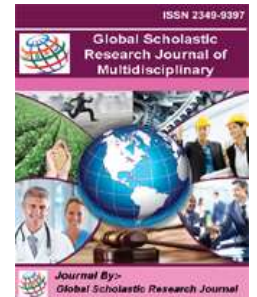




A PEER REVIEWED INTERNATIONAL  
JOURNAL OF GLOBAL SCHOLASTIC  
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## **FLEXIBLE MANUFACTURING SYSTEM WITH ROUTING FLEXIBILITY IN STOCHASTIC ENVIRONMENT**

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### **Abstract**

This paper focuses on a simulation-based experimental study of the performance of flexible manufacturing system with routing flexibility, system load conditions and sequencing rules. Four routing flexibility levels, four system load conditions (i.e. LUB, LFB, LBMUPT, and LUMBPT) and four rules for part sequencing decision (i.e. FCFS, SPT, HPT, and LCFS) are considered for the investigation. The performance of the FMS is evaluated using make-span time, work-in-process and resource utilization. After full factorial experimentation we applied the Taguchi's method to study the various factors contributing to the system performance and identify the key factors for enhancing performance of the system. Furthermore, the most significant factor is determined by using the analysis of variance (ANOVA). Based on the analysis of the relevant data collected through simulation the results were analyzed. The analysis of results reveals that system performance can be improved substantially by incorporating routing flexibility. However, the benefit of this flexibility diminishes at higher levels of routing flexibility in all the combinations. Sequencing rules and system load conditions also affect the performance of the system.

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