

Scheduled Transport Service Design for Cross-Border Logistics in Airport Cluster

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Abstract. The airport cluster plays a pivotal role in the highly-growing market of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) through achieving bundling of cargo flows via multimodal transport and higher connectivity to the rest of the world via frequent transport services. Due to the uncertainties of cross-border logistics, as well as limited and expensive space at the airport cluster, it is increasingly popular to build cross-border logistics parks in the Pearl River Delta region for cargo consolidation and storage, where customs clearance, security screening, and other services for exports could be completed before transporting cargoes to the airport cluster by sea for air transshipment to worldwide destinations, and vice versa. This paper studies the design of cross-border scheduled transport service by barge between a logistics park and multiple airports in the airport cluster for both imports and exports. The barge service is operated by a third-party logistics company who visits multiple airports to pick up and drop off cargoes in milk-run mode. In addition to the barge service, the operator offers the more expensive truck service for supplementary and expediate transport. We model this scheduled transport service design problem with the objective of minimizing the total operating cost considering transport cost, flight schedules, and capacity limits. A series of numerical experiments are conducted to illustrate the effectiveness of the scheduled transport service and generate managerial guidelines for the GBA multimodal transport development.

Keywords. Scheduled transport service, multimodal transport, barge transport, cross-border logistics, airport cluster

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