

Travel Models and the Application of Performance Measures: MPO Experiences

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Presentation Outline

- Update on project status and methodology
- Agency website findings
- Additional results of survey of MPOs
- Conclusions

Introduction

- Study began in 2014 in response to MAP-21 requirements related to performance measures.
- Methodology:
 - Literature review
 - MPO website review
 - Online survey of MPOs
- Updated in 2016 to determine changes in practice/applications.

Introduction

- Study Objective
 - Investigate how MPOs nationwide use or are planning to use regional travel demand models to aid in addressing the pertinent performance measure requirements of MAP-21/FAST Act.

Agency Website Findings

- 290 MPO websites and LRTPs reviewed
- Each examined to determine
 - Whether or not performance measures were explicitly addressed in the current plan,
 - To identify the performance measure categories where travel model outputs were used (if possible), and
 - To identify the specific model outputs used in performance measure evaluation

Findings of Review of Agency Websites

Performance Measure Category	Number of Agencies Using Travel Model for Performance Measure Assessment			
	MPO Population Served			
	50,000- <200,000	200,000- <500,000	500,000- <1,000,000	>1,000,000
Pavement Conditions	6	11	3	5
Reliability, Efficiency, and Access	32	30	20	20
Bridge Conditions	11	8	5	6
Fatalities and Serious Injuries	29	21	14	14
Congestion	36	35	21	25
Mobile Source Emissions	16	15	8	14
Freight Movement	8	11	7	6

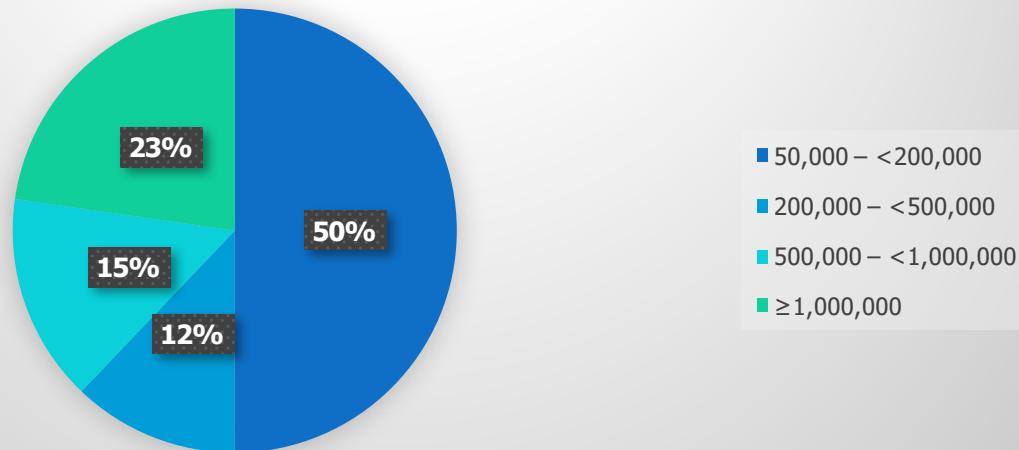
National Survey Methodology

- Questionnaire consisting of fourteen questions developed in SurveyMonkey.com on January 3, 2014, re-issued December 2015-January 2016.
- Questions addressed:
 - MPO size
 - Model type
 - Modes considered within the model
 - Use of models to address performance measure requirements
 - Consideration of multiple scenarios
- Invitation to participate in survey sent to the 384 MPOs in the database.
- Reminder message sent to non responding MPOs.

Results of National Survey

- Number of MPOs that completed the survey: 66
 - Survey response rate is about 18%
 - Responding MPOs located in 30 states that have representation in each of the major geographic regions of the US

What is the population of the region your MPO is responsible for?



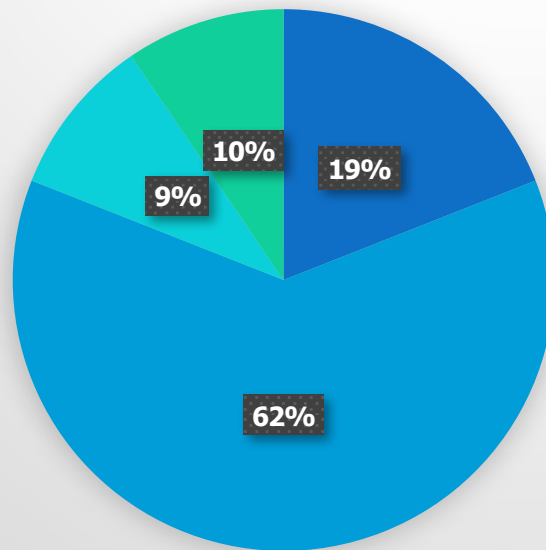
Results of National Survey

What transportation modes are considered in your long range regional transportation plan?

Answer Options	Response Percent	Response Count
Private vehicle	100.0%	63
Carpool/Vanpool	68.3%	43
Commercial vehicle	74.6%	47
Bicycle/pedestrian	87.3%	55
Bus transit	87.3%	55
Rail transit	57.1%	36
Other (please describe)	17.5%	11
	answered question	63
	skipped question	3

Results of National Survey

What type of regional passenger travel demand model does your MPO use in plan development?



- Three-step urban transportation model system (excludes the mode choice step)
- Four-step urban transportation model system
- Activity-based model
- Other (please describe)

Results of National Survey

Developing Estimates of Non-motorized Demand

- 36% do not estimate demand for non-motorized modes
- 9% could not provide any details because modeling is not done in-house
- 25% use multinomial logit or nested-logit model
- 27% use a pre-distribution mode split model (either direct generation or trip end mode split)
- 3% estimate through discussion with professional planners

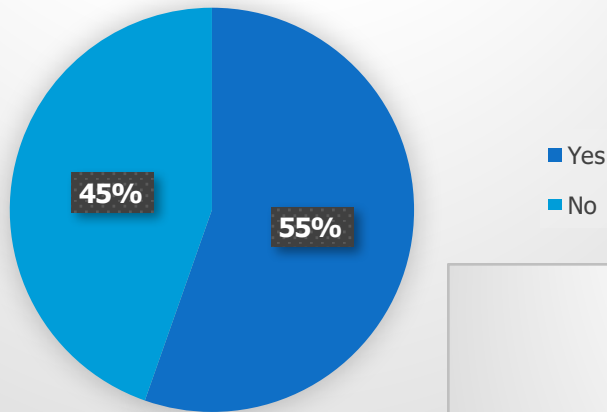
Results of National Survey

Developing Estimates of Public Transit Demand

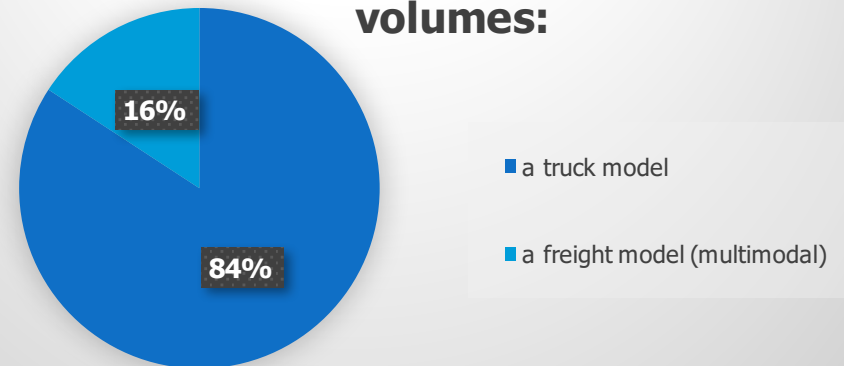
- Of the 55 MPOs that plan for the public transit mode in their LRTP, 45 of them use a competitive model for estimating transit demand
- 9 of these 45 MPOs provided a bit more detail on their model
 - 78% use a multinomial logit or nested-logit model
 - 22% use a pre-distribution mode split model

Results of National Survey

Does your MPO have a freight or truck model?



Which of the following models does your MPO use in forecasting truck volumes:



Results of National Survey

In which of the following performance-measure categories does your MPO use/plan to use regional TDMs?

Answer Options	Response Percent	Response Count
Pavement condition on the Interstate System and on remainder of the National Highway System (NHS)	20.3%	12
Performance (reliability, efficiency, access) of the Interstate System and the remainder of the NHS	45.8%	27
Bridge condition on the NHS	13.6%	8
Fatalities and serious injuries—both number and rate per vehicle mile traveled--on all public roads	33.9%	20
Traffic congestion	88.1%	52
On-road mobile source emissions	52.5%	31
Freight movement on the Interstate System	28.8%	17
Other (please describe)	28.8%	17
answered question		59
skipped question		7

Results of National Survey

How will Model Results be used?

- *Measure congestion via v/c ratios*
- *Modeling results will be used to identify strategies or policies that would help the region meet its targets.*
- *We will use our TDM for traffic congestion and mobile source emissions. We have other models (i.e., an Asset Management Model that predicts pavement conditions that may help to measure performance for some of these other categories. We also use the Highway Safety Manual, which can be used to predict the locations of fatalities and serious injuries.)*
- *It's uncertain at this time. The model might not be used as much as many might think because it does not measure the current reality. It will play a role in target setting, and testing of scenarios to see how realistic certain targets might be.*

Results of National Survey

How will Model Results be used?

- *We will use the future traffic numbers to predict congestion. However, we are highly urban and built-out, and will not be addressing congestion via more road building. These model outputs will be helpful to demonstrating the need for alternative modes in our county, but will not be used to justify increasing roadway capacity.*
- *Post-process with MOVES model to estimate GHG as well as the standard transportation conformity assessment for the region. Congestion-output V/C by link. Also free-flow and congested travel times & speeds. For freight movement - Assign commodity flow data to highway network and summarize differences by Scenario.*

Results of National Survey

How will Model Results be used?

- *We are still in the process of determining what tools we will use to set targets for the categories. The expectation is that we will use real-time data (e.g. INRIX data) to help with the congestion, reliability and freight measures. It's possible that the model will be used to help understand potential future outcomes to determine reasonable targets but that is still being analyzed.*
- *Our agency intends to use the travel demand model to evaluate alternative investment scenarios with regards to publicly established goals and targets. This will be used in the project selection phase of the regional transportation plan.*

Results of National Survey

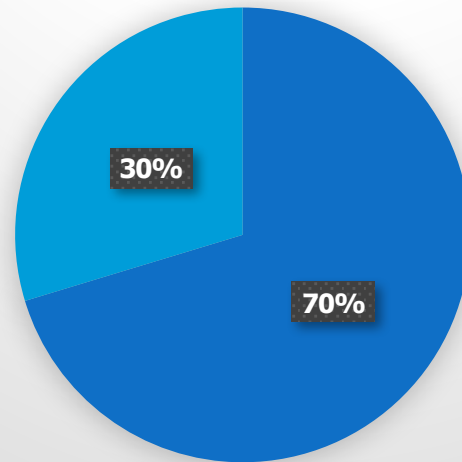
How will Model Results be used?

- *Largely to be determined at this point, but I do not envision a major change from the current performance analyses that are used with the model such as future v/c ratios and delay hour estimates.*
- *Our model does not address pavement condition, bridge condition. We can address congestion and reliability.*
- *Whatever the model has direct outputs for (performance with regard to reliability, efficiency, access, congestion) will be used to address the performance measures.*
- *Still working on defining how the model will be utilized.*

Results of National Survey

- Performance targets set?
 - No – 70%
 - Yes – 30%

Does your agency intend to use multiple scenarios to aid in development of the LRTP?



■ Yes ■ No

Conclusions

- Many MPOs and state DOTs already have performance measures incorporated into their transportation planning process.
 - For some though, realignment of performance categories will be required to conform to MAP-21/FAST Act requirements
- Some MPOs and DOTs use or plan to use their travel demand models, where applicable, to predict future performance of their transportation system.
- More agencies have moved to a 4-step or activity-based model and have also developed a freight/truck model and it is expected that they will also be using these for forecasting performance metrics defined in the pertinent National Goal Areas.

Conclusions

- The three national goal areas which stood out in terms of MPOs already using or planning to use demand models to evaluate associated performance measures were (1) Congestion Reduction (88%); (2) Environmental Sustainability (53%); and (3) System Performance (46%).
- Discrepancies exist based upon MPO size in terms of types of travel models in use, travel modes considered explicitly in models, and planned use of travel demand models in developing system performance measures.
- Results of the study point to the need to share experience with regard to performance measure development across MPOs, but particularly for small to mid-size MPOs that may not have staff time available to fully explore all of the opportunities for using travel models in depth.