Technical Methods

Part 2

Performance Measurement in Transportation Planning
“Leading for results means that performance must be planned, not just reported”
Learning Objectives

Describe a sample technical process for developing performance measures
Understand appropriate applications
Identify potential analysis techniques
Identify data needs
Examine noteworthy practices
Sample Technical Process for Developing Performance Measures

1. Select Appropriate Application
2. Link to Goals and Objectives
3. Select Performance Measures
4. Identify Data Needs
5. Identify Analytical Tools
6. Report Results
1. Select Application

Establish planning context and scale
Relate performance measure computations to metropolitan or statewide plan/TIP implementation, etc.
Develop in a cooperative fashion
Establish Advisory Committee or Task Force to guide technical process
For example: Minnesota DOT
## Performance Planning Framework

<table>
<thead>
<tr>
<th>What is the Desired Societal Outcome?</th>
<th>What is the Desired Agency Result?</th>
<th>How Can the Agency Make a Difference?</th>
<th>How Can A Unit Make a Difference?</th>
</tr>
</thead>
</table>

**WHY?**

**HOW?**
2. Link Measures to Goals and Objectives

Develop clear definitions for
- “goals”, “smart objectives”, etc.

Establish standards
- A desired achievement or target (i.e., setting the bar)

Select broad categories of relevance to planning
- Accessibility, mobility, safety, environment, operations, etc.
Setting Performance Targets

- Targets are based on:
  - Past performance
  - Performance of peers
  - Performance standards
  - Service/Industry benchmarks
  - Market research
What Do DOTs Commonly Measure?

- Mobility and Congestion
- Safety
- Quality of Life
- Environment
- Economic Development
- System Preservation
- Project Delivery
- Maintenance

Source: Measuring Performance among State DOTs; AASHTO, March 2006.
What Measures Do They Often Use?

- Delay
- Extent of Congestion
- Incident Duration
- Speed
- Throughput
- Travel Time
- Travel Time Reliability
The Quandry with Performance Measures!

**Cartoon Text:**

1. Why are we using 75 different metrics to track performance? We should only look at the top 5.
2. OK, which ones are the top 5?
3. Let's pretend we never had this conversation.
3. Select Measures

Be measurable and provide for cost-effective data collection
Have a clear and intuitive meaning
Be comparable across time and geographical areas (modes, facilities, corridors, subareas)
Have a relationship to actual system performance
Facilitate periodic refinement
### Table 16: Linkage of Performance Measures to Objectives

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Performance Measure</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 - Rehabilitate and/or reconstruct existing road and bridge facilities where necessary, and continue to maintain existing facilities.</td>
<td>Number of road and bridge rehabilitation projects programmed and accomplished.</td>
<td>Regional Transportation Improvement Program (RTIP); Regional Transportation Plan (RTP); Trinity County DOT; Caltrans District 02</td>
</tr>
<tr>
<td>1.1.2 - Provide reliable all-weather access to all developed communities of the county.</td>
<td>Number of communities with alternative access routes, and number of projects programmed and implemented to improve</td>
<td>Regional Transportation Improvement Program (RTIP); Regional Transportation Plan (RTP); Trinity County DOT;</td>
</tr>
<tr>
<td>1.2.3 - Provide safe passing zones on State highways and county roads.</td>
<td>Number of passing zones on highways and county roads.</td>
<td>Accident data from Trinity County DOT, Caltrans District 02, and CHP; General Plan Circulation Element; Regional Transportation Plan (RTP)</td>
</tr>
</tbody>
</table>
4. Identify Data Needs

Generated by performance measures

- Operations measures require traditional data, such as traffic counts, travel time studies, etc.
- Outcome oriented measures (e.g., reliability) may require more innovative or spatial GIS data

Tempered by cost and resources

Updated and collected on a periodic basis
Data Analysis Tips

Start simple
Examine trends and comparisons
Build on existing data
Use spreadsheets before investing in expensive software packages
Let’s Take a Closer Look at One Measure....
1. Data Definition
Example

BWI Revenue per Enplaned Passenger

Terms
- Revenue – revenue paid or due the Maryland Aviation Administration from BWI Airport
- Enplaned passengers – passengers that board an aircraft at BWI, even if such passengers previously disembarked from another aircraft

Method of Calculation
- Divide revenues as defined by total number of enplaned passengers
2. Data Documentation

- Data location – where is it?
  - Electronic files
  - Hard copy
  - Third party

- Data owner – who entered the data?
  - Primary contact
  - Secondary contact
3. Control Procedures: Ability to Replicate the Data

- Input control = data collection
  - Verify that data was accurately collected (i.e., written guidance for data collection and calculation and training)

- Process control = data analysis
  - Verify that analysis and calculation of the performance measure is accurate (i.e., periodic review of measure calculation, such as Excel formulas and database language)

- Review control = review process
  - Verify that performance measure data has been reviewed for accuracy (i.e., internal review or formal quality assurance/quality control process)
4. Program Performance

Why did performance change over the last fiscal year?

Example – BWI Revenue per Enplaned Passenger

Action taken
- Awarded a new food service, retail, and consumer services concession contract

Challenges faced (operational, resource, data, other)
- Resource – Increased operating costs
- Other – Regional airport competition
Example – MDOT (cont.)

5. Strategies

What are future performance strategies?

Example – BWI Revenue per Enplaned Passenger

Strategies (new, ongoing)

- Ongoing – initiate parking strategies to increase long-term and overnight parking revenues

Challenges faced (operational, resource, data, other)

- Other – remain poised to take advantage of airline industry recovery while remaining sensitive to our low-cost airport creed
5. Identify Analytical Tools

Spreadsheets

Regression and Cost/Benefit Analyses

Models

• Travel Demand Forecasting (metropolitan and statewide)

• Microsimulation (Synchro, Paramics, CorSim, etc.)
Survey Tools

Travel Surveys

- Activity surveys
- External Station surveys
- Transit onboard surveys
- Truck surveys
- Employer surveys
- Special Generator surveys
- Parking Surveys
6. Report Results

Be clear and concise

Tailor information to target audience – in general, information should increase moving down from decision makers to managers and planners

Simplify and visualize for the public

Establish reporting cycle – annual vs. other time frame
2009 Annual Attainment Report on Transportation System Performance

Implementing the Maryland Transportation Plan & Consolidated Transportation Program

Martin O’Malley, Governor
Anthony G. Brown, Lt. Governor
John D. Porcaro, Secretary
SYSTEM PRESERVATION & PERFORMANCE

OBJECTIVES:
- Preserve and maintain the existing transportation network
- Maximize operational performance and efficiency of existing systems

For example, Maryland uses access management techniques to increase capacity, maximize performance, and reduce congestion on Maryland’s transportation network. Increasing spacing between signals and interchanges, implementing exclusive turn lanes, and encouraging land use policies that limit access to highways are just a few access management strategies the Modal Administrations and MDTA have employed.

KEY INITIATIVES:
- MDOT: Utilizes the Capital Program Management System (CPMS), a software database that allows agencies to identify and track capital project work schedules, cash flows, and expansion & preservation categories.
- MAA: Focuses on advertising and awareness campaigns to passengers on the advantages and options BWM Marshall provides, such as parking, concessions, and transit options.
- MPA: Improves the reliability of Saagr Yard Crane’s GPS auto steering system by incorporating new software.
- MTA: Supports Commuter Choice Maryland, a comprehensive online commuting resource guide that offers tax-free commuter benefits and cost savings to attract transit ridership.
- MDTA: Connects I-95 Express Toll Lanes™ and the Intercounty Connector to relieve congestion north of Baltimore.
- MWA: Promotes MWA, an online store where customers can conduct business, such as license and registration renewals, without visiting an MWA location.
- SHA: Participates in the I-95 Corridor Coalition, an alliance of transportation agencies, toll authorities, and rail organizations aimed at coordinated strategies to improve network performance throughout the I-95 Corridor.

Maryland’s transportation network is a valuable asset to the State’s economy. Therefore, preserving and maintaining the existing infrastructure is MDOT’s first priority and planning priority. The State continues to optimize performance by prioritizing investments that provide the best return. Key to this approach is extending the useful life of existing facilities and equipment before undertaking costly capacity expansion projects. Given the rising costs of materials, construction, and fuel, implementing innovative solutions to achieve operational efficiencies is critical to meeting user demand and facilitating the seamless movement of people and goods around the State.

Routine maintenance, such as roadway resurfacing, engineering safety improvements, and equipment replacements, is essential to preserving transportation infrastructure assets. Maryland’s transportation agencies continue to identify new maintenance solutions and value-added technologies to improve performance across existing modal infrastructure.
Communication – Virginia DOT

http://dashboard.virginiadot.org/
MPOs are in on the Action too!!
The Regional Indicators Project is part of CMAP’s innovative GO TO 2040 comprehensive planning campaign. In order to develop and evaluate strategies for implementing the GO TO 2040 Regional Vision, CMAP is collaborating with The Chicago Community Trust to create indicators for predicting and measuring economic, environmental, social, and cultural variables that affect quality of life.

An indicator is a quantitative measure that describes an economic, environmental, social or cultural condition over time. Examples include the unemployment rate, infant mortality rates, number of new business start-ups, or air quality indexes.
San Francisco MPO - Metropolitan Transportation Commission
http://www.mtc.ca.gov/planning/2035_plan/index.htm

Three Es Guide Transportation 2035 Vision

**Economy**
- Maintenance and Safety: Improve Condition of Assets, Reduce Collisions and Fatalities
- Reliability: Reduce Delay

**Environment**
- Clean Air: Reduce Vehicle Travel
- Climate Protection: Reduce Emissions

**Equity**
- Equitable Access: Improve Affordability
- Livable Communities: TBD
Dallas-Fort Worth MPO - North Central Texas COG
Regional Performance Summary of Congestion Measures

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2030 Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Miles of Travel</td>
<td>151,392,421</td>
<td>241,219,970</td>
</tr>
<tr>
<td>Vehicle Hours Spent in Delay</td>
<td>1,026,960</td>
<td>1,697,274</td>
</tr>
<tr>
<td>(daily)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Increase in Travel Time due</td>
<td>34.32%</td>
<td>36.87%</td>
</tr>
<tr>
<td>to Congestion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Cost of Congestion</td>
<td>$4.2</td>
<td>$6.6</td>
</tr>
<tr>
<td>(billions)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

http://www.nctcog.org/trans/mtp/2030/
Savannah MPO – medium size example

SAFETY and Security GOAL - Increase the safety and security of the transportation system for motorized and non-motorized users.

Goal 2 Objectives
• Minimize frequency and severity of vehicular accidents
• Promote projects which aid in hurricane evacuation
• Eliminate at-grade rail crossings
• Expand transit service area and increase service frequency

Goal 2 Performance Measures
• Total accidents per million miles traveled
• Injury accidents per million miles traveled
• Fatal accidents per million miles traveled
• Hurricane evacuation route status
• Transit/other safety projects

Savannah MPO 2030 LRP
Here’s a wonderful resource......

Report 446
“A Guidebook for Performance-Based Transportation Planning”
Transportation Research Board
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_446.pdf
Resources


Rural Transportation Performance Measures

I-95 Corridor Coalition Performance Measures Course (online)
http://www.i95coalition.org/i95/Training/PerformanceMeasuresCourse/tabid/92/Default.aspx
SHRP2 Highway Research Product

SHRP2 (Strategic Highway Research Program)

Project Number C02

System-Based Performance Measurement Framework or Highway Capacity Decision Making in a web-based tool

http://shrp2webtool.camsys.com
Enhance Performance through Collaboration!!
Questions?
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