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Optimization of Parallel Machine Scheduling for a Plastic Pallet Manufacturing Company

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Abstract

This research deal with a case study of a plastic pallets manufacturing company in Taiwan. The main manufacturing process of plastic pallet is injection molding. In the company, there are several identical injection molding machines. Each plastic pallet only needs to be processed by one of these machines. When a machine completes one batch of product, additional resources are required for the changeover if different product is to be produced subsequently. Because the additional resources are limited, batch splitting, which would increase the number of changeovers, is not permitted. Moreover, at most one changeover per day. The production strategy is mainly based on make-to-stock. When the current inventory is less than quantity of the new order, the corresponding products will be scheduled to be produced in predetermined production batches which are larger than the quantity of the order. A two-phase methodology is proposed. In both phases, a mathematical model is developed. The model in the first phase aims to minimize the makespan. Then the makespan resulted by Phase 1 becomes the constraint of the model in the second phase. Testing data were generated for experiment. The results show the promise of the proposed methodology for solving practical applications.

Keywords
Additional resource, Identical Parallel Machine Scheduling, Plastic Pallet.

Biographies
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