Industrial Research Project Title	Parallel-processor Scheduling by Setup Time and Due Date for Outer Tube Production Line
Industrial Research Project Credits	6
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Abstract

The industrial research project presents the parallel-processor scheduling problem involving setup for the outer tube production line. Each job can have different lot sizes and belongs to a model under its due date requirement. The setup times are treated separately from the processing times used to produce jobs. Setup is needed when the processor switches between models of jobs. For such problem characteristics, the optimization technique is computationally intractable. The aim of this study is to develop heuristic scheduling procedures such that mean tardiness and total setup times are minimized.

Heuristics are developed for an allocation stage and for sequencing stage. In the allocation stage, the criteria used to assign each job to a processor are; MST (Minimum Slack Time), CR (Critical Ratio), SPT (Shortest Processing Time) and LPT (Longest Processing Time). In the sequencing stage, a heuristic is developed to sequence the allocated jobs with the purpose of improving the results from the allocation stage. API (All Pairwise Interchange) is used to reduce mean tardiness and total setup times. The outstanding point of API is that it allows jobs to swap between processors in order to obtain a better result.

MST, CR, SPT and LPT are applied to assign jobs to identical parallel processors in the outer tube production line, and then API is used to sequence the assigned jobs. The experiments reveal that the MST and CR respond to the due date whereas SPT and LPT respond

to total setup times. API can noticeably improve all job sequences from the allocation stage, resulting in a reduction of mean tardiness and reduced total setup times.