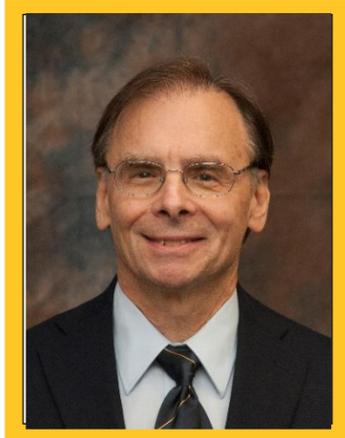


Determining the Long-term Requirements for Powered Industrial Vehicles within Mail Processing & Distribution Centers

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Abstract

This talk describes a vehicle routing problem (VRP) within mail processing and distribution centers. Throughout the day, large volumes of partially processed mail must be transferred between workstations in accordance with narrow time windows and a variety of system constraints. To help coordinate operations, it is desirable to cluster the pickup and drop-off points into zones. Given these zones, the primary objective is to solve a VRP to minimize the number of vehicles required to satisfy all demand requests, and secondarily, to minimize the total distance traveled. A solution consists of an invariant assignment of vehicles to zones and a routing plan for each 8-hour shift of the day. The clustering is performed with a greedy randomized adaptive search procedure, and two heuristics are developed to find solutions to the VRP, which proved intractable for realistic instances. The heuristics are optimization-based within a rolling horizon framework. The first uses a fixed time increment and the second a fixed number of requests for each subproblem. An extensive analysis was undertaken to evaluate the relative performance of the two heuristics and to better understand how solution quality is affected by changes in parameter values, including subproblem size, vehicle speed, number of zones and time window length. Test data were provided by the Chicago center.

Biography

Jonathan F. Bard is the Industrial Properties Corp. Fellow and professor of Operations Research & Industrial Engineering in the Mechanical Engineering Department at the University of Texas at Austin. He received a D.Sc. in Operations Research from The George Washington University. Dr. Bard's research centers on production planning and control, improving healthcare delivery, personnel scheduling, and the design of decomposition algorithms for solving large-scale optimization problems. He currently serves on six editorial boards and previously was a Focused Issue Editor of IIE Transaction and an Associate Editor of Management Science. He is a registered engineer in the State of Texas, a fellow of IISE and INFORMS, and a senior member of IEEE. In the past, he has held a number of offices in each of these organizations, including both IISE and INFORMS Vice President of Publications.

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