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A Solution Approach for the Joint Order Batching and Picker Routing Problem in a Two-Block Layout.

This page contains material of the following publication:

Abstract: Order Batching and Picker Routing Problems arise in warehouses when articles have to be retrieved from their storage location in order to satisfy a given demand specified by customer orders. The Order Batching Problem includes the grouping of a given set of customer orders into feasible picking orders such that the total length of all picker tours is minimized. The problem of determining the sequence according to which articles have to be picked is known as the Picker Routing Problem. Although these problems occur at the same planning level, it is common to solve these problems not simultaneously, but separately and in sequence. As for the batching problem it is usually assumed that the order pickers, when making their ways through the warehouse, follow a certain, simple routing strategy. Based on this routing strategy, the customer orders are then grouped into picking orders. The advantage of this approach can be seen in the fact that - for single-block warehouse layouts, in particular - the corresponding order picker tours are very straightforward and can be memorized easily by the order pickers. This advantage diminishes, however, when more complex, multi-block layouts have to be dealt with. Furthermore, in such case, the approach may result in picker tours that can be far from optimality. Therefore, for multi-block layouts, we develop a new approach, namely an iterated local search algorithm into which different routing algorithms have been integrated and which allows for solving the Order Batching Problem and the Picker Routing Problem simultaneously. By means of numerical experiments it is shown that this approach results in a substantial improvement of the solution quality without increasing computing times.

Typ	› Titel	Content
	› Joint Order Batching and Picker Routing (Appendix)	This file contains the appendix of the paper including pseudo-codes of the exact algorithm by Roodbergen & de Koster (2001) as well as the code of a heuristic derived from the exact approach.
	› Instances PRP	This file contains all data files for the Picker Routing Problem.
	› Instances JOBPRP	This file contains all data files for the Joint Order Batching and Picker Routing Problem.