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A STUDY ON THE DESIGN OF EXPRESS COURIER SERVICE NETWORK BASED ON THE CUT-OFF TIME ADJUSTMENTS

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Abstract. *The productivity and service level of an express courier service are highly related to how to operate the consolidation terminals and their corresponding service centers. A consolidation terminal typically acts as a hub in an express service network where packages from a number of service centers are combined, mixed, sorted, and transshipped for local deliveries. Initially, the design of an express service network is determined by considering the amount of initial investments and operating costs for terminals and service centers within the network. Therefore, continuous modifications of network design are required to adjust to rapidly changing business environments. This study suggests an approach to the reconfiguration of an express courier service network with respect to assignments of service centers to consolidation terminals and adjustments of their cutoff times. We propose an integer programming model and a genetic algorithm based solution procedure for allowing express couriers to maximize their incremental profit. An illustrative numerical example with reduced data sets from an express courier in Korea is presented to demonstrate the practicality and efficiency of the proposed model and its solution procedure.*

Keywords: Profit, Reconfiguration, Express courier service network, Consolidation terminal, Cutoff time

1. **Introduction.** Demand for express package deliveries in Korea is rapidly increasing according to recent progress of telephone sales, TV home shopping and electronic commerce. Accordingly, various sized domestic express companies have been established, and various foreign companies with high level of service also consider entering into the Korean express market. As a result of the surplus of express companies, they are struggling with providing superior service at a competitive price in order to remain competitive.

In general, an express courier service network consists of customer zones, service centers and consolidation terminals. Customer zones refer to geographical districts in which customers either ship or receive packages and are covered by a service center. And a service center receives customer shipment requests and picks up parcels from customer zones, and then they are collected before transshipping in bulk to a consolidation terminal. In this way, the service center acts as a transshipment and temporary storage facility connecting customers to a consolidation terminal. At the consolidation terminal, consolidated packages are screened, sorted and then loaded onto delivery trucks for their destinations.

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