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Redesign of a Mixed Model Helicopter Assembly Line: A Simulation Optimization

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Abstract

The aim of this study is to redesign the mixed model assembly line of the General-Purpose Helicopter for mass production and to improve the designed line using Lean Manufacturing Techniques for a company in Ankara, Turkey. As the system is complex and involves stochastic processes, simulation technique has been used to model the system. The current assemble line is analyzed by a simulation model emphasizing the bottlenecks and the poorly utilized workers. In the established model, the learning rate based on the labour's learning tendency is used in processing times (Learning Curve Theory) for Aviation industry. Validated simulation outputs are collected according to Taguchi design with a focus on minimizing project completion time and total cost. This methodology has enabled an examination of the performance of the existing assembly line, which utilizes a mixed-model production line and variable workforce. Using this methodology, we investigate the system performance of the current assembly line and determine the optimum working conditions with reduced cost, time, and effort. In addition to solving the current optimization problem, the study also aims to increase the productivity of the assembly line through the implementation of lean manufacturing techniques.

Keywords: Mixed model assembly line, Taguchi method, Simulation optimization, Lean manufacturing