

Project Title: Decision Making Tools for Distribution Networks in Disaster Relief

Principal Investigator:

Karen Smilowitz, Associate Professor, Industrial Engineering and Management Sciences

Co-PI:

Irina Dolinskaya, Assistant Professor, Industrial Engineering and Management Sciences

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Project Summary

The devastation caused by the 2010 earthquake in Haiti was compounded by the significant logistical challenges of distributing relief to those in need. Unfortunately this is the case with many disasters. Rapid and efficient distribution of water, food, medication and other essential supplies is crucial to saving lives and rebuilding the region. Our research team at Northwestern University is leveraging our expertise in supply chain management and vehicle navigation under uncertainty to study design and operational improvements for humanitarian relief chains. Our proposed initiative will bring insights from this research to the relief community through the development of decision-making tools for supply distribution.

Distribution in commercial delivery services share some features with disaster relief; however, several critical attributes are not present. First, models and solution must be accessible and easy to implement by relief workers operating in extreme conditions. These end users often lack the technical background and support during their operations, and cannot implement complex optimization software used in industry. Second, information about the environment can be very limited following a disaster, to a degree not often encountered in commercial settings. Our analysis will integrate this uncertainty in a dynamic approach that reflects the evolution of information. Third, the objectives in disaster relief have not been extensively studied in other sectors. We will analyze relief systems with multiple (often conflicting) objectives to ensure efficient and effective distribution of relief supplies.

The proposal has three key activities: learning from agencies about their current relief operations; developing prototype logistics models to improve operations; and transitioning this research to Northwestern engineers, trained through this initiative. Upon completion of this one-year project, these engineers will adapt our prototype models to create and deploy decision-making tools for agencies to improve relief distribution, through an NU-incubated start-up company.