

Research on assembly line simulation and Optimization Technology



Aiming at the optimization of [snack machine production line](#), the basic steps of production line simulation and the two most commonly used optimization technologies, ECRS analysis and operation analysis, are described as the theoretical basis of this paper. Subsequently, taking [microwave drying machinery](#) as the research object, the assembly line is modeled based on FlexSim simulation software, and the bottleneck is the clamping process of the iron frame. Based on this, a set of targeted optimization schemes is proposed from the two perspectives of workflow optimization and machining position increase. Finally, FlexSim simulation is applied to verify the effectiveness and feasibility. The simulation results show that the implementation of the optimization scheme can greatly improve the production efficiency of the target assembly line, and has a good reference for the modeling and optimization of similar manufacturing or logistics systems.

With the increasingly fierce market competition and the growing demand of customers' individualization, the operation and optimization of assembly line are becoming more and more complex, which has attracted extensive attention from industry and academia. Comparing with slow, time-consuming, abstract and error-prone manual calculation and solution, computer simulation technology is a more intuitive and effective means for assembly line analysis, design and optimization. However, most of the existing research is just the visualization analysis and application of computer simulation software. Although the related technology of industrial engineering has remarkable practical value and unique advantages in the field of assembly line operation, design improvement and optimization, the integrated application of industrial engineering and simulation technology in production line optimization is rare.

First, the basic steps of the production line simulation and the common industrial engineering optimization techniques are described. Then, taking an assembly line as the research object, based on the application of FlexSim logistics simulation software to model and analyze the bottleneck of the assembly line [6-7], an optimization scheme combining the optimization of the process flow and the increase of the processing position is put forward by integrating industrial engineering optimization technology. Finally, FlexSim simulation is applied to verify it. The simulation results show that the implementation of the optimization scheme can significantly improve the production efficiency and comprehensive benefits of the target assembly line.

With the help of FlexSim logistics simulation software, aiming at an assembly line, the technology of modeling, bottleneck analysis and optimization is studied. Finally, an effective optimization improvement scheme is given, which significantly improves the production efficiency of the assembly line. Modeling and Optimization for similar manufacturing systems or logistics systems also have a good reference value.

In view of the insufficient test data of testing instruments and equipment, the reliability index is modeled and analyzed by reliability unit method. The reliability analysis process of friction coefficient tester is automated and simplified by using MATLAB algorithm to realize and simulate. The application example proves that the reliability unit method is feasible to analyze the reliability of products in the absence of data. It has important guiding significance for the reliability analysis of products or instruments under the background of customized production.