

OPRE 6398.001 Prescriptive Analytics

Reading 7*

Yellow Freight System is one of the largest motor carriers in the United States, handling over 15 million deliveries for more than 300,000 customers annually using 630 terminals connected by a hub-and-spoke network. With revenues in 1990 exceeding \$2.3 billion, the firm primarily concentrates on the less-than-truckload (LTL) market, where shipments are typically less than 10,000 pounds. Since tractor-trailer trucks can normally carry up to 45,000 pounds, LTL orders need to be consolidated and broken down to form economical full truckloads.

A simulation model was originally in use to manage this complex terminal network, but it could not keep up with Yellow Freight's business growth. Additionally, in the 1980s, the trucking industry was deregulated and became a very competitive environment. The company then decided to design a large-scale interactive optimization system for routing shipments to make its operations more efficient. The ultimate goal is to reduce costs through improved service, reliability, as well as planning accuracy. The effort led to the development of SYSNET, a sophisticated code including a module of network optimization.

SYSNET was primarily used for tactical planning, which involved decisions on what shipments to place on how many trucks. Each month, the loading plans underwent minor revisions to handle forecasted changes in freight volumes. SYSNET played a key role in corporate long-range planning as well, which called for deciding where new terminal facilities should be set up and how many trucks would be required.

Several benefits were derived from the implementation of this new tool: projects were completed with greater precision; consolidation decisions were optimized; better customer service was provided due to more reliable transportation; and there were less claims for damage in the shipping process. The total cost savings attributable to SYSNET were estimated to be more than \$7.3 million per year. In 1990 this computerized network model was utilized to identify over \$10 million in savings from relocating terminals and break bulking. It also helped Yellow Freight reduce late deliveries by 27% during a three-year period.

* Adapted from Braklow, J., Graham, W., Hassler, S., Peck, K., & Powell, W. Interactive optimization improves service and performance for Yellow Freight System. *Interfaces*, 1992, January-February, 147-172.