

Abstract

Intermodal Transportation has emerged as a new field in transportation research in the recent years, with the advent of containerized freight. It has become much easier to transfer loaded containers from one mode to another. In this light, Intermodal Terminals play a big role in making this transfer, between different transport modes, efficient both in terms of cost and time.

Depending on the demand, the locations of intermodal terminals play a major role in determining the financial benefits that can be extended to different entities involved in freight transportation. Researchers in this field have addressed the problem of identifying the locations of such terminals from different perspectives. In this dissertation, we aim to address the objectives of rail operators in opening Intermodal Terminals between road and rail networks. We assume that rail is owned by the government and therefore, it has to take into account the implications of the decision on other stake holders.

As demand originates and is destined to inland locations, containerized demand for rail is generated as a result of transportation decisions taken by Intermodal Operators. With the intent to maximize profits for rail, we, first, formulate a two step model to investigate and identify simple rules which can aid strategic decision making. We then extend the formulation to address the stakes of road and rail operators together.

We formulate arc based linear static models, involving binary and integer variables and use simulated demand data to solve the above mentioned problem. Rail transportation has an inherently complex structure (NP hard problems) that has been modeled in different ways in literature. We are able to investigate and conclude that it is possible to avoid most of the complexity in almost all cases and take decisions based on a simpler optimization model. We also point out the differences that arise in case of combined rail-road optimization and identify the conditions under which this model can still be used.