross-appointed with the Department of Mechanical, Automotive, and Materials Engineering. He received his PhD from the University of Waterloo Engineering in 1999, MBA from the University of New Brunswick in 1995 and Institute of Business Administration, University Dhaka, Bangladesh in 1991, and B.Sc Engineering from Rajshahi University of Engineering and Technology in 1987. He was involved with an industrial research project in DaimlerChrysler as a Summer Professor Intern in 2004 and 2005. He served the Institute of Business Administration, University Dhaka, Bangladesh from 1992 to 1993.

Dr. Ahmed Azab, PEng, is Director of the Production & Operations Management Research Lab at the University of Windsor and Professor at the Department of Mechanical, Automotive, and Materials Engineering. He has been recipient and nominee for international and national research excellence awards. Dr. Azab's research has been

sponsored by National and Provincial granting agencies, which include NSERC, CFI, OCE, MITACS, FEDEV, as well as direct research funds provided by the local industry.