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New Jersey Department of Transportation
Bureau of Research

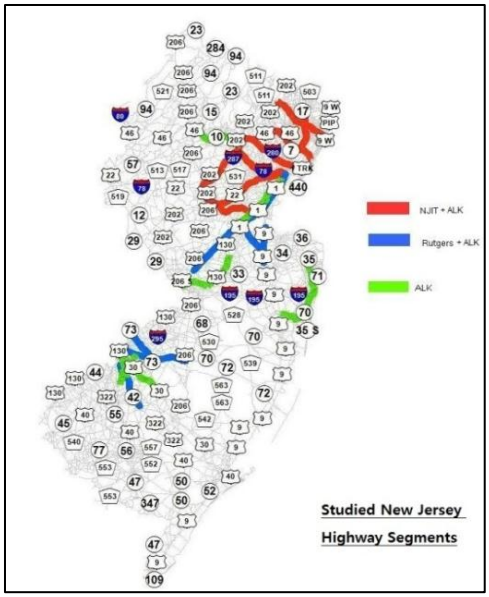
Technical Brief

Variability of Travel Times on New Jersey Highways

This study estimated a path and link travel time variability on selected New Jersey highways. The travel time data were collected from 6:15 A.M. to 8:15 A.M on weekdays between October 8, 2007 and April 21, 2008 with Co-Pilot™ GPS-based in-vehicle navigation devices. The reliability of travel time was estimated using the buffer index based on the 95th percentile travel time.

Background

The Variability of Travel Time (VTT) in transportation systems has been a focal point of many transportation agencies because it relates to the performance and the quality of service provided by the systems. The VTT is a consequence of travel behavior (departure time, route choice, and driving characteristics), of the road users (passenger cars, transit vehicles, and trucks), and the transportation network topology, geometry and traffic control. This report discusses the technologies for collecting travel time data, methodologies to process and analyze the collected data, the development of VTT measures as a component of mobility performance metrics, and the corresponding estimates on fifteen New Jersey highways.



Research Objectives and Approach

In order to (1) measure travel times for repetitive day-to-day trips in the A.M. peak period on 15 congested New Jersey highway segments, (2) determine good estimates of travel time reliability, and (3) identify roadways with high variability in day-to-day travel times, this research was started with conducting a comprehensive literature review, followed by developing plans for collecting data, collecting and processing data, and estimating the VTT and reliability indices (buffer indices) for the 15 studied New Jersey highways.

Findings

The main outcome of this study is a set of reliability indices and corresponding statistics for the studied highways for the morning peak period in 30-minute time intervals (from 6:15 A.M. to 8:15 A.M.), the 95th percentile travel time, and the corresponding buffer index. US 1 (Segment C) (I-295 to US 130) had the lowest 95th percentile buffer index of travel time while I-287(Segment A) had the highest 95th percentile buffer index of travel time. Thus, the travel time on US 1 (I-295 to US 130) was more reliable than the travel time for other studied highways in the A.M. peak of the weekdays.

The main findings of this study are:

- The highest mean travel speed (59.9 mph) for all records in the A.M. peak was observed on the segment of NJ 24 & I-78, while the lowest speed (28.3 mph) occurred on the segment of NJ 208 & NJ 4. For mean speed of each departure time period, the highest speed (68.4 mph) was found at 6:30 A.M. on I-287 (Segment B). The lowest speed (23.5 mph) occurred at 7:30 A.M. on the segment of NJ 70.

- The highest travel time coefficient of variation (CV=0.4) to the mean for all records in the A.M. peak was found on the segment of US 46 & NJ 3, while the lowest CV (=0.09) was observed on US 1 (Segment C).

- The greatest buffer index of the 95th percentile travel time (73.8%) for records in the A.M. peak occurred on the segment of US 46 & NJ 3, while the smallest buffer index (10.9%) was observed on US 1 (Segment C).

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A final report is available online at: http://www.state.nj.us/transportation/refdata/research/. If you would like a copy of the full report, send an e-mail to: Research.Bureau@dot.state.nj.us and request:

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