

A Hierarchical Production Planning in Line Production System

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ABSTRACT

This study presents a hierarchical production planning procedure for line production systems. The procedure consists of the following three phases : aggregated production planning, family disaggregation and item disaggregation.

In the first phase, an LP formulation is developed with the objective of minimizing the sum of inventory holding cost and overtime labor cost, which can be solved on a rolling horizon basis. In the second phase, the first period's solution of the aggregated plan is disaggregated to families in a way which maximizes line efficiency. In the last phase, the production quantity of each family is disaggregated to items such that the flow time is minimized. In this regard, item-flow model and batch-flow model are proposed to determine the batch size and operation sequence of each item. For the first model, the case with two items is solved optimally, whereas a heuristic procedure is presented for the multi-item case. And for the second model, a heuristic is developed.

An example problem is solved to examine the validity of the procedure.