Balancing Assembly Line of Sofa Sets in a Furniture Factory and Measuring the Efficiency of the System by A Simulation

1Halil İbrahim Koruca, 1Utku Köker, 2Samia Chehbi-Gamoura and 1Serhat Uluṣık
1Faculty of Engineering, Department of Industrial Engineering Süleyman Demirel University, Isparta, Turkey
2Faculty of Engineering, Department of Civil Engineering Strasbourg, France

Abstract

The assembly line is a system which is formed by the integration of some workstations by a material handling system. The purpose of the system is to achieve a finished product by the assembly of the components of it. Assembly process is composed of the order of the components of the work, or of the tasks that have to be performed in order. The assembly of the components is performed by considering the priority of them in the related workstations which are decided previously. In the design of an assembly line, a problem arises due to time differences of the assembly operations on the product, which is caused by unbalanced distribution to workstations. At the process of formation of the product, the assembly line balancing means sharing of durations equally and assigning tasks by minimizing the times missed which is caused by unbalanced workloads between the assembly stations. The main purpose of the assembly line balancing is to distribute an equal amount of workload to each workstation which is formed to have an equal or close activity to each other. To have equal or close workloads is the factor that increases the line efficiency.

Position Weighted Balancing Method which is one of the intuitive solution methods of the Assembly Line Balancing Problems is used in this study. By this method, the manufacturing operation time in a production line of the workflow plan in a furniture factory has been examined; and conclusions have been proposed accordingly. Within the study, time measurements, data from work study and workflow plans during the production process have been modeled with the help of Arena simulation software. The weak points of the system have been detected according to simulation data of the current state. Considering these weak points, Position Weighted Balancing Method has assigned operations to the workstations. According to the results of the simulation, improvements have been observed on the parameters of product quantity and the system performance (the duration of supply, the rates of capacity utilization of personnel, cycle time and the workstations).

Key words: Assembly Line Balancing, Production Systems, Simulation, Furniture Factory

7. References


