TRAVEL TIME RELIABILITY

The Science Behind "On-Time" Arrival

What Is Reliability?

Travel time reliability is a measure of a traveler's ability to reach a destination within an anticipated timeline relatively consistently. The travel time reliability of a roadway segment or corridor can be assessed using different approaches, including measures that estimate the additional travel time needed for disruptions or unexpected delays.

Why Is Travel Time Reliability Important?

Travel time reliability metrics can assess how the performance of a roadway changes amid unreliable travel conditions, such as fluctuating demand, crashes or other incidents, weather, events, and construction work zones. These metrics can also assess the effectiveness of operational improvements, which is crucial for planning and prioritizing projects.

Everyone is impacted by transportation system reliability. Unreliable travel can cause families to miss school and work, freight operators to miss loading and unloading windows, and public transit to fall off schedule. Travel time reliability tells travelers how much extra time they should budget into their trip to arrive at their destination on time, most of the time.

3.7 MILLION

DAYS OF PRODUCTIVITY

are lost annually due to unreliable transportation systems

Source: https://ops.fhwa.dot.gov/publications/fhwahop19062/index.htm#toc

Unreliable travel conditions can promote risky driver behavior, which can lead to traffic incidents and secondary crashes.

Source: https://ops.fhwa.dot.gov/publications/fhwahop19062/whyreliability.htm#link2

How Can We Improve Travel Time Reliability?

Defining and measuring reliability provides a strong foundation for improving transportation system travel time reliability. This translates the instinctual decision-making of commuters (such as a commuter leaving a few minutes earlier due to rain) into data that planners and decision-makers can evaluate and use as part of transportation planning and operations.

Planners and engineers use travel time reliability data to identify and prioritize the enhancements needed along corridors. When data indicates a roadway segment is becoming unreliable, the root causes are explored and the best solution to address the issue is employed. The Florida Department of Transportation (FDOT) reports historical reliability data for state roadways and the National Highway System (NHS) via the **FDOT Source Book**, accessible at http://fdotsourcebook.com/.

How Do We Measure Reliability?

For automobiles, travel time reliability can be represented as the ratio of a longer travel time to an expected travel time, or as a percentage of trips that meet a predetermined standard. These measures use field data captured on the roads as commuters traverse them to monitor the roadway's reliability.

Planning Time Index (PTI)

Planning Time Index (PTI) is a measure of the time a traveler should budget for a trip to ensure on-time arrival to their destination at least 95% of the time. This measure is calculated by dividing the time it takes 95% of vehicles to travel a road segment during peak travel times by the amount of time it takes 85% of vehicles to travel the same road segment during off peak times (called the reference travel time). A higher PTI indicates travelers need to set aside more time to ensure on-time arrival at their destination.

- Reference Travel Time = 12 minutes
- 95th Percentile Travel Time = 24 minutes
  PTI = 24/12 = 2.0

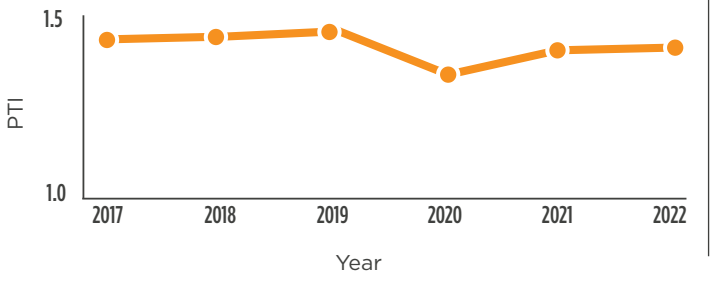
Level of Travel Time Reliability (LOTTR)

The Federal Highway Administration (FHWA) requires reporting reliability measures (PM3) as part of the Transportation Management Program, a strategic approach using system performance as a tool to make investment and policy decisions. This report is the percentage of miles traveled on reliable roads. A road is considered reliable if the Level of Travel Time Reliability (LOTTR) is less than 1.5 for all reporting time periods. LOTTR is calculated as the ratio of 80th percentile to 50th percentile travel times.

- 50th Percentile Travel Time = 18 minutes
- 80th Percentile Travel Time = 21 minutes
- LOTTR = 21 minutes/18 minutes = 1.2
  (1.2 is less than 1.5, so this is considered a reliable roadway.)

Peak Hour Planning Time Index (PTI) on State Highway System

Source: FDOT Source Book

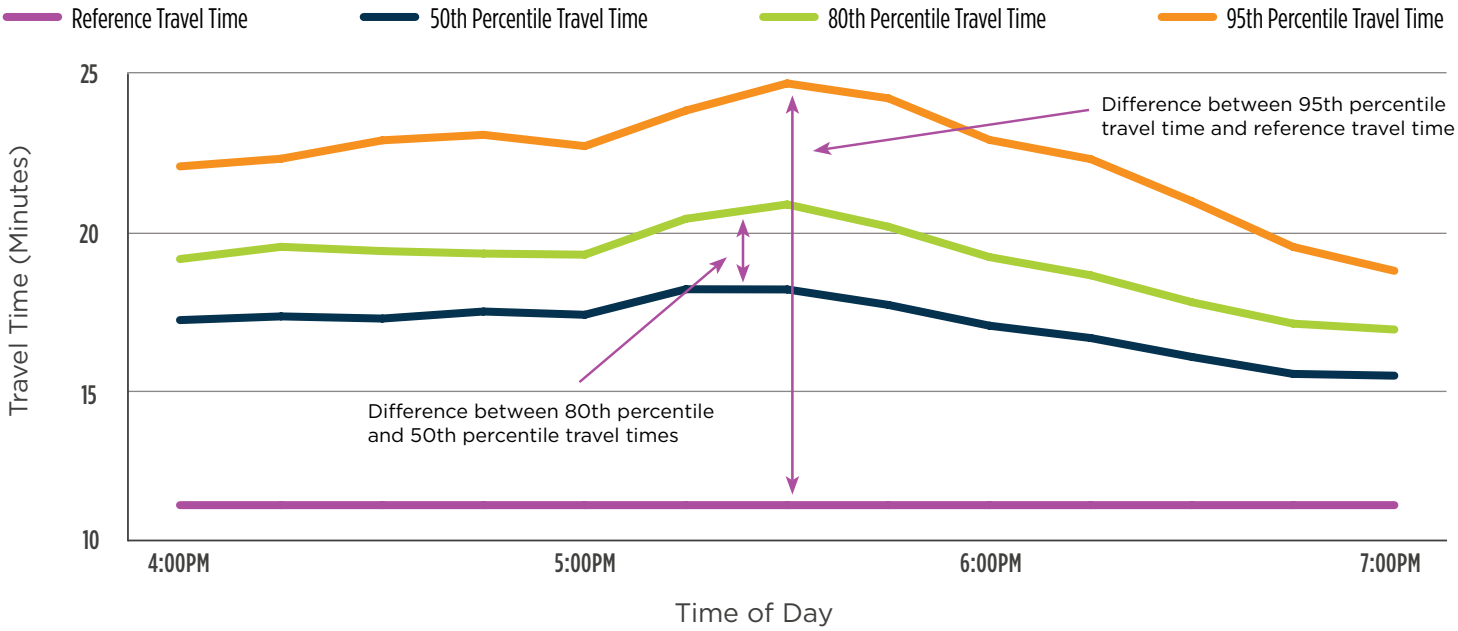


% of Person-Miles Traveled that are Reliable

Source: FDOT Source Book (2022)

85.7% of the Interstate National Highway System

92.1% % of the non-Interstate National Highway System



Source: HERE Analytics 2022