

Using Discrete Event Simulation to Evaluate the Performance of Lean Manufacturing Implementation: A Case Study of an Electronic Manufacturer Company

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Abstract

A case study from company that involved in the electrical and electronic manufacturing industry is presented in this paper. The manufacturing operation consists of several workstations that form an assembly line to make magnetic electronic products. Excess work in process inventory, unnecessary movement, over processing, and waiting time are identified as non-value-added activities across the process value stream. Meanwhile process cycle time, pieces per man hour, and manufacturing lead time are selected as a performance measures. A comprehensive discrete event simulation model was developed to replicate the existing assembly process. It then been utilized to optimize the interactions among the elements by focusing on minimizing the mentioned waste, to analyze improvement opportunities, and to quantify the possible benefits of the proposed actions. The information obtained from the computer simulation experiments, allows the management of the case study company, a real time perspective of how lean manufacturing implementation affect the performance measures. Besides, it may also reducing the risks associated with making decision in tweaking the current process through improvement activities.

Keywords

Lean manufacturing, Simulation, Process improvement

Biographies

Ahmad Nazif Noor Kamar is a lecturer for Industrial Technology Management Program at Faculty of Industrial Management, Universiti Malaysia Pahang (UMP). He holds a Master of Science in Industrial Management and Technology from Universiti Kebangsaan Malaysia, Bachelor Degree in Industrial Chemistry from Universiti Sains Malaysia and Diploma in Science from Institut Teknologi MARA. Prior to joining UMP, he had enjoyed a flourishing career, spanning 10 years in the manufacturing industries with key positions as a Production Manager. As production personnel in producing automotive component, he had involved in projects related to process improvement such as Kaizen, Poka-Yoke, Line Balancing, SMED, TPM and FMEA. Since joining UMP in 2010, he has lectured Operation and Production Management, Quality Management, Lean Manufacturing, Manufacturing Technology, and Statistical Process Control courses. Currently he pursue his study in PhD level specializing in operations management area.

Cheng Jack Kie is currently a fulltime senior lecturer at Faculty of Industrial Management, Universiti Malaysia Pahang. Cheng holds a PhD in Decision Sciences and a Bachelor Degree in Decision Sciences, both from Universiti Utara Malaysia. Her area of research includes logistics, supply chain management, system dynamics simulation, discrete event simulation and operations research. She has taught courses such as operations research, managerial decision modelling, optimization, strategic management and change management.