

Minimizing the number of tardy jobs on unrelated parallel machines with dirt consideration

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Abstrak

ABSTRACT

This paper considers an unrelated parallel machine scheduling problem with the objective of minimizing the number of tardy jobs. Each machine should stop periodically to perform maintenance activities. The problem, motivated from a wafer manufacturing company, considers the job scheduling and maintenance activities simultaneously under dirt constraint. That is, the dirt accumulation in the machine does not exceed the prespecified dirt limit. A mixed binary integer programming (MBIP) model is developed to find optimal solutions, and two three-phase heuristics are proposed. The heuristics assign each job to its most efficient machine first. Then, an intension of Moores algorithm is applied for each machine, and finally the solution is improved by the forward/backward insert mechanism. The experimental results showed that the proposed heuristics perform well. Furthermore, the efficiency of the MBIP model and the impact of the dirt accumulation as well as maintenance time are studied in detail.