

A DBR scheduling method for manufacturing environments with bottleneck re-entrant flows

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Abstract

Implementing the drum-buffer-rope (DBR) management system effectively increases throughput, lowers work in process (WIP), shortens cycle time, and improves on-time delivery performance. However, implementing DBR is difficult and complex in manufacturing environments with bottleneck re-entrant flows, such as semiconductor wafer manufacturing plants, IC substrate manufacturing plants, and multilayer board manufacturing plants. The lack of a drum development method for these environments is a key problem. That is, several bottleneck operations of a lot will appear on the drum in various locations. Ensuring proper sequencing of bottleneck operations and providing sufficient time between adjacent bottleneck operations of a lot requires a method in the drum development process. A drum development method for manufacturing environments with bottleneck re-entrant flows is proposed. This method can ensure the effective sequencing of bottleneck operations and provide sufficient time between adjacent bottleneck operations of a lot within a drum. In addition, a detailed exploration of the principles and algorithm in this method is presented. A numeric example and a real-life IC substrate manufacturing case are

utilized

to evaluate the application of the proposed method. Employing this proposed

methodology will facilitate manufacturing plants with bottleneck re-entrant flows

to successfully implement an effective DBR management system.

Keyword : TOC (theory of constraints); DBR (drum-buffer-rope); Bottleneck scheduling; Drum development method; Bottleneck re-entrant flows