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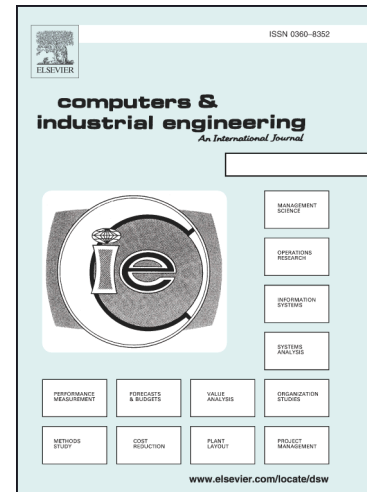
PII: S0360-8352(16)30506-X  
DOI: <http://dx.doi.org/10.1016/j.cie.2016.12.028>  
Reference: CAIE 4580

To appear in: *Computers & Industrial Engineering*

Received Date: 28 April 2016  
Revised Date: 19 December 2016  
Accepted Date: 21 December 2016

Please cite this article as: Imran, M., Kang, C., Hae Lee, Y., Zaib, J., Aziz, H., Cell Formation in a Cellular Manufacturing System Using Simulation Integrated Hybrid Genetic Algorithm, *Computers & Industrial Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.cie.2016.12.028>

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## Cell Formation in a Cellular Manufacturing System Using Simulation Integrated Hybrid Genetic Algorithm

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### Abstract

Work-in-process (WIP) is an important performance measure of contemporary manufacturing systems such as cellular manufacturing system (CMS). The term value added WIP (VAWIP) is used because; the value of WIP increased at each stage of production due to the application of resources in the form of labor, time and energy. This research is an attempt of cell formation (CF) in CMS that would minimize the value added work in process. To achieve this objective a mathematical model is formulated and solved using discrete event simulation (DES) integrated hybrid genetic algorithm (HSGA) in which simulation and the genetic algorithm have been integrated to form an approach called HSGA and it has the advantages of using both. The proposed approach has been applied on local automobile part supply industry for cell formation. While solving problem with HSGA each population has been evaluated using the discrete event simulation (DES). The solution was found in the form of assigning machines to cells in a way that resulted in minimum cost of value added work in process. A 9.01% cost reduction of value added work in process occurred using HSGA. The reduction of value added work in process VAWIP in the system resulted in the reduced waiting and throughput times, whereas increased throughput rate and machine utilization.

**Keywords:** Cost of Value Added Work-In-Process (VAWIP), Cellular Manufacturing System (CMS), Cell formation, Deterministic simulation, Hybrid genetic algorithm (HSGA)

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