ABSTRACT

The frequency of breakdown and costs of corrective and preventive maintenance are important considerations of applying the maintenance policy in the production. In this work, an electronic production which has frequency breakdown was studied to balance the maintenance with the productivity. In this research, an innovative integration of production and maintenance scheduling was proposed to consider the trade-off of the corrective and preventive maintenance simultaneously. This work defined a Mix Integer Non-Linear Programming (MINLP) mathematical model with the objective function that is to minimize the total cost, consisting of the expected maintenance cost, setup, production, inventory, and expected income lost. Multiple decision variables such as the length between the preventive maintenances, product sequence, and quantity of product were studied. Based on the historical failure data in the above mentioned production, the breakdown period is assumed to follow the Weibull distribution and the shape and scale parameter of it was estimated using Maximum Likelihood Estimation. Multiple scenarios are built to evaluate the model based on the actual machine breakdown cases in a company that used an injection molding machine for production. Parameters regarding the production were extracted by previous research with the same machine and same production characteristic. The experimental results show that the proposed method is able to optimize the cost based on the length between the preventive maintenances. Especially, the addition of preventive maintenance might not be cost-effective especially when the corrective maintenance has reached the limit.

Keyword: ***Scheduling, Mathematical Modelling, Sequence-Dependent Setup, Maximum Likelihood Estimation***