Transportation Center Seminar Series presents…..

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“Strategic Design of a Relay Network for Truckload Transportation”

Thursday – Feb. 18, 2010
4:00 - 5:00 pm
Refreshments available at 3:30 pm

Location:
Transportation Center –Lower level
Northwestern University
Chambers Hall - 600 Foster
Evanston, IL

Abstract: The truckload industry faces a serious and chronic problem of high driver turnover rate -- typically more than 100% -- with staggering associated costs. Among the major causes of this problem are extended on-the-road times where drivers handle several truckload pick-up and deliveries successively, non-regular schedules and get-home rates, and low utilization, i.e., less mileage/unit-time per driver, which leads to low pay.

We consider the strategic design of a relay network which may potentially help to alleviate this problem by providing an efficient underlying network that facilitates an assignment of drivers to home-bases (domiciles to which they stay close) and generation of more predictable schedules with continuity and higher get-home rates. In relay network design, we are interested in determining a number of relay point locations, assigning network nodes to these relay points (i.e., defining domiciles), and determining the actual route (from the origin to the destination) for each truckload on the network. In doing so, we explicitly consider driver tour lengths, load imbalance at relay points, and the percentage circuitry constraints.

We develop an efficient Benders decomposition based algorithm that is significantly enhanced via strengthened Benders cuts, cut disaggregation schemes, heuristics for improved upper bounds, and surrogate constraints. Our approach provides the ability to solve large size instances within reasonable solution times and very small optimality gaps as we illustrate with an extensive computational study. Furthermore, in our experiments, we also examine the effects of changes in the problem parameters on the performance of solution algorithm.

Bio: Halit Üster is an Associate Professor in the Department of Industrial and Systems Engineering at Texas A&M University. He holds a Ph.D. in Management Science/Systems from McMaster University, Ontario, Canada. His research interests are in the areas of logistics, design of networked systems, and applied optimization. His publications appeared in Computers and Operations Research, European Journal of Operational Research, IIE Transactions, Interfaces, Naval Research Logistics, and Transportation Science among others. He is visiting IEMS Department at Northwestern University during 2009-2010 academic year where he has been named Eshbach Scholar in the McCormick School of Engineering & Applied Science for Fall Quarter 2009.