The Florida Reliability Method
In Florida's Mobility Performance Measures Program

Transportation professionals and elected officials in Florida are seeking new ways of measuring the performance of the transportation system in order to support investment decisions and policy analysis, as well as to assess new ways of providing transportation services for the citizens of Florida. Florida's Mobility Performance Measures describe the ease with which people and goods move throughout their community, state and world. Mobility is further described in terms of the quantity of travel served, quality of travel, accessibility and utilization of transportation systems. Travel time reliability is one of the measures used to describe the quality of travel.

Travel time reliability in Florida's Mobility Performance Measures Program is based on a benchmarking technique and is referred to as the Florida Reliability Method. The Florida Reliability Method was derived from the Department's definition of reliability of a highway system as the percent of travel on a corridor that takes no longer than the expected travel time plus a certain acceptable additional time. In this context, it is necessary to define the three major components of reliability:

1. Travel time - The time it takes a typical commuter to move from the beginning to the end of a corridor. Since speed is determined along each segment as the traveler moves through the corridor, this travel time is a function of both time and distance. This is representative of the typical commuter's experience in the corridor.
2. Expected travel time - The median travel time across the corridor during the time period being analyzed. The median is used rather than the mean so that the value of the expected travel time is not influenced by any unusual major incidents that may have occurred during the sampling period. These major incidents will be accounted for in the percentage of how often the travel takes longer than expected, but will not change the baseline to which that unusually high travel time is being compared.
3. Acceptable additional time- The amount of additional time (?), beyond the expected travel time, that a commuter would find acceptable during a commute. The acceptable additional time is expressed as a percentage of the expected travel time during the period being analyzed. Percentages of 5%, 10%, 15%, and 20% above the expected travel time are currently being considered. However, it is recommended that preference surveys be conducted to determine how much difference from the expected commute that a traveler would find acceptable.

The threshold when travel exceeds the acceptable additional time beyond the expected travel time is obtained using the following equation:

$$\text{Acceptable } TT = \bar{x} + \Delta$$

where:

$\bar{x}$ is the median travel time across the corridor during the period of interest; and

? is a percentage of the median travel time during the period of interest, used to establish the additional time beyond the expected travel time that a traveler would find acceptable.

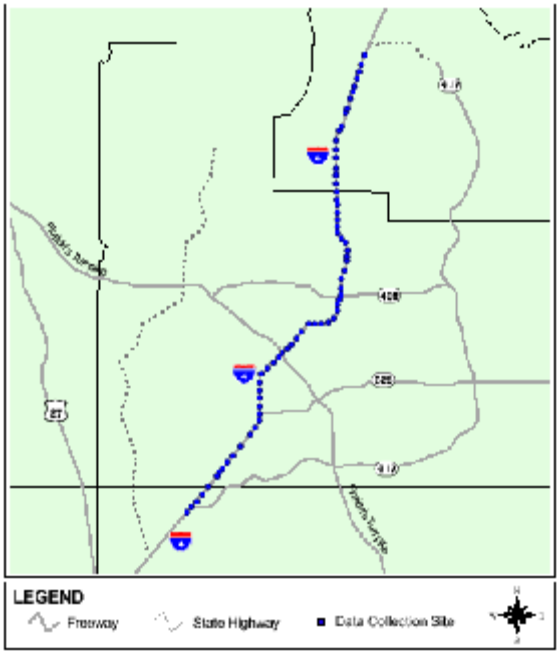
The percent of reliable travel is calculated as the percent of travel on a corridor that takes no longer than this acceptable travel time.

The data needed for travel time reliability can be derived from speed data collected through loops along a corridor equipped with an intelligent transportation system (ITS). If speed data are not available, travel times can be derived by estimating speeds using volume and lane occupancy data, or can be measured directly with the floating car technique. The following are recommendations regarding data collection for reliability measurement:

- Reliability should be measured for one peak hour (such as 5 to 6 PM) rather than the current peak period. This allows comparisons between facilities, and also enables annual monitoring of reliability on the same facility, since the peak period may change from year to year;
- The time interval for aggregating speed and volume should be less than the travel time under free-flow conditions.
- The optimum data collection period for the reliability measurement is a six-week period using data collected at intervals of five minutes or less;
- Data collected over a four-week period at 15-minute intervals is the minimum recommended to provide an adequate sample size.

The method outlined above was tested in several Interstate Highway corridors in Florida. These corridors varied in the levels of congestion and reliability observed. The following summarizes the reliability for the I-4 corridor in the Orlando area.

I-4 Corridor Map



Summary of Results (5:00 to 6:00 PM)

	NB	SB
Expected Travel Time (min)	43.1	37.6
Reliability @ 5% Delta	68%	57%
Reliability @ 10% Delta	78%	64%
Reliability @ 15% Delta	85%	78%
Reliability @ 20% Delta	86%	83%

Based on six weeks of sampling and 15 minute interval data on speed and volume from January 3, to February 11, 2000. Data was provided from the approximately 70 inductive loop sensors that support ITS along this corridor.

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