

HUB ARC SELECTION FOR LESS-THAN-TRUCKLOAD CONSOLIDATION

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ABSTRACT

For more than twenty years, shipment consolidation has been utilized as a method to significantly decrease the cost of transporting goods, people, and information. Due to ever-increasing fuel costs and customer expectations, consolidation strategies are becoming even more important in the freight transportation industry. The hub-and-spoke model has also been widely recognized as an effective design for shipment consolidation. This shipment consolidation takes advantage of transportation economies of scale by gathering the shipments from clustered origins around a transshipment center, called a hub, transporting them in bulk to other hubs, and distributing the shipments to clustered destinations.

This research proposes mathematical models and solution methodologies that will determine the optimal set of hub-to-hub routes for the consolidation and transportation of less-than-truckload (LTL) shipments, shipments that were originally transported individually by commercial trucking. Data from a Fortune-500 manufacturing company concerning a large-scale domestic LTL network has been provided as a case example for the proposed methods. Results are given in which 8 scenarios are identified to save transportation costs when compared to previous policy. The methods can also be extended or tailored in a variety of ways.