

Analysis of Vehicle Routing Problem with Stochastic Travel and Service Times: A Case Study

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Transportation is an essential driver of the supply chain; directly impacts both the responsiveness and efficiency therein. The decision of route selection based on the optimal travel time reduces the product delivery time and cost; enhancing customer satisfaction. This paper presents a case study identifying the optimal routes in a network consisting of 81 alternatives. Various sample data were collected in regards to travel time between adjacent nodes as well as the loading and unloading times for each node. A probability distribution function was identified using a curve fitting technique for each sample. Pro-Model simulation software was executed to determine the average travel time and standard deviation for all possible routes. The sensitivity analysis outcome illustrates that as the standard deviation of the travel time between adjacent nodes increases; the average travel time of the entire trip increases, standard deviation had no specific trend, and optimal route was subject to change.

Keywords: supply chain, vehicle routing, simulation modeling, statistical analysis

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