The Study of Unrelated Parallel Machine with Multiple Processors Scheduling Problem in Semi-conductor Flip Chip Assembly House

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ABSTRACT

In a semiconductor flip chip production system each process is typically handled by more than one machine, which could be either new or old. This problem is referred to as an "Unrelated Parallel Machine with Multiple Processors Scheduling Problem". In addition, the flip chip assembly process has different flow-shop based on different products and allows zero process time for some processes. Therefore, the flip chip production system belongs to a "General Flow-Shop Factory". Due to unrelated parallel machines with multiple processors, the scheduling problem in the above situations is a NP-hard problem. To solve the problem, this study applied a genetic algorithm for flip chip assembly scheduling problem that has different sequence-dependent setup times and different cycle time requirements. The result of this study indicates that the proposed GA method has 12% improvement to a real case company when compared with EDD scheduling method. Besides, the proposed method has over 80% improvement when compared with SPT and LPT methods.

Key words: GA, unrelated parallel machine with multiple processors, Sequence-Dependent setup times, general flow-shop factory, semi-conductor flip chip assembly