

Route Choice Characteristics of Owner-Operated Trucks on Southern California Freeways

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Project Objective

The goal of this project was to develop a full design of the stated preference survey. The research team defined the objective of the stated preference survey as to evaluate route choice characteristics used by owner-operated trucks when choosing from two or three different types of roads. To achieve the survey objectives, the project team members undertake the following derived objectives: (1) To identify and evaluate key factors through information gathering from literature surveys; (2) To construct the evaluation criteria hierarchy and calculate the relative weights of criteria through applying fuzzy AHP model; and (3) To achieve the final ranking results and summarize, compare, and compile the findings of truck routing choice characteristics and its improvement alternatives.

Problem Statement

In the growing population of Southern California, freeway congestion is becoming a severe problem. The increasing number of people using freeways has contributed to many problems including an increase in the frequency of traffic jams and the frequency of accidents. These problems largely impact the fluidity and efficiency of heavy truck operations, giving them higher overall costs, which in-turn affects the costs of the goods that they transport. In recent years, researchers have been steadily attempting to solve the problem of congestion, and this research is aimed at contributing to that by focusing on truck drivers and the costs that can be reduced for them, as well as for the community. Truck drivers almost always face dilemmas which require them to make decisions for best route choice. Drivers frequently ask themselves if they should proceed through downtown or avoid it? Should they choose this freeway over the other? Should they pay to use a toll road that may save time or wait in traffic? Daily trips having the same origin and destination often vary significantly among other. The presence of regular lanes, toll lanes, HOV lanes, and navigation devices offer truck drivers the option of several routes to choose from. A route choice preference study is one of the demand analysis processes which determine the number or percentage of preferences between zones made by owner-operated truck drivers. The selection of truck routes is complex, depending on factors such as the owner truck driver's income, the availability of transit service, and the relative advantages of each mode in terms of travel time, cost, comfort, convenience, and safety. Therefore, a driver's route choice model is needed to replicate the relevant characteristics of the truck operators, the transportation system, and the trip itself to obtain a realistic estimate of the number of trips by each mode for each zone pair. The VOT of trucks, which constitutes a considerable portion of the benefit items in the economic feasibility study for a new road, needs to be validated by going beyond a typical academic discussion.

Research Methodology

A preliminary interview survey was conducted with owner-operated truck drivers using eleven questions. The answers to all these questions provided us with some useful information regarding the sample population intended for the study and for the primary factors that were used in developing a survey instrument. A survey instrument was designed to ask owner-operated truck drivers for the key factors affecting their route choice characteristics. We collected survey data at the Long Beach site areas, and then analyzed survey data using the fuzzy analytic hierarchy process technique to identify the contemporary key factors affecting route choice decision making process. The critical factors identified from the second survey were used in developing a full design of the stated preference survey.

Results

This report presented evaluation results on key factors that affect route choice characteristics of owner-operated trucks in Southern California freeways. Unlike truck drivers who work for a company, owner-operated truck drivers need to make decisions when considering the best possible route for a trip since they have the liberty of choosing their own route and their value of time is dependent on numerous factors, rather than being dependent on their hourly wage. The most significant criterion was the route characteristics, and the alternatives under the route characteristics were travel time and reliability of on-time arrival characteristics. This outcome was not surprising because the variables of travel time and reliability of on-time arrival were the two variables that were most often considered in the related studies. Another factor that played a significant role within this criterion was safety, which was consistent with what was expected. The other factor was travel cost, reasonably as it is directly related to travel time. What was surprising was that the alternative of scheduled delivery (which was in the trip characteristics criterion) was so high in relation to all other alternatives, as this variable was only considered by few related studies; though it is reasonable for the drivers to adhere to their own set schedule. Additionally, the other alternatives within this criterion (behind schedule and congestion hotspot) would play a minor role, as these are related to whether a scheduled delivery time will be met. One explanation for these findings is that none of the related studies were conducted in Southern California highway systems specifically. Another explanation is that these truck drivers surveyed believe that these identified variables were important. Their opinions might suggest that further data collection is necessary to obtain a more accurate representation of the population.



Figure 1. Field survey with truck drivers

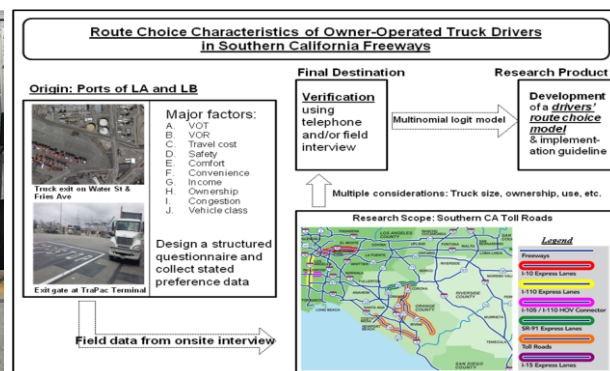


Figure 2. Research schemata