Meta-Heuristic Methods to Multi-Vehicle Truck Loading Problems, And An Application in Industry

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Abstract: Demand fluctuation requires consideration of many parameters, and compels enterprises to have a flexible fleet planning. The objective of this paper is to develop a heuristic algorithm that can allocate orders into trucks, and determine the shipment plan. In the model, it is assumed that the company has a fleet of own trucks and an agreement with an outside carrier company. The demand for each product is deterministic, and known for every period of planning horizon. Truck capacity, outside carrier capacity, delivery date, and total demand are the main constraints of the model. Objective function contains inventory holding cost, late delivery cost as well as the cost of outsourcing the order to an outside carrier. In the algorithm, the shipment plan for the upcoming week is constructed via minimization of total cost. As a result, the necessity of outside carrier and order distribution plan are determined.

Keywords: Truck loading, outside carrier, distribution planning, meta-heuristics