Abstracts taken from various journals ranging from 2016 to 2018

1. Sustainable Living Factories for Next Generation Manufacturing,

Yoram Koren, Xi Gu, Fazleena Badurdeen, I.S. Jawahir,

Procedia Manufacturing,

Volume 21,

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(http://www.sciencedirect.com/science/article/pii/S2351978918301294)

Abstract: To be profitable and to generate sustainable value for all stakeholders, next generation manufacturers must develop capabilities to rapidly and economically respond to changing market needs while at the same time minimizing adverse impacts on the environment and benefiting society. 6R-based (Reduce, Reuse, Recycle, Recover, Redesign and Remanufacturing) sustainable manufacturing practices enable closed-loop and multi-life cycle material flow; they facilitate producing more sustainable products using manufacturing processes and systems that are more sustainable. Reconfigurable Manufacturing Systems (RMS) and its characteristics of scalability, convertibility, diagnosability, customization, modularity and integrability have emerged as a basis for living factories for next generation manufacturing that can significantly enhance the system sustainability by quickly adjusting system configuration and production processes to meet the market needs, and maintain the system values for generations of products. This paper examines the significance of developing such next generation manufacturing systems as the basis for futuristic sustainable living factories by adapting, integrating and implementing the RMS characteristics with the principles of sustainable manufacturing to achieve value creation for all stakeholders.

Keywords: Sustainable manufacturing; Reconfigurable Manufacturing Systems; Value Creation

8. Engineering Technology Education Based on the Reconfigurable Manufacturing Paradigm: A Case Study,

Bashir Salah, Saber Darmoul,

Procedia Manufacturing,

Volume 23,

2018,

Pages 87-92,

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(http://www.sciencedirect.com/science/article/pii/S2351978918304700)

Abstract: Engineering technology deals with the development and implementation of engineering and technology. Engineering technology education focuses on providing more specialized and applied engineering education, as opposed to theoretical knowledge. Consequently, institutions providing engineering technology education curricula need to develop applied courses that take advantage of recent advancements in automation, information and communication technologies to show integration, interoperability, modularity and flexibility in modern manufacturing environments. Since the late 1990s, the reconfigurable manufacturing paradigm has been introduced to extend the flexibilities and capabilities of modern manufacturing systems. Unfortunately, in scientific literature, there is still a lack of works that describe success stories related to the application of the reconfigurable manufacturing paradigm in engineering technology education. This article provides a case study that takes advantage of the reconfigurable manufacturing paradigm to introduce students to the complex tasks of design and operation of reconfigurable manufacturing systems (RMS). The article describes how a course is designed based on project management methodology in order to get students faced with the complexity of designing, implementing, assessing the performance and operating an RMS.

Keywords: Reconfigurable manufacturing; Engineering technology education; Learning factory

10. Explaining the impact of reconfigurable manufacturing systems on environmental performance: The role of top management and organizational culture,

Rameshwar Dubey, Angappa Gunasekaran, Petri Helo, Thanos Papadopoulos, Stephen J. Childe, B.S. Sahay,

Journal of Cleaner Production,

Volume 141,

2017,

Pages 56-66,

ISSN 0959-6526,

https://doi.org/10.1016/j.jclepro.2016.09.035.

(http://www.sciencedirect.com/science/article/pii/S0959652616313762)

Abstract: This study develops a theoretical model that links reconfigurable manufacturing systems with top management beliefs, participation, and environmental performance, drawing on agency theory and organizational culture. The study takes into account the possible confounding effects of organization size and organizational comparability. Drawing on responses from 167 top managers, the results of hypothesis testing suggest that (i) higher top management participation, being influenced by top management beliefs, leads to higher chances of RMS becoming adopted by organizations as their manufacturing strategy; (ii) organizational culture moderates the relationship between the level of top management participation and RMS (and manufacturing strategies) adoption; and (iii) higher re-configurability of manufacturing systems leads to better environmental performance. Furthermore, we integrate Agency Theory and organizational culture to explain the role of top management beliefs and participation in achieving environmental performance via RMS. Finally, we offer guidance to those managers who would like to engage in leveraging top management commitment for achieving environmental performance, and outline further research directions.

Keywords: Reconfigurable manufacturing systems; Environmental performance; Agency theory; Organizational culture

20. Towards a generic design method for reconfigurable manufacturing systems: Analysis and synthesis of current design methods and evaluation of supportive tools,

Ann-Louise Andersen, Thomas Ditlev Brunoe, Kjeld Nielsen, Carin Rösiö,

Journal of Manufacturing Systems,

Volume 42,

2017,

Pages 179-195,

ISSN 0278-6125,

https://doi.org/10.1016/j.jmsy.2016.11.006.

(http://www.sciencedirect.com/science/article/pii/S0278612516300951)

Abstract: In today's global manufacturing environment, changes are inevitable and something that every manufacturer must respond to and take advantage of, whether it is in regards to technology changes, product changes, or changes in the manufacturing processes. The reconfigurable manufacturing system (RMS) meets this challenge through the ability to rapidly and efficiently change capacity and functionality, which is the reason why it has been widely labelled the manufacturing paradigm of the future. However, design of the RMS represents a significant challenge compared to the design of traditional manufacturing systems, as it should be designed for efficient production of multiple variants, as well as multiple product generations over its lifetime. Thus, critical decisions regarding the degree of scalability and convertibility of the system must be considered in the design phase, which affects the abilities to reconfigure the system in accordance with changes during its operating lifetime. However, in current research it is indicated that conventional manufacturing system design methods do not support the design of an RMS and that a systematic RMS design method is lacking, despite the fact that numerous contributions exist. Moreover, there is currently only limited evidence for the breakthrough of reconfigurability in industry. Therefore, the research presented in this paper aims at synthesizing current contributions into a generic method for RMS design. Initially, currently available design methods for RMS are reviewed, in terms of classifying and comparing their content, structure, and scope, which leads to a synthesis of the reviewed methods into a generic design method. In continuation of this, the paper includes a discussion of practical implications related to carrying out the design, including an identification of potential challenges and an assessment of which tools that can be applied to support the design. Conclusively, further areas for research are indicated, which provides valuable knowledge of how to develop and realize the benefits of reconfigurability in industry.

Keywords: Reconfigurable manufacturing system; Reconfigurable manufacturing design; Changeability; RMS; Literature review

21. Study of Production Scheduling Problem for Reconfigurable Manufacturing System (RMS),

A. Bhargav, C.N.V. Sridhar, M.L.S. Deva Kumar,

Materials Today: Proceedings,

Volume 4, Issue 8,

2017,

Pages 7406-7412,

ISSN 2214-7853,

https://doi.org/10.1016/j.matpr.2017.07.071.

(http://www.sciencedirect.com/science/article/pii/S2214785317313197)

Abstract: In the present competitive manufacturing environment, handling changes and uncertainties in the production scheduling is a major challenge Reconfigurable Manufacturing system (RMS) provides an effective and promising solution for this challenge. This paper provides a novel approach of production scheduling considering the reconfigurable machine tools. In Dedicated Manufacturing lines (DML) and flexible manufacturing systems (FMS) do not meet the challenges up to expected level because of short comings in their implementation procedurals like lack of support for product variation, scalable production capacity and high production cost, RMS provides the solution in designing a new manufacturing system with scalable flexibility and functionality which is needed in the manufacturing industry. This paper studies the problem of scheduling of different operations in for the selected product in reconfigurable manufacturing systems (RMS). The objective is to minimize the make span of the product by segregating and scheduling the similar operations of product. To solve the existing problem in the production scheduling different metaheuristic approaches are developed for simulation, models are evaluated for the performance.

Keywords: Reconfigurable Manufacturing System (RMS); Production Scheduling; Dedicated Manufacturing Lines (DML); Flexible Manufacturing Systems (FMS)

29. Hybrid Heuristic to Minimize Machine's Unavailability Impact on Reconfigurable Manufacturing System Using Reconfigurable Process Plan,

Hichem Haddou-Benderbal, Mohammed Dahane, Lyes Benyoucef,

IFAC-PapersOnLine,

Volume 49, Issue 12,

2016,

Pages 1626-1631,

ISSN 2405-8963,

https://doi.org/10.1016/j.ifacol.2016.07.813.

(http://www.sciencedirect.com/science/article/pii/S2405896316310965)

Abstract: In this paper, we consider a reconfigurable manufacturing systems RMS at the operational level, where we focus on the impact of machines unavailability on the efficiency of the system. More specifically, the problem consists of finding the best alternative solution (i.e. available machine) to ensure the system responsiveness if an unavailability of machine occurs. A hybrid heuristic is developed based on an adaptation of the well-known non-dominated sorting genetic algorithm (NSGA-II). Two objective functions are considered respectively the minimization of the total completion time and the minimization of the adapted robustness index. The two objectives guide the developed hybrid heuristic to the best alternative solutions by modifying the existing process plan. To illustrate the efficiency of the proposed heuristic, we present some experimental results and analyses.

Keywords: Reconfigurable manufacturing systems; robustness index; process plan; hybrid heuristic; NSGA-II