Public Abstract
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Title:An Integrated Stock Assignment Model for a Warehouse Fast Picking Area

Warehousing is a significant component of the supply chain activities. Modern distribution centers configure their warehouses in fast picking areas to fulfill orders more rapidly at a lower cost while achieving customer satisfaction. Order picking and restocking of the fast picking area have been identified as the most labor-intensive and costly activities of any distribution center. In a picker-to-item process environment, traveling is an important factor than can account up to 50% of the total labor time dedicated to order picking and restocking. Previous research has mostly focused in reducing costs from a myopic perspective, either analyzing the flows from order picking or restocking. This research integrates order picking and restocking to generate a stock keeping unit (SKU) layout that minimizes the overall walking distance traveled within an S-shaped routing policy. Given a set of order routes and SKU restocking frequencies, the assignment of SKUs to a location is formulated as a Binary Mixed Integer Linear Programming (BMILP) model which is able to solve small scale problems to optimality. In the cases where the BIMLP model does not find the optimal solution, the best feasible solution falls within 20% of the lower bound. For larger scale problems, a heuristic is presented obtaining solutions in little computation time. The BMILP and the heuristic are compared to other scientific and popular methods in practice, and show that additional savings in labor can be obtained.