Optimization Model for the Harbor Scrap-Metal Logistic

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We study a new optimization model to minimize the total operational cost of a logistic company on a given time horizon. The company has some local providers who supply it by scrap-metal materials of different qualities. The materials are manufactured into the high quality product and exported to abroad by heterogeneous fleet of ships. Company can send at most one ship per day. The total demand for the product is known in advance according to a contract. The company has to pay to providers according to piecewise linear prices, transportation cost to deliver all materials to depot in harbor by vehicles (own or rented), keeping cost in depot, manufacturing cost, the shipping cost, and payment for international declarations. The goal is to find the best strategy for the company to minimize the total cost to perform the contract. We present a mixed integer linear programming formulation for the model. The CPLEX software can find optimal or near optimal solutions for small horizon only. Thus, we design a mat-heuristic and use CPLEX solver for moving time intervals. We conduct computational experiments on real test instances and discuss so-called tail's effect.

This research was partially supported by RFBR grant 16-07-00319.