

TRANSPORTATION ENGINEERING SEMINAR

Dynamic Resource Allocation for Large-Scale Transportation Network Evacuation

Friday, February 27, 2015
3:00pm to 4:30pm

Please join us in College Avenue Commons Room 459 

Srinivas Peeta, PhD

Professor of Civil Engineering and Director, NEXTRANS Center, Purdue University



Allocating movable resources (such as trained personnel and equipment) dynamically enables evacuation management agencies to improve evacuation system performance in both the spatial and temporal dimensions. This study proposes a mixed integer linear program (MILP) model to address the dynamic resource allocation problem for transportation evacuation planning on large-scale networks. The proposed model is built on the earliest arrival flow formulation that significantly reduces problem size. A set of binary variables, specifically, the beginning and the ending time of resource allocation at a location, enable a strong formulation with tight constraints. A solution algorithm is developed to solve for an optimal solution on large-scale network applications by adopting Benders decomposition. In this algorithm, the MILP model is decomposed into two sub-problems. The first sub-problem, called the restricted master problem, identifies a feasible dynamic resource allocation plan. The second sub-problem, called the auxiliary problem, models dynamic traffic assignment in the evacuation network given a resource allocation plan. A numerical study is performed on the Dallas-Fort Worth network. The results show that the Benders decomposition algorithm can solve an optimal solution efficiently on a large-scale network. The proposed MILP model provides a general framework to solve other problems characterized by a similar bi-level structure with the system optimum objective.

Dr. Peeta is a Professor of Civil Engineering at Purdue University and the Director of the NEXTRANS Center, the USDOT's Region 5 University Transportation Center. He received his M.S. and Ph.D. degrees from Caltech and University of Texas at Austin, respectively. He has authored over 255 technical publications made numerous invited, keynote, and conference presentations and received numerous awards over his career



<http://goo.gl/A9e8aq>



Sponsored by GPSA.
Event is open to the public.