

This topic is “practice ready.” Yes No

Prepositioning Highway Helper Trucks for Incident Response Dispatch

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Abstract

Incidents such as stalled vehicles and crashes usually causes traffic delays and clearing them off the road quickly can improves the mobility and safety of the roadway. In order to mitigate the impact of incidents, the Iowa Department of Transportation implemented a safety service patrol, called Highway Helper, which assists stalled vehicles, removes debris on the roadway and responds to help clear an incident scene through fast response. This paper investigates the prepositioning Highway Helper trucks to minimize the total incident response time. A P-median model is proposed to find the locations to preposition Highway Helper trucks that minimize the total weighted distance between the incident site and truck preposition site. The incident delays for each type of incidents, in terms of number of lanes blocked, were calculated based on historical traffic flow and speed data. Then, the weight associated with each incident was estimated by traffic volume at the incident site and the delay of such incident type. A case study for the Des Moines area in Iowa was conducted. The p-median model was solved using ArcGIS on a directed network of the study area. Preposition strategies for varied fleet sizes were recommended for both morning peak and afternoon peak.

Keywords: Incident response—Fleet allocation—P-Median Model—Optimization

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