

# Improved Load Planning for SAIA

## *The Challenge*

SAIA is a super-regional less-than-truckload (LTL) carrier and runs a high-volume freight transportation operation, spending millions of dollars in transportation and handling costs each week. SAIA transports shipments that typically occupy only 5-10% of trailer capacity. Hence, transporting each customer shipment directly from origin to destination is not economically viable. Therefore, freight from multiple shippers is collected and consolidated to increase trailer utilization, and routed through a network of consolidation terminals. The savings generated by increasing trailer utilization through consolidation is partially offset by other costs; terminal-to-terminal routing increases the total time and distance each shipment requires to reach its destination and transferring freight between trailers generates a handling cost. How freight is routed through the network, i.e., specifying sequences of terminals where trailer-to-trailer transfer takes place for each shipment moved, so as to minimize total cost is at the heart of running a profitable LTL business. These routing decisions are known in the industry as the load plan. Constructing a cost-effective load plan has become more difficult and more time-consuming in the last few years because of tighter and tighter service level commitments. Improved load planning technology is needed to remain competitive in a transport market where margins are razor thin.

## *The Solution*

An integer programming based search algorithm was developed that can produce cost-effective load plans in a few hours, whereas it takes human planners at least a few days. In addition, the technology can produce day-differentiated load plans that can effectively handle predictable daily freight volume fluctuations. This is the only technology on the market today that can produce day-differentiated load plans.

## *The Benefits*

The technology generated load plans that result in cost savings on operating costs of approximately 4%. When day-differentiated load plans are adopted the cost savings increase to approximately 6.5%. Furthermore, because the efficiency with which load plans can be generated, it has now become possible for SAIA to generate load plans weekly (each Sunday evening) which provides an opportunity to accommodate known freight volume patterns, e.g., higher freight volumes during the first week of the month than any other week or reduced freight volumes in weeks that include a public holiday or higher freight flows in weeks leading up to Christmas holidays.

*C-OPT Researcher involved: Martin Savelsbergh*

