

ABSTRACT

Nowdays, the manufacturing vendors with Make To Order (MTO) concept is crucial to have an order scheduling multi-model with a due date set by the consumer. The goal is to achieve the maximum On Time Performance (OTP) percentage, the minimum penalty cost and a high consumer trust. As the footwear industry, PT XYZ has a low OTP percentage compared to the minimum target that has been set. Average OTP percentage target for each month is 90% but from August 2020 to February 2021 period, minimum OTP percentage target cannot be achieved. The lower OTP percentage resulted, impacted to higher the penalty cost that must be paid. Which, PT XYZ has determined maximum target of the average penalty cost per month is 350 USD. While, currently average penalty cost from July 2020 to February 2021 is 874 USD. This condition is caused by improper order scheduling multi-model because doesn't yet considered material availability, high bottlenecks between lines due to having 10 production lines whose workloads must be balanced, high model changeovers and the difficulty and length of the production scheduling process because they do not have a model or order scheduling method.

This, study will discuss the design of a multi-objective order scheduling multi-model on a multi-mixed model production line in the footwear industry by considering line balancing and sequencing models using the Multi-Objective Hybrid Bee Colony Algorithm (MHABC) method and also considering materials availability and due date. The objective function set is the minimization of the penalty cost, makespan, line inefficiency and model changeover. Parameters set in line balancing stage are the separation of new styles, pairs of shoes for each due date, and makespan. Parameters to measure the changeover model are lasting, model, style and color changes. The output of the scheduling design is the allocation of orders on each line along with the order of the order assignment process for each line. The results show that the penalty cost can be minimized 64% with the average penalty cost generated for each month is 269 USD, makespan can be minimized 6%, line inefficiency can be minimized 13% and model changeover can be minimized 43%. Overall, the order scheduling performance can be improved 32%

and scheduling processing time can be improve 24 hours 47 minutes 41 seconds compared to the actual scheduling.

Keywords: Order Scheduling, Multi-Mixed Model Production Line, Line Balancing, Model Sequencing