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Sequencing of picking orders in mobile rack warehouses. (English) Zbl 1394.90265

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Summary: A growing population and increasing real estate costs in many urbanized areas have made space for roomy warehouses with single-deep storage and wide aisles scarce and expensive. Mobile rack warehouses increase the space utilization by providing only a few open aisles at a time for accessing the racks. Whenever a stock keeping unit (SKU) is to be retrieved, neighboring racks mounted on rail tracks have to be moved aside by a strong engine, so that the adjacent aisle opens and the SKU can be accessed. As moving the heavy racks takes considerable time, the resulting waiting time determines large parts of the picking effort. It is, thus, advantageous to sequence picking orders, such that the last aisle visited for the preceding order is also the first aisle to enter when retrieving a subsequent picking order. We formalize the resulting picking order sequencing problem and present suited exact and heuristic solution procedures. These algorithms are tested in a comprehensive computational study and then applied to explore managerial aspects, such as the influence of the number of open aisles on the picking effort.

MSC:

90B35 Deterministic scheduling theory in operations research
90B06 Transportation, logistics and supply chain management
90B50 Management decision making, including multiple objectives
90B30 Production models

Cited in **5** Documents

Keywords:

warehousing; mobile racks; picker routing; sequencing

Full Text: DOI

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