Abstract

Manufacturing companies are constantly looking for new, innovative technologies and tools to find out the real constraints and bottlenecks that impede the performance of their production systems. There are several approaches and methods that have been developing for decades to overcome these constraints of production processes but they are not sufficient to pinpoint the exact location and its severity. They also generally fall short to suggest the way to implement the right actions in the right order, to avoid sub-optimizations and wastes in time and expenses. So according to recent research in using simulation based optimization, it is believed that some more accurate and efficient methodology for supporting decision making in production systems development and improvement is badly needed. SCORE (Simulation-based Constraint Removal) is a promising methodology for identifying and ranking the bottlenecks of production systems that utilizes simulation-based multi-objective optimization (SMO), which was developed by Pehrsson (2013) as a part of his Ph.D. work. The main principle of this new methodology is the application of SMO with the objectives to maximize the throughput and minimize the number of required improvement actions simultaneously. Additionally, by using post-optimality analysis to process the generated optimization dataset, the precise improvement actions needed to attain a certain level of performance of the production line are automatically put into a rank order. The main aim of this project is, therefore, to apply this new technique in a real-world context, in order to understand how far this technique will support for decision making, by conducting a simulation-based bottleneck analysis in one of the major Volvo group trucks facilities. This is to find out the bottlenecks and optimize it in order to increase the overall productivity. Three research questions related to the effectiveness and accuracy of the methodology will be answered through this real-world application study.