

Decision Systems Engineering Fall '13 Seminar Series

“Rapid Response: Restoration of Road Network Connectivity After a Disaster”

FEATURING



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Friday, November 1st, 2013 - 1:00 PM – 2:00 PM
Brickyard Mezzanine M1-09

Abstract:

In a natural disaster, emergency response operations are impeded by damaged and blocked roads. While most origin-destination pairs have to take detours, trips between some origin-destination pairs cannot be made. To facilitate emergency transportation, a critical subset of the blocked roads should be cleared to restore network connectivity rapidly. A fleet of machinery positioned at various depots is dispatched for this task. We define an optimization problem to generate a coordinated work schedule for the teams responsible from clearing the roads. The problem is defined on a directed network with a given set of blocked arcs and estimated clearing durations. We determine which blocked arcs to clear and a walk for each team starting at its depot that collectively cover the selected blocked arcs. The objective is to minimize the total time of the longest walk, i.e. the makespan. We formulate a mixed integer program (MIP) for this routing and scheduling problem. We provide two heuristic solution methods. The first one obtains a feasible solution from a relaxation of the MIP and the second one is a metaheuristic. We analyze the Istanbul earthquake case using these methods.

Bio:

Sibel Salman is an Associate Professor in Industrial Engineering at Koç University, Istanbul. She got her Ph.D. in Operations Research from Carnegie Mellon University, following her M.Sc. and B.Sc. degrees in Industrial Engineering from Bilkent University. Prior to joining Koç University, she held a faculty position at the Krannert School of Management, Purdue University. She has published in the areas of telecommunication network design, production scheduling, supply chain management, data mining in addition to disaster mitigation and preparedness. Her current research interests are in network optimization with applications in logistics and disaster management. Further information can be obtained from <http://home.ku.edu.tr/~ssalman/>.