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**An Integrated Strategy for a Production Planning and
Warehouse Layout Problem: Modeling and Solution Approaches**

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Abstract We study a real-world production warehousing case, where the company always faces the challenge to find available space for its products and to manage the items in the warehouse. To resolve the problem, an integrated strategy that combines warehouse layout with the capacitated lot-sizing problem is presented, which have been traditionally treated separately in the existing literature. We develop a mixed integer linear programming model to formulate the integrated optimization problem with the objective of minimizing the total cost of production and warehouse operations. The problem with real data is a large-scale instance that is beyond the capability of optimization solvers. A novel Lagrangian relax-and-fix heuristic approach and its variants are proposed to solve the large-scale problem. The preliminary numerical results from the heuristic approaches are reported.

Keywords: warehouse layout, capacitated lot-sizing, integer linear programming, Lagrangian heuristics

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