

## Modeling Reliability

### *Improved analysis of the benefits of operational strategies to reduce congestion*

Early travel demand models were developed to help modelers and decision makers analyze recurring congestion and its solutions. The models have been instrumental to metropolitan planning by allowing the estimation of benefits from traditional projects such as adding lanes or expanding an interchange.

Those models, however, were limited in their ability to meet the demands of today's decision makers. The models could not easily capture the effects at the network level of some operational strategies such as adding auxiliary lanes or channelizing an intersection. Without the ability to model these issues, planners and decision makers were constrained in how they could capture or compare the benefits of such potential solutions.

In today's complex environment, transportation agencies need improved accuracy from network travel demand models and the models need to capture highway user responses to congestion, reliability, and tolling.

## The Solution

Recent research from the second Strategic Highway Research Program (SHRP2) has identified **new equations and processes that can be incorporated into travel demand models for improved modeling that shows how operations can affect a highway network's performance.**

*Improving Our Understanding of How Highway Congestion and Pricing Affect Travel Demand* (C04) develops mathematical descriptions of the full range of highway-user behavioral responses to congestion, travel-time reliability, and pricing. This report formats the mathematical descriptions of behavior so that they can be incorporated into various travel-demand modeling systems in use or being developed. The report also examines network assignment practices needed to support models that simulate behavioral responses to congestion, travel-time reliability, and pricing.

*Understanding the Contribution of Operations, Technology, and Design to Meeting Highway Capacity Needs* (C05) is a new guide that will allow transportation agencies to use enhanced simulation models to test the effectiveness of highway operations strategies. The guide shows modelers how to compare the effectiveness of less complex operational strategies, such as intersection channelization, with more expensive and complex treatments, such as adding general-purpose highway lanes. This research will enable departments of transportation to measure the cost and effectiveness of traffic operations strategies and demonstrate whether they solve a particular congestion problem.

### Improved models for tolling and operations strategies

#### FOCUS AREA: Capacity (C04/C05)

These products can improve modeling of such strategies as tolling, systems operations, and management, and can lower the cost of operational improvements.

#### Save Money

- The model allows evaluation of lower-cost operational strategies.

#### Save Time

- By using these equations and processes, improvements can be made to existing models, reducing the need for state departments of transportation to conduct similar research.

## The Benefits

These products provide modelers with new equations and guidance on how to more accurately capture the benefits or effectiveness of various operations strategies. Agencies or metropolitan planning organizations can gain a better understanding of how operations projects can improve the function of their highway networks.

## How can you learn more?

The reports are available at [www.trb.org/Main/Blurbs/168141.aspx](http://www.trb.org/Main/Blurbs/168141.aspx) and [www.trb.org/Main/Blurbs/166939.aspx](http://www.trb.org/Main/Blurbs/166939.aspx). For more information, contact Patrick DeCorla-Souza at FHWA, [patrick.decorla-souza@dot.gov](mailto:patrick.decorla-souza@dot.gov); Matt Hardy at AASHTO, [mhardy@ashto.org](mailto:mhardy@ashto.org); or Steve Andrie at TRB, [Sandrie@nas.edu](mailto:Sandrie@nas.edu).



### About SHRP2 Implementation

The second Strategic Highway Research Program is a national partnership of key transportation organizations: the Federal Highway Administration, the American Association of State Highway and Transportation Officials, and the Transportation Research Board. Together, these partners conduct research and deploy products that will help the transportation community enhance the productivity, boost the efficiency, increase the safety, and improve the reliability of the Nation's highway system.

### Strategic Highway Research Program

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