



Research Notes

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Transportation Planning Performance Measures

Performance measurement can be defined as an assessment of progress toward goals. In transportation planning a “good” measure is clearly defined, is acceptable to stakeholders, allows for economical data collection and analysis, shows how well the goal is being met, and is sensitive to differences among alternative transportation policies and investments.

Transportation performance measures that are commonly used in Oregon to evaluate alternative plans and projects include per capita vehicle miles of travel, volume/capacity ratios, and auto occupancy. The current measures, however, do not address the full range of policies that currently guide Oregon transportation planning. For example, they do not provide meaningful indications of 1) how well the transportation system delivers multi-modal services; 2) the efficiency with which public resources are used to deliver transportation services; and 3) how public policies affect the delivery of those services.

This study was undertaken to a) examine Oregon transportation planning policies and identify those that currently lack adequate performance measures; and b) identify, develop, and recommend multi-modal transportation performance measures that could achieve the following conditions:

- Address relevant local, state, and federal policies;
- Build upon recent research in transportation plan performance measurement;
- Can be readily implemented by ODOT and Oregon MPOs in their planning processes;
- Allow performance to be measured and also forecasted through modeling; and
- Help decision makers discern among plan alternatives and investment options and enable them to consider impacts on both the public in general and on various population segments.

Narrowing the Focus

Examination of the Oregon Transportation Plan and current regional transportation plans for metropolitan areas showed that the policy areas that are not adequately addressed by performance measures include the following: balance and adaptability; economic vitality; safety and security; environmental justice; land use compatibility; and quality of life.

In considering possible performance measures to address these policy areas, the research narrowed its focus to measures that would be useful for evaluating alternative plan scenarios. Each measure had to be calculable using forecasted land use and transportation output. The forecasted land use variables had to be sufficiently disaggregate (by household demographic, employment sector, and geographic location) to support the calculations. Similarly, the forecasted transportation variables had to be sufficiently detailed (by trip purpose, mode of travel, time of day, speed, volume, etc.).

Selected Performance Measures

The following measures were selected for further development and testing:

1. Urban Mobility – This is a family of performance measures developed by the Texas Transportation Institute and included as part of the annual Urban Mobility Report for U.S. urban areas. These include Travel Delay, Travel Time Index, Buffer (Reliability) Index, and Annual Cost of Congestion.
2. Transportation Cost Index – This is an accessibility measure that is analogous to the Consumer Price Index. The TCI measures the relative cost of accessing a market basket of travel destinations. It may be used to compare accessibility by trip purpose, mode, income group, geographic area and time period.

3. Percent of Travel Market-Basket Accessible by Non-Auto Modes – This measure focuses upon transportation choices rather than behavior. It is primarily influenced by land use, but is also influenced by non-motorized network connectivity, and by transit system coverage and service frequencies.
4. Auto-Dependence Index – This measure compares the Transportation Cost Indices for auto and non-auto modes to indicate the degree of auto-dependence that the land use and transportation system fosters. It is affected by changes in transportation costs.
5. Freight Delay Costs – This measure is similar to the freight congestion cost component of Measure 1 but is intended for application to a freight model.
6. Road Network Concentration Index – This is a measure of the degree to which travel is distributed over the regional arterial network. It is a measure of both system vulnerability and balance. The less evenly traffic is spread over the system, the less balanced it is and the more vulnerable the system is to traffic disruptions.

The Urban Mobility Measures and Freight Delay Costs used performance measures developed by others and extended them for use in Oregon plans. They address mobility and economic vitality. The Transportation Cost Index represented a novel approach to measuring

accessibility and to address, in part, issues related to balance and adaptability, environmental justice, land use compatibility, and quality of life. The Percent of Market Basket Accessible by Non-auto Modes and the Auto Dependence Index measures were designed to address issues related to automobile reliance in the Oregon Transportation Planning Rule. The Road Network Concentration Index represented a novel approach to measuring transportation system security and efficiency. Other potential performance measures were considered but dropped because current models do not generate the appropriate data.

Putting the Measures to Use

The results of testing and analysis of these measures indicated that the Urban Mobility Measures and the Freight Delay Costs could be implemented immediately in Oregon. The others could be implemented soon following further refinement. ODOT will be using the measures for several projects in the Medford area, specifically the Urban Mobility measures and the Road Network Concentration Index. Others cannot be used until a new transportation model has been calibrated. ODOT will also be using the measures for the Medford area regional problem solving process, which involves modeling alternate land use distributions and looking at the transportation impacts.

**For more information, contact Alan Kirk at 503-986-2843,
or via e-mail at Alan.R.Kirk@odot.state.or.us**

To obtain a copy of the study, "Transportation Planning Performance Measures," you may download a PDF version at http://www.oregon.gov/ODOT/TD/TP_RES/ResearchReports.shtml; or you may request a printed copy from the ODOT Research Unit at 503-986-2700.



Oregon Department of Transportation

Research Unit

200 Hawthorne Ave. SE, Suite B-240

Salem, OR 97301-5192

Telephone: 503-986-2700

FAX: 503-986-2844

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