Ohio Department of Transportation Research Project Fact Sheet

Division of Engineering ROC 2024-26 – Task 8: Re-examining Level of Service as a Measure of Effectiveness for Roadway Improvements

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The Problem

State Departments of Transportation (DOTs) and municipalities throughout the country have their own unique approaches to dealing with increasing traffic congestion on their roadways. From long-range planning to analysis approaches to prioritization to alternatives development and refinement to construction, traffic operations play an important role in the project development process. The Ohio Department of Transportation (ODOT) seeks to gain insight to answer the following questions:

- What other methods and goals (besides peak-hour level of service [LOS] analysis) are states using to determine potential roadway/intersection improvements and their effectiveness?
- Do states have different requirements for interstates/freeways as compared to other road classifications or those located in cities or villages?
- What national research has been done on this topic?

A potential benefit of this research would be revising ODOT's traffic analysis goals to optimize the design of Ohio roadways to improve safety. This could mean less pavement to maintain and lower construction costs as Ohio looks to "right-size" the roadway network for the future.

Research Approach

The research was broken down into the following main components:

1. Literature review of state DOT policies, procedures, and guidelines throughout the country – and provide summaries of five state DOTs.
2. Literature review of national research pertaining to Measures of effectiveness (MOEs) and their place in traffic operational assessments.
3. State DOT interviews pertaining to items listed previously and the different in state DOT approaches on different road classifications.

Ultimately, the team was tasked with developing a list of modifications and recommendations to existing ODOT guidance to right-size future ODOT led projects.

Findings

Through the literature of various state DOTs, the research found two distinct schools of thought relating to MOEs:

Approach #1: Utilize MOEs to understand operations and help drive alternatives development. LOS should be supplemented with real-world metrics (such as travel times) to provide context to a nontechnical audience. This approach tries to achieve intended LOS targets but recognizes that there can be diminishing returns at a certain level and can therefore accept LOS E or LOS F provided that the delay per vehicle is greatly improved for the cost of the project.

Approach #2: Vehicular LOS is a secondary MOE to the main priority of providing access for all modes of transportation. Project objectives should establish a modal hierarchy emphasizing the needs of vulnerable users. Objectives also typically highlight the need to reduce vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions, minimizing the amount of traditional

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roadway widenings and focusing more on safety, accessibility, and Transportation Systems Management and Operations- (TSMO-) related solutions. This approach does not believe that a new interchange project should have major congestion or queues but rather emphasizes the need to provide access to all users during the project development process and does not weigh traffic operations as high as other project metrics.

These approaches were similar to the national research reviewed. Either the research focused on incorporating other multimodal metrics (accessibility, level of traffic stress, etc.) into the overall assessment, or it focused on ways to ultimately reduce overall congestion via various MOEs including LOS (vehicle hours traveled, travel times, overall delay, etc.).

The approach that DOTs ultimately focused on for operations related to the overall goals of the agency.

Recommendations

The culmination of the research into state DOTs, national programs or documents, and roadway classifications led to the following recommendations for ODOT:

- Update the *ODOT Analysis and Traffic Simulation Manual*
  - Shift from AM and PM peak hour to the "two highest hours"
  - Report area-wide VMT, vehicle hours traveled, and delay for all TransModeler projects
  - Include metered flow into TransModeler analysis area
  - Provide analysis results for an interim year when the design year is oversaturated
  - Include TransModeler as a requirement for interchange analysis in congested areas
  - Test the sensitivity of volumes (higher or lower) to gauge operational performance
  - Adjust the turning movement count data collection time frame in metropolitan planning organization areas to 6 a.m. to 8 p.m.
  - Adjust the operational goals section for unsignalized intersections and provide operational context examples to use in congested or high-growth areas
- Update the *State Highway Access Management Manual* to refer to *ODOT Analysis and Traffic Simulation Manual* level of service targets
- Right-size its infrastructure
  - Provide a low-cost countermeasure first policy for near-term improvements and delay the need for a major reconstruction
  - Refocus on non-intrusive solutions through technology enhancements, demand management, signal timing, and other Transportation Systems Management and Operations strategies
  - Continue to implement a performance-based project development process
  - Develop a transparent prioritization process that incorporates weighting and other metrics similar to Virginia DOT and North Carolina DOT
  - Continue to innovate on design to reduce overall pavement area through creative intersections and interchange concepts
  - Incorporate multimodal considerations to provide a more balanced approach to transportation infrastructure enhancements that improve all modes in a context-sensitive manner

In conclusion, this report highlights key insights from various state DOTs and national research and provides strategic recommendations for ODOT to implement to help right-size infrastructure investments going forward.

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