Project Title: Adaptive Evacuation Transportation Planning Under Uncertainty

Principal Investigator: Sung Hoon Chung

Two conference papers were submitted based on the research for this project as follows:

Kohts, S., Chung, S., Li, Y., Sawant, N. (2016) "Evacuation Planning for Urban Areas Using Public Transit Systems," Proceedings of the 2016 Industrial and Systems Engineering Research Conference

Abstract

Detailed evacuation planning during natural disasters is a critical aspect of managing calamities. Typically, it is assumed that evacuees use personal vehicles to vacate; however, the use of public transportation for evacuation may have advantages, especially in urban areas. Moreover, if everyone utilizes his/her own vehicle to evacuate out of an urban area, it would cause a dangerous amount of congestion. Therefore, this study has considered using public transit systems for evacuation in an urban area. Assuming that there are enough resources to evacuate every individual in need, the objective is to minimize the amount of time it takes to rescue every person.

Link

Evacuation Planning for Urban Areas Using Public Transit Systems

Li, Yinglei & Chung, Sung. (2016). "Specification of Uncertainty Sets for Robust Evacuation Planning"

Abstract

The importance of effective evacuation planning cannot be overemphasized when it comes to hazards and disaster management. The available data about evacuation demand is usually limited in disaster evacuation planning. In this paper, we tackle methodologies on how to select an uncertainty set of evacuation demand even when available data is limited in the context of robust network design models applied to disaster evacuation planning. In particular, we propose two approaches. The first approach enables us to estimate the set of demands, which can be used as the uncertainty set for our robust counterpart of the evacuation model. The second approach makes it possible to estimate the mean demands, after which the uncertainty set can be defined by use of a desired uncertainty level specified by stakeholders. Preliminary results of the evacuation simulation are presented.

Link

PDF: Specification of Uncertainty Sets for Robust Evacuation Planning [accessed Oct 15 2018].

Sponsors: University Transportation Research Center

Completion Date:

University: SUNY Binghamton