

Production Process Improvement Using Discrete Event Simulation: A Case Study

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Abstract

Process improvement can range from simple changes to major shifts, where the objective is to make the process better, easier, and faster. Today, the ability to improve current processes to meet the needs of a global and competitive market is extremely important. In this paper, a case study from a manufacturing company involved in producing various aluminum casting products is presented to see the implications of the planned improvement activities. Difficulty in handling too many work-in-process parts, unnecessary motions or movements, and excessive waiting time are identified as non-value-added activities across the process value stream. Meanwhile, process cycle time, throughput time, and output quantity are selected as performance measures for this study. A comprehensive discrete event simulation model was developed to imitate the current process. It is then used to optimize the interaction between the components by reducing the mentioned waste, to analyze improvement opportunities, as well as to measure the possible advantages of the proposed actions. The results obtained from the simulation experiments will allow the case study company to evaluate real-time perspective on how improvement activities can directly improve operational performance measures. In addition, it can minimize the risks associated with making decisions in changing existing practices to achieve desired targets.

Keywords: Process improvement, Operational performance, Discrete-event simulation.