
Production and delivery problem with late departure and tardiness penalties

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Abstract

The context of supply chain imposes a high-level of coordination between the production and the delivery of types of good that cannot be stored for a long time. (drugs, foods). We study an integrated production and delivery problem where commands of such type of good have to be produced and delivered to various customers. Each customer has a specific localization and an expected due date. Each command is produced on a flow shop with permutation production chain. In order to build the delivery plan, the commands are grouped in batches and assigned to a dedicated vehicle among a homogeneous fleet. A vehicle can start as soon as all the commands of the batch are completed in order to serve customers.

A solution ensures the production and the delivery of commands minimizing several costs. A storage cost is taken to account when a product on the production chain is not in process on a machine or when the product is finished and waiting for its vehicle departure. A fixed cost is taken into account for each vehicle used. A routing cost is considered and a penalty must be paid to customers for any tardiness related to his command.

A heuristic method is proposed to solve this global problem. From a production sequence, a linear model is solved to minimize the inventory costs. The batches are determined using a clustering method. An original approach, based on local search, is designed to optimize a batch delivery with uncertainty on the departure date.

Keywords: Production, delivery, matheuristique, modelization

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