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Last Mile Distribution in Humanitarian Relief

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Abstract

Last mile distribution is the final stage of a humanitarian relief chain; it refers to delivery of relief supplies from local distribution centers (LDCs) to beneficiaries affected by disasters. In this study, we consider a vehicle-based last mile distribution system, in which an LDC stores and distributes emergency relief supplies to a number of demand locations. The main decisions are allocating the relief supplies at the LDCs among the demand locations and determining the delivery schedules/routes for each vehicle throughout the planning horizon. We propose a mixed integer programming model that determines delivery schedules for vehicles and equitably allocates resources, based on supply, vehicle capacity, and delivery time restrictions, with the objectives of minimizing transportation costs and maximizing benefits to aid recipients. We show how the proposed model optimizes resource allocation and routing decisions and discuss the tradeoffs between these decisions on a number of test problems. Finally, we

identify opportunities for the use of intelligent transportation systems in last mile distribution.

Keywords:

Last Mile Distribution   Humanitarian Relief Chains   Integrated Routing and Resource Allocation

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