

Ph.D. Dissertation Defense Announcement
Engineering Management and Systems Engineering

Dissertation Title: Profit Based Simulation Model for the Rail Transportation Industry

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Abstract

Schedules often conflict in the rail transportation industry. Operations managers assign resources and make scheduling decisions with no visibility of the revenue, cost, and profitability characteristics of the route they are manipulating. Transit speed decisions focus on ensuring trains safely reach their destination, on-time, with little regard given to the actual service needs of the customer. Although all customers want on-time deliveries, few actually pay a premium to garner this level of preferential treatment. Operating in this type of environment results in decisions that severely erode profits.

In this dissertation, a simulation model referred to as the Rail Profit Model (RPM) is developed to test three transit strategies that reveal how transit speed decisions impact supply chain and rail service provider profits, and lay the groundwork to challenge the cultural premise that the rail industry must behave like the trucking industry in order to thrive. In fact, the Rail Profit Model demonstrates that most trains should maintain most economical speed to maximize profits. The model also identifies specific scenarios where increasing speed to arrive on-time is the most profitable solution, contributing to the ability to leverage revenue management techniques to ensure customers pay an adequate premium that on-time delivery requires. Equipped with the Rail Profit Model, operations managers can now examine transit speed decisions and de-conflict competing resources to form recommended solutions that preserve maximum profits for the rail service provider and supply chain.