



Isfahan University
of Technology

Department of Transportation Engineering

Seminar Announcement

Monday, December 22nd, 2014
2pm Seminar room

**Integrated Modeling of High Performance Passenger and Freight Train Operation
Planning on Shared Use Rail Corridors: A Focus on the US Context**

Ahmadreza Talebian

Abstract: Passenger rail has been resurging in the United States over the past decade. To sustain this trend which promotes sustainability and multimodality at the same time in inter-city travel, several states have been pursuing higher performance rail systems, in the forms of High Speed Rail (HSR) services on new or existing corridors. With comprehensive consideration of realistic values for different cost components involved and the fact that passenger trains are given scheduling priority over freight trains on shared corridors in the US, this research proposes a hypergraph based, two-level modeling approach, in which passenger and freight side costs are sequentially minimized. Passenger schedule delay and freight foregone demand as a function of train schedules, which are largely ignored in previous research, are explicitly considered. Different solution approaches are explored, and a modified linearized formulation taking advantage of the special structure of the problem achieves superior computational performance is introduced. The model is applied to a sample problem and a real-world shared use corridor in the US. It is found that schedule delay cost is as important as rail fare. Scheduling more passenger trains on a shared corridor lowers passenger schedule delay but at the price of freight side cost increase. The resulting marginal freight cost increase is in most cases higher than the marginal passenger schedule delay reduction, especially when frequent passenger train services already exist on the corridor. The train speed heterogeneity significantly affects freight side cost, most of which comes from foregone demand.

Biography: Ahmadreza Talebian is a doctoral student in transportation engineering in the Department of Civil and Materials Engineering, at the University of Illinois at Chicago. He received his M.S. in transportation planning in 2011 from Sharif University of Technology, Tehran, and B.S. in civil engineering in 2008 from Isfahan University of Technology, Isfahan. His research interests include: rail service scheduling on shared use passenger and freight corridors, game theory based allocation of rail capacities, transportation demand management; and fuzzy approach in transportation modeling. His research has been sponsored in part by Illinois Department of Transportation and the Urban Transportation Center at the University of Illinois at Chicago.