



FDOT MOBILITY MEASURES PROGRAM

Consensus Items

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Introduction

The Florida Department of Transportation (FDOT) has established the Mobility Measures Program (MMP) to develop and report on multimodal mobility performance measures. The objective of the program is to develop and regularly update measures, analytic and reporting techniques for measures in every mode (freight, auto/truck, transit, pedestrian, bicycle), and to ensure they are in accordance with state of the art practices and national guidelines related to mobility performance measurement.

The program can be described through several key components as follows:

- Purpose of a Mobility Measures Program
- Performance measures from a multimodal perspective
- Reporting and sources of data
- Roles of Central Office, Districts and Metropolitan Planning Organizations (MPOs)
- Definitions
- Future direction

The details of these components have been discussed (and continue to be discussed) with various groups including FDOT Central and District offices and MPOs throughout the state. This report documents the results of the consensus-building process in terms of agreed upon elements of the six key components above.

Consensus Items

The following items summarize the MMP and are for stakeholder consideration in future efforts.

Purpose of a Mobility Measures Program

The purpose of the MMP at FDOT is to:

- Develop statewide mobility measures for use by transportation and other partners across the state
- Ensure consistency in understanding and approach by the state and MPOs through a consensus-building process
- Comply with MAP-21/FAST Act requirements related to mobility measures
- Provide support in evaluating alternatives and prioritizing projects in planning and programming processes

The Forecasting and Trends Office within FDOT Central Office is responsible for reporting on the statewide measures annually through *The FDOT Source Book*. Other offices and MPOs are encouraged to use the measures and results in their own planning and programming processes.

Multimodal Mobility Measures

Multimodal mobility measures (MMM) represent one aspect of FDOT's overall performance measures program. A matrix of MMMs has been developed and will be updated as needed. The matrix includes freight and people components and is divided into four dimensions of mobility: quantity, quality, accessibility, and utilization. Appendix A contains the current measures that were reported in 2017. The current measures are shown for people (auto, transit, pedestrian, bicycle, aviation, rail and seaports) and freight (truck, aviation, rail, seaports.) The four dimensions stratify the measures and reporting periods (peak hour, peak period, daily and yearly) are indicated for each measure. An agency may wish to revise how the measures are reported, for example: vehicle miles traveled *per capita*.

Reporting of Mobility Information

Multimodal mobility measures for the State of Florida are currently reported in *The FDOT Source Book*. To meet the MAP-21/Fast Act requirements, FDOT will report the required measures to FHWA as indicated by rule.

The FDOT Source Book

The primary source of information and analysis is *The FDOT Source Book*, published annually. It is anticipated that MPOs and District offices will refer to and use it as a basis in their own reporting.

Measures are provided by facility and area types as appropriate. Most measures are reported for National Highway System (NHS), Interstate, State Highway System (SHS), and Strategic Intermodal System (SIS) by freeways and non-freeways and by state, urbanized areas, and non-urbanized areas.

For more information, please refer to [the Mobility Measures Program website](#).

In 2017, FDOT provided all MPOs with a state of the system analysis for their respective planning areas similar to *The FDOT Source Book*. Through this effort, the Metropolitan Planning Organization Advisory Committee (MPOAC), partner organizations, and other stakeholders are able to access these measures to report on the collective MPO system in Florida or specific regions. Ten performance measures were selected based on feedback from the MPOs and MPOAC staff. It is agreed that every year six core measures will be provided to all MPOs and four secondary measures will rotate from year to year.

MAP-21/Fast Act

On May 20, 2017, the Federal Highway Administration (FHWA) made effective the rule titled [Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program](#) (Starting on Page 196). Since this is the third and final rule on performance measures, it is commonly referred to as PM3. On October 5, 2017, FHWA published a notice of proposed rulemaking (NPRM) proposing the repeal of one of the measures from PM3 Rule - the Greenhouse Gas (GHG) measure. Thus, currently, to assess the performance of the National Highway System (NHS), the PM3 rule establishes two performance measures:

- Percent of Person-Miles Traveled on the Interstate System That Are Reliable
- Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable

To assess the performance of Freight Movement on the Interstate System, PM3 rule establishes one measure:

- Truck Travel Time Reliability

FDOT is required to report the above three performance measures to FHWA every two years starting in 2018. The first report – Baseline Performance Period Report due on or before October 1, 2018 – will report the performance measures using 2017 data. The second report – Mid Performance Period Progress Report on or before October 1, 2020 – will report the performance measures using 2019 data. MPOs are not required to report results directly to FHWA though PM3 measures are required to be included in their planning documents. It is the intent of FDOT to provide all required PM3 measures for each MPO.

Roles of Central Office, Districts and MPOs

FDOT and MPOs will be responsible for developing/reporting:

- Multimodal mobility measures
- Performance targets

- Performance reports

The consensus measures and definitions contained in this document are designed for use by all stakeholders.

The FDOT FTO Office will:

1. **Coordinate statewide efforts** on the Mobility Measures Program.
 - a. Lead the development and update of measures and analysis techniques
 - b. Be the primary/office source of mobility measures for Florida
 - c. Conduct and share research activities and District case studies through the State with all stakeholders
 - d. Engage other offices and support their data needs
 - e. Field technical questions from Districts and MPOs
2. **Produce and report on statewide MAP-21/FAST Act PM3 measures** – This will include the development of performance targets and performance plans. The reports and information will be provided to FDOT Central Office Transportation and Data Analytics Office for the Highway Performance Monitoring System, and to the MPOs directly (with a copy to the Districts). Coordination with Office of Policy Planning MPO Coordinator will also occur.
3. **Produce the annual FDOT Source Book** every December. The measures and reporting periods are shown in the 2017 MMP Matrix (Appendix A).
4. **Provide additional mobility measures** on a case-by-case basis (as requested).
5. **Assist districts, MPOs and program areas with mobility measures** at a more granular geographic level.
6. **Lead the development of mobility measure targets.**
7. **Develop and provide training.**

FDOT District Offices will:

1. **Provide input** to Central Office on the Mobility Measures program.
2. **Coordinate with MPOs and MPO Alliances.**
3. **Provide technical support.**
4. **Implement FDOT projects/programs** to fulfill federal and state goals/objectives and document those activities.
5. **Develop mobility measures** within and across districts, as appropriate or desired.
6. **Share mobility measure results and data** with other partners as appropriate.

MPOs will:

1. **Develop and use mobility measures**, as appropriate.
2. **Comply with MAP-21/FAST Act.**
 - a. Use calculated results provided by FDOT, if desired.
 - b. Choose to support FDOT targets or develop an MPO-level target.
 - c. Report to FDOT as required.
 - d. Coordinate with other MPOs, as appropriate.

Definitions

A set of MMM-related definitions is included in Appendix B. It is recommended these FDOT definitions be used for statewide consistency.

Future Direction

In addition to the roles and responsibilities listed above, FDOT Central Office will take the lead on the following activities:

- Continue to refine the mobility measures and coordinate with the stakeholder groups.
- Develop and deliver a Training and Users Guide on multimodal mobility measures and performance based planning.
- Coordinate development of mobility measure targets and address issues related to planning documents by other offices and timing.

2017 Mobility Measures Matrix

Mode	QUANTITY	Reporting Period				QUALITY	Reporting Period				ACCESSIBILITY	Reporting Period				UTILIZATION	Reporting Period			
		PH	PP	D	Y		PH	PP	D	Y		PH	PP	D	Y		PH	PP	D	Y
PEOPLE	Auto/ Truck	Vehicle Miles Traveled	X	X	% Travel Meeting LOS Criteria	X	X	X	Time Spent Commuting	X	% Travel Heavily Congested	X	X	X	X					
					% Miles Meeting LOS Criteria	X	X	% Miles Heavily Congested			X	X								
					Travel Time Reliability ■ On-Time Arrival ■ Travel Time Variability	X	X	X			Vehicles per Lane Mile	X								
		Person Miles Traveled	X	X	Vehicle Hours of Delay	X	X	X			Job Accessibility - Auto	X	Hours Heavily Congested	X	X					
					Person Hours of Delay	X	X	X												
					Average Travel Speed	X	X													
		Percent of non-SOV Travel		X	Number of Fatalities			X			Job Accessibility - Transit	X	Passenger Trips Per Revenue Mile		X					
					Number of Serious Injuries			X												
					Rate of fatalities/1,000 VMT			X												
	Transit		X	Revenue Miles			X	Revenue Miles between Failures	X	Weekday Span of Service		X								
				Passenger Trips			X			Resident Access to Transit		X								
										X	Job Accessibility - Transit		X							
	Pedestrian Bicycle			Pedestrian Level of Service		X	Pedestrian and bicycle - Fatalities and serious injuries		X	% Pedestrian Facility Coverage		X								
										% Bicycle Facility Coverage		X								
				Bicycle Level of Service		X				% Population within 1 mile of Bike Lane and Shared-Use Paths		X								
Aviation	Passenger Boardings			X	Departure Reliability			X			Demand to Capacity Ratios				X					
Rail	Passengers			X	Departure Reliability			X												
Seaports	Passengers			X																
FREIGHT	Truck	Combination Truck Miles Traveled		X	Travel Time Reliability ■ On-Time Arrival ■ Travel Time Variability	X	X	X			Truck Empty Backhaul Tonnage				X					
					Truck Miles Traveled			X			% Miles Heavily Congested	X	X							
		Combination Truck Tonnage			X	Combination Truck Hours of Delay					X	Vehicles per Lane Mile	X							
		Combination Truck Ton Miles Traveled			X	Combination Truck Average Travel Speed	X	X												
		Truck Value of Freight			X	Combination Truck Cost of Delay					X									
	Aviation	Tonnage			X															
		Value of Freight			X															
	Rail	Tonnage			X				Active Rail Access		X									
		Value of Freight			X															
	Seaports	Tonnage			X						X									
Twenty-foot Equivalent Units				X				Active Rail Access		X										
	Value of Freight			X																

Note:
 PH = Peak Hour; PP = Peak Period; D = Daily; Y = Yearly

Definitions

95th percentile travel time - the travel time that is higher than 94% of observations or equivalently lower than 4% of the average speed observations

Accessibility (a dimension of mobility) – conceptually the ease in engaging in activities; ability to reach desired destinations, activities, goods, and services – performance measures typically associated with this mobility dimension are:

- Time, distance or cost to reach a destination
- Modal choices/alternatives
- Connectivity
- Number of transfers (transit)

Auto (automobile) – a highway travel mode that includes motor vehicle traffic including motorcycles, passenger cars, and four tire, single units (FHWA Vehicle Category Classification, Classes 1- 3 (See Appendix D))

Auto/Truck – a combination of the auto and truck modes (FHWA Vehicle Category Classification Classes 1-13)

Average travel speed – the length of the highway segment divided by the average travel time of all vehicles traversing the segment, including all stopped delay times

Aviation – mode relating to the transportation of people and goods by aircraft

Benchmark – a common reference point used for comparisons for performance measures practices

Bicycle – a mode comprised of vehicles with two wheels tandem, propelled by human power

Bicycle Facility - a bicycle path physically separated from motorized traffic by an open space or barrier, either within the highway right-of-way or within an independent right-of-way, including bike lanes and shared-use paths

Bottleneck – a segment of a transportation network that consistently experiences significant operational problems such as oversaturated congestion

Bus – a highway travel mode operated by rubber-tired vehicles that follow fixed routes and schedules along roadways (FHWA Vehicle Category Classification Class 4)

Capacity (for auto/truck modes) – the maximum number of vehicles that reasonably can be expected to traverse a point or a uniform section of roadway during a given time period under prevailing conditions.

Combination truck – a truck consisting of a tractor and trailer (FHWA Vehicle Category Classification Classes 8-13)

Congestion (congested conditions) (for the auto/truck modes) – a condition in which traffic demand causes crowding of vehicles

Adjectives describing the severity of congestion are:

- Mild (for auto/truck modes on freeways) - a situation in which average travel speeds are in the range from 55-59 mph
- Moderate congestion (for auto/truck modes on freeways) - a situation in which average travel speeds are in the range from 45-54 mph
- Heavy congestion (for auto/truck modes on freeways) - a situation in which average travel speeds are in the range from 20-44 mph
- Severe congestion (for auto/truck modes on freeways) - a situation in which average travel speeds are below 20 mph

Adjectives describing the types of congestion are:

- Non-recurring (for auto/truck modes) – congestion caused by unexpected disruptions or other events, particularly lane blocking incidents
- Recurring (for auto mode) – the routine presence of congestion on a facility

Context measure – see Indicator

Corridor (for auto/truck modes) – (1) a set of essentially interrelated, parallel transportation facilities for moving people and goods between two points; (2) a geographic area used for the movement of people and goods; (3) highway, rail line, waterway, bikeway and other exclusive-use facilities that connect major origin/destination markets

Delay (for auto/truck modes) – (1) additional travel time beyond some norm (e.g., LOS C in urbanized areas, LOS B elsewhere) experienced by a traveler; (2) any additional travel time experienced by a traveler

Demand – the number of persons or vehicles desiring to use a mode or facility

Demand to capacity ratio – see volume to capacity ratio

Enplanements – passenger boarding at airports

Facility (for auto mode) – a length of roadway composed of points and segments

Free flow speed (for auto/truck modes) – the average speed of vehicles on a given segment, measured under low-volume conditions, when drivers are free to drive at their desired speed and are not constrained by the presence of other vehicles or downstream traffic control devices; typically 5 mph over the posted speed limit

Free flow time (for auto/truck modes) – the average time spent by vehicles traveling at the free flow speed over a facility length

Freeway – a multilane, divided highway with at least two lanes for exclusive use of traffic in each direction and full control of ingress and egress

Freight – any commodity being transported

Goal – the description of a desired outcome. The purpose toward which an endeavor is directed, integral to organization mission (e.g., provide safe and secure transportation across modes)

Heavy vehicle (truck and bus modes) – a vehicle meeting FHWA Vehicle Category Classification Classes 4-13.

Highway – a general term for denoting a public way for purposes of vehicular and people travel, including the entire area within the right-of-way

Highway modes – methods of motorized and non-motorized travel that may utilize a highway, specifically auto, bicycle, bus, pedestrian, and truck

Indicator (also known as context measure) – a type of mobility performance measure which is used to identify relevant background conditions and trends

Intermodal – related to the connection between two or more modes of transportation

Lane miles - the product of the centerline miles and the number of lanes

Level of service (LOS) – a quantitative stratification of the quality of service to a typical traveler of a service or facility into six letter grade levels, with “A” describing the highest quality and “F” describing the lowest quality

Mobility – the movement of people and goods

Mobility measure – a metric that quantitatively describes something about one of the four dimensions of mobility (quantity, quality, accessibility, utilization). Measures can be considered as one of two types:

- a mobility metric directly tied to achieving a goal or objective or used in a decision-making process; or
- an indicator or context measure which is used to identify relevant background conditions and trends

Mode – a means of moving people or goods

Motor carrier – a firm engaged in providing commercial motor freight or long-distance trucking

Multimodal – more than one travel mode including potentially the four highway modes (auto/truck, bicycle, bus/transit, and pedestrian), aviation, rail, and seaports

National Highway System (NHS) - the Interstate Highway System as well as other roads important to the nation’s economy, defense, and mobility

Objective – a specific, quantifiable statement that clearly relates to a goal; states a desired direction (e.g., reduce the rate of injuries)

On-time arrival - a travel time reliability performance measure defined by a designated travel time (typically, for freeways based on a 45-mph speed or 1.33 travel time index); conceptually represents a trip that arrives within a defined travel time

Paratransit (or demand response) - forms of transportation service that are more flexible and personalized than conventional fixed route, fixed schedule transit service; typically utilized to accommodate passengers who are older or disabled and unable to use the fixed route service

Passengers (for aviation, rail, seaports, transit modes) – people in a vehicle making use of a mode

Peak hour – (1) the hour in which the greatest amount of travel occurs (typically considered 5:00-6:00 p.m. on a weekday); (2) the hour in which the greatest amount of travel occurs for a mode

Peak period – (1) a multi-hour period in which travel is greatest and (2) for the auto mode in large urbanized areas, the two-hour weekday time period of 5:00-7:00 p.m. at which congestion is typically highest

Pedestrian - an individual traveling on foot

Performance-based planning – application of performance management principles to transportation system policy and investment decisions

Performance measure – a metric that quantifies an agency’s progress in meeting stated goals and objectives.

Planning time index - a travel time reliability performance measure defined by the ratio of an actual 95th percentile travel time to the free flow travel time. Conceptually represents the congested travel time travelers must spend compared to an uncongested travel time to arrive at their destination on time 95% of the time (a value of 3.00 indicates a traveler should allow 60 minutes to make an important trip that takes 20 minutes in uncongested traffic) (a.k.a., travel time variability by FDOT)

Quality (a dimension of mobility) - how well people or goods are being transported – performance measures typically associated with this mobility dimension are:

- Average travel speed
- Travel time reliability
- Vehicle delay
- Level of service

Quality of service – a user based perception of how well a service or facility is operating

Quantity (a dimension of mobility) – how much freight is moved and how many people are served – performance measures typically associated with this mobility dimension are:

- Person trips
- Person miles traveled
- Vehicle miles travel
- Truck miles traveled
- Tonnage

Rail - relating to the transportation of people and goods by train

Reliability – see travel time reliability

Seaport - relating to the transportation of people and goods by waterborne vessels

Single unit truck - a truck without a trailer (FHWA Vehicle Category Classification Classes 5-7)

Stable flow – a flow of traffic on freeways, which is not stop-and-go

Strategic Intermodal System (SIS) – Florida’s transportation system composed of facilities and services of statewide and interregional significance, including appropriate components of all modes

System – a combination of facilities or services forming a network or being selected for analysis

Target – a value of a performance measure representing the level of desired performance reflecting an agency’s goals and objectives

Throughput – the maximum number of people or vehicles that reasonably can be expected to traverse a point or a uniform transportation facility section during a given time period under prevailing conditions

Transit – a travel mode in which vehicles (including busses, streetcars, light rail, metro rail, and commuter rail) stop at regular intervals along the roadway or exclusive right-of-way to pick up and drop off passengers

Travel time – the total time spent getting from one point to another

Travel time index - a performance measure defined by the ratio of an actual travel time to the free flow travel time. Conceptually represents the congested travel time travelers must spend compared to an uncongested travel time

Travel time reliability – (1) the percent of trips that succeed in accordance with a predetermined performance standard for time or speed; and/or (2) the variability of travel times that occur on a facility or a trip over a period of time. Measures reported in Florida are:

- On-time arrival
- Planning time index or travel time variability

Travel time variability – see travel time reliability.

Truck – a vehicle engaged primarily in the transport of goods and materials (FHWA Vehicle Category Classification Classes 5-13; excludes “pick-up trucks”)

Twenty-foot equivalent unit – the eight-foot by eight-foot by twenty-foot intermodal container used as a basic measure for container cargo.

Urban - an area with a population of at least 5,000 people.

Urbanized area - an area with a population of at least 50,000 people.

Utilization (a dimension of mobility) – how much of the transportation system is used or available – performance measures typically associated with this mobility dimension are:

- Volume to capacity ratios
- Percent miles severely congested
- Percent travel severely congested

Vehicle – a motorized mode of transportation

Vehicle miles traveled (for auto/truck modes) – the total number of miles traveled by vehicles using a highway system

Volume to capacity ratio – the ratio of demand to capacity