State Freight Mobility Performance Measures

Doug McLeod
FDOT Planning Manager, Mobility Performance Measures
TRB Performance Measurement Committee
FHWA Primer Technical Working Group
Presentation Purposes

• Overview of
  – Mobility performance measures
  – Florida’s mobility performance measures statewide team
  – MAP-21 requirements and FHWA freight activities
  – Other FDOT freight activities

• FDOT’s current freight mobility performance measures
  – Relationship to MPO measures

• Discussion
Importance of Mobility

“Providing mobility for people and goods is transportation’s most essential function.”

Mobility performance measures
MPOAC survey

Freight/Goods Movement Topics of Interest (lowest score indicates highest rank)

<table>
<thead>
<tr>
<th>Performance measures</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight policies and legal issues</td>
<td>2.88</td>
</tr>
<tr>
<td>Freight success stories and lessons learned</td>
<td>3.13</td>
</tr>
<tr>
<td>Data collection and modeling</td>
<td>3.75</td>
</tr>
<tr>
<td>Public/private collaborations</td>
<td>4.00</td>
</tr>
<tr>
<td>Systems operations and maintenance</td>
<td>4.50</td>
</tr>
</tbody>
</table>
Florida DOT’s Perspective

Get out in front

“FDOT is committed to being leaders and innovators in this vitally important area of transportation management”

Positive

“We track progress toward meeting our own goals”

Supportive

Ananth Prasad
FDOT Secretary
Dimensions of Mobility

To adequately address mobility, **all four dimensions** should be emphasized and multiple performance measures used.
Quantity

How much
Quality

How good

How bad

SOFT SHOULDER
BLIND CURVES
STEEP GRADE
BIG TRUCKS
GOOD LUCK!
Accessibility
Capacity Utilization
Applicability to All Modes
MAP-21 Requirements

Moving Ahead for Progress in the 21st Century

USDOT wants States and MPOs to do performance based planning
ISTEA/TEA-21

Multimodal
Public Involvement

Performance Measures
MAP-21 National Goal Areas for the Federal Aid Highway Program

- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- **Freight Movement** and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays
Use of Performance Measures

Performance Based planning

Not area funding allocations

Application of performance management principles to transportation system policy and investment decisions
MAP-21 Mobility Performance Measures Schedule

- **USDOT Notice of Proposed Rulemaking**: October 2012
- **USDOT establishes measures**: December 2013
- **90 day comment period**: December 2014
- **Effective date of final rule**: 180 days December 2015
- **MPOs set targets**: December 2016
- **States set targets**: December 2017
- **90 day comment period**: 2018

*Notes:*
- 2017: Year for public comment period
- 2018: Year for implementation of final rule
States and MPOs must integrate performance plans into a performance-based process.
Performance Targets

States will set targets within 1 year after the final rule.

MPOs will set targets within 180 days after States set their targets.
Statewide Mobility Performance Measures Team Purpose

To provide guidance and support to FDOT and the state’s MPOs on multimodal mobility performance measures on reporting of internal and MAP-21 purposes

Consensus on approach and measures
Statewide Mobility Performance Measures Team Consensus

Consensus on approach and measures

Team makeup

Consensus document
  - FDOT, MPO roles
  - Recommended measures
  - Definitions

Meetings
FDOT TranStat’s Intent

FDOT will provide an analysis of all required MAP-21 mobility performance measures

- For the state as a whole (not by Districts)
- Each MPO (has the option to use or not)

Comparable measurements for road networks

- MAP-21 networks
- State Highway System
<table>
<thead>
<tr>
<th>Central Office</th>
<th>District Office</th>
<th>MPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinate statewide efforts on MPM Program</td>
<td>Produce and report on statewide MAP-21 measures</td>
<td>Produce additional MPMs</td>
</tr>
<tr>
<td>Produce annual TranStat Source Book</td>
<td>Lead development of targets and support MPOs</td>
<td>Develop and provide training in 2015</td>
</tr>
</tbody>
</table>
FDOT District Offices Roles:

Central Office:
- Provide input to Central Office on MPM program
- Implement FDOT projects/programs to implement Federal and State goals/objectives and document activities
- Develop own MPMs within districts, if appropriate
- Coordinate with MPOs and Regional MPOs
  - Provide MAP-21 mobility performance measure analyses developed by the Central Office
  - Provide technical support
  - Provide advice on setting goals and objectives
MPOs Roles:

• Comply with MAP-21
  – Use calculated results provided by FDOT, if desired
  – Report to FHWA as required
  – Develop performance targets
  – Include in LRTPs and Congestion Management Plans to evaluate alternatives, programming/prioritization of projects

• Develop own MPMs, if appropriate
• Coordination with other MPOs, if appropriate
MAP-21 National Goal Areas for the Federal Aid Highway Program

- Does not address mobility in general
- Not multimodal in scope
Thoughts on MAP-21 Mobility Performance Measures
FHWA’s Freight Primer

• Content
  – Standard practices and terms
  – Selecting the right analytical tool
    • Tools and techniques
  – Freight performance measures
    • Travel time reliability
    • Measuring freight accessibility
    • Measuring bottlenecks
  – Data sources
    • NPMRDS
    • Use of probe data
    • Other options
  – Investment strategies
  – Case studies
  – Freight transportation economic competitiveness and cost

• Schedule
  – Draft – Fall 2015
  – Final – Early 2016
Additional USDOT/FHWA Activities

• Freight Conditions and Performance Report
• North American Fluidity Concept and Implementation
• National Performance Measures Research Data Set (NPMRDS)
• Rulemaking
• Map-21 performance measures
  – Downplaying MAP-21 measures
  – Emphasis on consistency
  – Limited by legislation
    • Interstate only
    • Not multimodal
  – Daily values
  – 1/30/15 Notice of Proposed Rule Making
FDOT’s Primary Source for Mobility Performance Measures Reporting

http://www.dot.state.fl.us/planning/statistics/sourcebook/
Possible Freight Performance Measures

- Average hours of delay per day
- Consistency
- Buffer index
- Reliability
  - Average time between flights
- Average hours of congested conditions per day
- Average time between flights
- Accessibility - Shippers within 50 miles
- Travel Time Index
  - Urban hours of congested conditions per day
- Freight performance measures
  - Average travel time
  - Travel time
  - Shippers
  - Freight
  - Links
  - Urban
  - Travel
  - Time
  - Miles
  - Freight-significant
  - Index
  - Day
  - Congested
  - Time
  - Freight
  - Vehicles
  - Buffer
# Recommended Matrix of Multimodal Mobility Performance Measures

<table>
<thead>
<tr>
<th>Mode</th>
<th>Quantity</th>
<th>Quality</th>
<th>Accessibility</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auto/Truck</strong></td>
<td>Vehicle Miles Traveled</td>
<td>% Travel Meeting LOS Criteria</td>
<td></td>
<td>% Miles Severely Congested</td>
</tr>
<tr>
<td></td>
<td>Person Miles Traveled</td>
<td>% Miles Meeting LOS Criteria</td>
<td></td>
<td>% Travel Severely Congested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Travel Time Reliability</td>
<td></td>
<td>Hours Severely Congested</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Travel Time Variability</td>
<td></td>
<td>Vehicles Per Lane Mile</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td></td>
<td>Vehicle Hours of Delay</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average Travel Speed</td>
<td>Person Hours of Delay</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Transit</strong></td>
<td>Passenger Miles Traveled</td>
<td>Level of Service (LOS)</td>
<td>% Sidewalk Coverage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Passenger Trips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pedestrian</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bicycle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aviation</strong></td>
<td>Passengers</td>
<td>Departure Reliability</td>
<td>Highway Adequacy (LOS)</td>
<td>Demand to Capacity Ratios</td>
</tr>
<tr>
<td><strong>Rail</strong></td>
<td>Passengers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Seaports</strong></td>
<td>Passengers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Auto/Truck</strong></td>
<td>Combination Truck Miles Traveled</td>
<td>Travel Time Reliability</td>
<td></td>
<td>% Miles Severely Congested</td>
</tr>
<tr>
<td></td>
<td>Truck Miles Traveled</td>
<td>Travel Time Variability</td>
<td></td>
<td>% Travel Severely Congested</td>
</tr>
<tr>
<td></td>
<td>Combination Truck Tonnage</td>
<td>Combination Truck Hours of Delay</td>
<td></td>
<td>Hours Severely Congested</td>
</tr>
<tr>
<td></td>
<td>Combination Truck Ton Miles Traveled</td>
<td>Combination Truck Average Travel Speed</td>
<td></td>
<td>Vehicles Per Lane Mile</td>
</tr>
<tr>
<td><strong>Freight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aviation</strong></td>
<td>Tonnage</td>
<td></td>
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<td><strong>Rail</strong></td>
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<td><strong>Seaports</strong></td>
<td>Tonnage</td>
<td></td>
<td>Highway Adequacy (LOS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Twenty-foot Equivalent Units</td>
<td></td>
<td>Active Rail Access</td>
<td></td>
</tr>
</tbody>
</table>

**Reporting Periods:**
- **Peak Hour**
- **Peak Period**
- **Daily**
- **Yearly**

**Bold** = FDOT Map-21 Recommended Measure
**Italicized Grey Text** = Measures added for 2014
FDOT Freight Coordination

• Modal Office Coordination Team
• District Freight Coordinators
## Meaning of trucks

### FHWA Vehicle Classifications

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Motorcycles, 2- or 3-axle</td>
<td><img src="image1" alt="Motorcycle" /></td>
</tr>
<tr>
<td>2.</td>
<td>Passenger Cars, 2-axle, can have 1- or 2-axle trailers</td>
<td><img src="image2" alt="Car" /></td>
</tr>
<tr>
<td>3.</td>
<td>Pickups, Panels, Vans, 2-axle, 4-axle single units, can have 1 or 2-axle trailers</td>
<td><img src="image3" alt="Pickup" /></td>
</tr>
<tr>
<td>4.</td>
<td>Buses, 2 or 3-axle, full length</td>
<td><img src="image4" alt="Bus" /></td>
</tr>
<tr>
<td>5.</td>
<td>Single Unit 2-Axle Trucks, 2 axles, 4 tires (rear-tires), single unit</td>
<td><img src="image5" alt="Single Unit 2-Axle" /></td>
</tr>
<tr>
<td>6.</td>
<td>Single Unit 3-Axle Trucks, 3 axles, single unit</td>
<td><img src="image6" alt="Single Unit 3-Axle" /></td>
</tr>
<tr>
<td>7.</td>
<td>Single Unit 4 or More-Axle Trucks, 4 or more axles, single unit</td>
<td><img src="image7" alt="Single Unit 4 or More-Axle" /></td>
</tr>
<tr>
<td>8.</td>
<td>Single Trailer 3- or 4-Axle Trucks, 3 or 4 axles, single trailer</td>
<td><img src="image8" alt="Single Trailer 3- or 4-Axle" /></td>
</tr>
<tr>
<td>9.</td>
<td>Single Trailer 5-Axle Trucks, 5 axles, single trailer</td>
<td><img src="image9" alt="Single Trailer 5-Axle" /></td>
</tr>
<tr>
<td>10.</td>
<td>Single Trailer 6 or More-Axle Trucks, 6 or more axles, single trailer</td>
<td><img src="image10" alt="Single Trailer 6 or More-Axle" /></td>
</tr>
<tr>
<td>11.</td>
<td>Multi-Trailer 5 or Less-Axle Trucks, 5 or less axles, multiple trailers</td>
<td><img src="image11" alt="Multi-Trailer 5 or Less-Axle" /></td>
</tr>
<tr>
<td>12.</td>
<td>Multi-Trailer 6-Axle Trucks, 6 axles, multiple trailers</td>
<td><img src="image12" alt="Multi-Trailer 6-Axle" /></td>
</tr>
<tr>
<td>13.</td>
<td>Multi-Trailer 7 or More-Axle Trucks, 7 or more axles, multiple trailers</td>
<td><img src="image13" alt="Multi-Trailer 7 or More-Axle" /></td>
</tr>
<tr>
<td>14.</td>
<td>4 or more axles, single unit</td>
<td><img src="image14" alt="4 or More Axles, Single Unit" /></td>
</tr>
<tr>
<td>15.</td>
<td>Single Unit 2-Axle Trucks, 2 axles, 4 tires (rear-tires), single unit</td>
<td><img src="image15" alt="Single Unit 2-Axle" /></td>
</tr>
<tr>
<td>16.</td>
<td>Single Unit 3-Axle Trucks, 3 axles, single unit</td>
<td><img src="image16" alt="Single Unit 3-Axle" /></td>
</tr>
<tr>
<td>17.</td>
<td>Single Unit 4 or More-Axle Trucks, 4 or more axles, single unit</td>
<td><img src="image17" alt="Single Unit 4 or More-Axle" /></td>
</tr>
<tr>
<td>18.</td>
<td>Single Trailer 3- or 4-Axle Trucks, 3 or 4 axles, single trailer</td>
<td><img src="image18" alt="Single Trailer 3- or 4-Axle" /></td>
</tr>
<tr>
<td>19.</td>
<td>Single Trailer 5-Axle Trucks, 5 axles, single trailer</td>
<td><img src="image19" alt="Single Trailer 5-Axle" /></td>
</tr>
<tr>
<td>20.</td>
<td>Single Trailer 6 or More-Axle Trucks, 6 or more axles, single trailer</td>
<td><img src="image20" alt="Single Trailer 6 or More-Axle" /></td>
</tr>
<tr>
<td>21.</td>
<td>Multi-Trailer 5 or Less-Axle Trucks, 5 or less axles, multiple trailers</td>
<td><img src="image21" alt="Multi-Trailer 5 or Less-Axle" /></td>
</tr>
<tr>
<td>22.</td>
<td>Multi-Trailer 6-Axle Trucks, 6 axles, multiple trailers</td>
<td><img src="image22" alt="Multi-Trailer 6-Axle" /></td>
</tr>
<tr>
<td>23.</td>
<td>Multi-Trailer 7 or More-Axle Trucks, 7 or more axles, multiple trailers</td>
<td><img src="image23" alt="Multi-Trailer 7 or More-Axle" /></td>
</tr>
</tbody>
</table>
Matrix Freight Truck Measures

Quantity

- Combination Truck Miles Traveled
- Truck Miles Traveled
- Combination Truck Tonnage
- Combination Truck Ton Miles Traveled

Quality

- Travel Time Reliability
- Travel Time Variability
- Combination Truck Hours of Delay
- Combination Truck Average Travel Speed

Utilization

- % Miles Severely Congested
- Vehicles Per Lane Mile
- Combination Truck Backhaul Tonnage
FDOT Draft MAP-21 Freight Recommendations

- Combination truck miles traveled
- Travel time reliability
- Combination Truck Delay
- % miles severely congested
Matrix Freight, Aviation, Rail, Seaports Measures

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aviation</strong></td>
<td></td>
</tr>
<tr>
<td>Tonnage</td>
<td>Highway Adequacy (LOS)</td>
</tr>
<tr>
<td><strong>Rail</strong></td>
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<tr>
<td>Twenty-foot Equivalent Units</td>
<td>Active Rail Access</td>
</tr>
</tbody>
</table>
Possible New Freight Measures

Freight values

Truck level of service

Aviation connections
Freight Mobility and Trade Plan Policy Element (2013)

2. Increase Operational Efficiency of Goods Movement
3. Minimize Costs in the Supply Chain
4. Align Public and Private Efforts for Trade and Logistics
5. Raise Awareness and Support for Freight Movement Investments
6. Develop a Balanced Transportation Planning and Investment Model That Considers and Integrates All Forms of Transportation
7. Transform the FDOT’s Organizational Culture to Include Consideration of Supply Chain and Freight Movement Issues
Freight Mobility and Trade Plan Investment Element (2014)

Florida Freight Project Needs by Mode

- **Highway**: $26.3 Billion (83%)
- **Rail**: $1.4 Billion (4%)
- **Air**: $1.1 Billion (3%)
- **Spaceport**: $0.6 Billion (2%)
- **Seaport**: $2.5 Billion (8%)
## Freight Mobility Performance Measures

<table>
<thead>
<tr>
<th>Mode</th>
<th>Performance Measure</th>
<th>Mobility</th>
<th>Reporting Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>Combination Truck Miles Travelled</td>
<td>Quantity</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Truck Miles Traveled</td>
<td>Quantity</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Travel Time Reliability</td>
<td>Quality</td>
<td>Peak Period</td>
</tr>
<tr>
<td></td>
<td>Travel Time Variability</td>
<td>Quality</td>
<td>Peak Period</td>
</tr>
<tr>
<td></td>
<td>Combination Truck Hours of Delay</td>
<td>Quality</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Combination Truck Average Travel Speed</td>
<td>Quality</td>
<td>Peak Hour</td>
</tr>
<tr>
<td></td>
<td>% Miles Severely Congested</td>
<td>Utilization</td>
<td>Peak Hour</td>
</tr>
<tr>
<td></td>
<td>Vehicles Per Lane Mile</td>
<td>Utilization</td>
<td>Peak Hour</td>
</tr>
<tr>
<td>Aviation</td>
<td>Tonnage</td>
<td>Quantity</td>
<td>Yearly</td>
</tr>
<tr>
<td>Rail</td>
<td>Tonnage</td>
<td>Quantity</td>
<td>Yearly</td>
</tr>
<tr>
<td>Seaport</td>
<td>Tonnage</td>
<td>Quantity</td>
<td>Yearly</td>
</tr>
<tr>
<td></td>
<td>Truck Equivalent Units</td>
<td>Quantity</td>
<td>Yearly</td>
</tr>
</tbody>
</table>
Freight Mobility and Trade Plan Investment Element

- Chapter 1 Introduction and Freight Goals
- Chapter 2 Freight System Performance and Issues
- Chapter 3 Florida Freight Network and Florida Freight Project Definition
- Chapter 4 Prioritization Process
- Chapter 5 Florida Freight Project Needs
- Chapter 6 Funding, Financing, and Next Steps
Other FDOT Central Office Freight Initiatives

- Freight and logistics overview by county
- Commodity Information Management System

- Truck commodity movement
  - Commodity type
  - By mode
Other TranStat Mobility Performance Measures Task Work Orders

• Under way
  – Trip
  – Last mile
  – Corridors
  – NHS/SIS connectors
  – Use of probe data
  – Outreach plan / coordination
  – Testing of travel time reliability products
  – Southeast Florida testing of measures

• Soon to be underway
  – Target setting
  – Freight performance metrics development
Freight Performance Metrics

Development Scope

**Network Measures**
- Develop systemwide measures like
  - Commercial vehicle delay costs
  - Commercial vehicle fuel costs

**Supply Chain Measures**
- Develop methodology and measures
  - At the corridor level
  - Like truck delay per mile for selected corridors
Freight Performance Metrics
Development Scope

Truck travel time reliability
• Based on actual truck speeds

Truck service measure
• Emphasizing a facility’s ability to accommodate trucks

Possibly a freight dashboard
• Collection of performance measures
• Paint an overall picture of freight mobility in Florida
Presentation Purposes

• Overview of
  – Mobility performance measures
  – Florida’s mobility performance measures statewide team
  – MAP-21 requirements and FHWA freight activities
  – Other FDOT freight activities

• FDOT’s current freight mobility performance measures
  – Relationship to MPO measures

• Discussion