

Assessing the Impact of Multi-Loop Kanban Systems in a High Volume Fabrication System

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Abstract

At present, competition has led manufacturers to invest in state-of-the-art technologies to cope with customer requirements. This has driven manufacturers to focus on maximizing throughput and prioritizing efficiency of their resources. They follow push strategies in production to maximize the use of their resources. They allow continuous processing of materials to ensure that there are enough buffers to respond to customer needs immediately. However, this produces large amounts of work-in-process (WIP) which incurs inventory costs within the system. In order to regulate the amount of WIP, the use of kanban systems is necessary because it promotes synchronized flow of materials. In recent years, studies in multi-stage pull production systems have focused on determining the number of kanbans and container sizes. Although these are important considerations, a more critical aspect of kanban systems is identifying locations of kanban control points and the spans of stages controlled by kanbans. This creates multiple loops of kanbans which controls production within the system. This study developed a simulation model of a high volume fabrication system to assess the impact of a multi-loop kanban system in the throughput, cycle time and the amount of WIP within the system.