

Addressing Network Imbalances

Goal Statement

Network imbalances- lack of quantity and timing of balancing freight in a particular sub-network during a particular period- are among the greatest challenges for an irregular route carrier like Bison Transport. The purpose of this challenge is to develop forecasting techniques that will result in improved balance management. The prediction will allow Bison to manage inefficiency and improve profitability.

Definition of Imbalance

In a transportation network, balance is calculated as the match of inbound freight versus outbound freight. That balance has timing properties, geographic properties, and equipment properties. When there is an imbalance, driver downtime, empty miles, and other inefficiencies cost the company precious margin. An imbalance, if bad enough, can nullify a whole week's profit in the span of one day.

The timing properties relate to

- (1) the date and time of delivery of inbound freight and the time and date of shipping of outbound freight
- (2) The time and date of required delivery versus arrival time of the freight to destination (slack time between arrival and final delivery)
- (3) The time and date of required departure (does not always match outbound shipping date and time)
- (4) The transit time required, based on the intended or actual routing of the shipment

Geographic properties are:

- (1) The origin region of the shipment that is inbound to PQ, and the route it takes to arrive in PQ
- (2) The destination region of the shipment that is outbound from PQ, and the intended route it would take to arrive at destination.

Equipment properties are:

- (1) The requested trailer type for any order inbound or outbound from a particular region
- (2) The actual trailer type (that may be different than the requested trailer type) of a particular order inbound or outbound from a particular region
- (3) The resident inventory of trailers in PQ designed to support inbound and outbound freight and asset flow.

The Quebec (PQ) Region

The PQ region has a wide variety of inbound and outbound to and from many different regions of Bison's network. The balance is subject seasonal and other customer related fluctuations. Bison has a small local delivery fleet in PQ, as well as a fleet of highway drivers who reside in the region.

The challenge is to match freight and capacity better by day of week to ensure efficiency that will assist in profitability.

Desired Outcome

A forecast that clearly and accurately identified imbalances by timing and equipment type would clarify pending needs and provide focus for proactive problem solving. Proactive problem solving will drive the bottom line for the region. The foundation of the forecast is to match inbound and outbound date accurately, along with equipment type, and origin point of the inbound shipments to promote efficiency. The forecast should call out days when the match is poor, offering clarity for proactive steps to address the imbalance.

Prizes: \$250 to first team, \$150 to second place, \$100 to third place, to be presented in the form of gift cards.