

## Analysis and algorithms for container loading-routing problem from China main ports to Balkan region concerning Belgrade as new hub

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### Abstract

Ocean freight has been transformed since the 1950s by the introduction of standardised, stackable shipping containers, which make vital contribution to the rapidly growing international trade. There is a growing recognition of the role that transportation and logistics excellence plays in achieving a world-class supply chain and that transportation costs represent a substantial component of overall supply chain and corporate spend for many companies. Today, 90% of non-bulk cargos are containerised and there are also many companies who want to send consignments of sub-optimal size so the freight forwarder arranges 'LCL Shipping' or 'Groupage Shipping' -making the amalgamation of loads into one bigger more cost-effective one. This paper analyse cost-effectiveness of leading Balkan region Non-Vessel Operating Common Carrier (NVOCC) considering less than container load (LCL) shipments. During research, special emphasis faces for the opening of a new hub for the transport of LCL shipments. The main goal of this research is to define optimal number of different types of containers, with respect to loading-routing problem, needed to transport LCL shipments with different sizes, weight, costs, loading ports and final points in order to maximize the profits of the NVOCC. Firstly, it was formed appropriate mathematical model which is subsequently made implementation within Lingo programming environment and programming language C. The implemented computational part of the framework offers substantial flexibility to accommodate assessment of various transportation alternatives and sensitivity analysis. Furthermore, as a result of the study NVOCC could make quality analysis projecting ahead shipping costs based on which can form the final price for each of LCL shipment.

**Keywords:** NVOCC, LCL shipping, Loading-routing problem, Optimization.