

ISyE 4111
Advanced Supply Chain Logistics
Fall 2010

Reading Assignment 7

Due Date: November 4, 2010

Read the materials below in preparation for discussion in class. The questions are intended to guide your reading and thoughts, but are not the only aspects that will be discussed in class.

1. Powell, W.B., “Optimization Models and Algorithms: An Emerging Technology for the Motor Carrier Industry”, *IEEE Transactions on Vehicular Technology*, vol. 40, nr. 1, pp. 68–80, 1991.
 - (a) What are some of the factors that encourage carriers to adopt decision support systems based on optimization?
 - (b) What are some of the factors not taken into account in the “driver assignment” problem?
 - (c) What are some of the factors not taken into account in the “driver/crew scheduling” problem?
 - (d) What are some of the factors that “dynamic fleet management” network models attempt to take into account?
 - (e) What are some of the arc types that are used in “dynamic fleet management” network models?
 - (f) What is the “end effect” in dynamic models?
 - (g) How are salvage arcs used to attempt to mitigate the end effect?
 - (h) According to the article, what is an advantage and disadvantage of local improvement heuristics?
 - (i) According to the article, what is an advantage and disadvantage of network flow algorithms?
 - (j) According to the article, what is an advantage and disadvantage of set partitioning methods?
 - (k) What two methods are mentioned to generate tours?
 - (l) What constraints does the article propose to relax in the discussion of Lagrangian relaxation?
 - (m) According to the article, what are some disadvantages of artificial intelligence methods?
 - (n) Name 4 problems that are encountered in truckload operations.

- (o) What are some issues that should be considered in the assignment of drivers and trucks to loads?
 - (p) Name 3 issues that make driver assignment hard.
 - (q) What are 3 important factors that should be taken into account when accepting or rejecting a load request?
2. Powell, W.B., Marar, A., Gelfand, J., and Bowers, S., “Implementing Real-Time Optimization Models: A Case Application from the Motor Carrier Industry”, *Operations Research*, vol. 50, nr. 4, pp. 571–581, 2002.
- (a) What is an important issue in operations besides obtaining useful data?
 - (b) What are some goals that are important in the assignment of drivers and trucks to loads? (Also compare with previous article.)
 - (c) What is the foremost challenge faced in the assignment of drivers to loads?
 - (d) What is another challenge faced in the assignment of drivers to loads?
 - (e) What is the “boundary effect” when responsibility for assignment of drivers to loads is divided up according to region?
 - (f) What are some of the benefits of the optimization model presented in the article?
 - (g) What are the 3 objective functions that are relevant in an implementation?
 - (h) Describe the saga of how the authors tried to obtain feedback regarding the extent to which users followed the optimization model’s recommendations, and the reasons why they often did not.
 - (i) What relationship was found between user compliance with the optimization model, and system profits?
 - (j) What were some of the reasons why dispatchers did not follow the decisions recommended by the optimization model?
 - (k) What is the problem with recommending decisions that the users would make themselves?
 - (l) What does the manager mean with “Sometimes when you can’t change the people, you have to change the people”?
 - (m) Compare the implementation issues in the article with the implementation issues of the meals-on-wheels project.
 - (n) What is the problem with the question “How well would we have done if we had just followed the model”?