

An Optimization Model and User Interface for Job Assignment and Scheduling Considering Due Dates

Duygu Ece Tarcan
Industrial Engineering
Gazi University, Ankara, Türkiye
duygul.ece@gmail.com

Abstract

This graduation project focuses on scheduling and capacity planning in the notebook production line of Meteksan Printing House. Frequent product changeovers during production lead to long setup times, which directly lower machine efficiency. To minimize these sequence-dependent setup times, ensure proper job-machine assignments, and meet order due dates, a mathematical model based on Hybrid Flow Shop Scheduling was developed and solved using CPLEX. The CPLEX-based optimization framework was configured with problem-specific constraints including routing and machine eligibility rules, shift-based capacity limits, and customer-defined due date priorities. The system's performance was tested using a real-world dataset of 198 orders taken directly from the shop floor. Additionally, a visualization interface was designed to make the mathematical outputs easily usable in daily operations. Through this interface, production engineers can easily track daily schedules to see exactly which machines will produce which items, in what order, and in what quantities. Ultimately, this work eliminates the time and cost losses caused by traditional, experience-based methods, providing the company with a much more efficient and traceable production planning tool.

Keywords

Hybrid Flow Shop Scheduling, CPLEX, User Interface, Job Assignment, Due Dates.