Companion Guide to Video

October 2013

Check out the video

U.S.Department of Transportation
Federal Highway Administration

Project Development Operations

Scoping and Conducting a Traffic Study to Meet Community Needs

www.fhwa.dot.gov/federal-aidessentials

Traffic studies predict project impacts and provide analysis of alternative solutions

Federal-aid Essentials for Local Public Agencies
Federal-aid Simplified.

As communities grow, so do problems with traffic congestion and roadway maintenance. These issues can result in unpredictable travel times, increased traffic collisions, growing driver frustration, and higher levels of air pollution.

What are your agency's plans to monitor and reduce community traffic congestion?

To best understand the cause of congestion and to identify solutions, such as the addition of a traffic signal or a new road, engineers conduct traffic studies. A traffic study helps engineers generate "What if?" scenarios and predict the impact of a potential transportation improvement on the traveling public. Additionally, operations personnel can use the study to make travel times more predictable each day and throughout the year.

Techniques for conducting traffic studies can be found in the Highway Capacity Manual and FHWA's Traffic Analysis Toolbox. But as methods of analysis continue to quickly evolve, the challenge for most agencies is how to effectively use newer, more sophisticated analysis and data collection techniques, such as travel data collected from cell phones, GPS, and Bluetooth devices.

Let's look at the process for conducting traffic studies and the innovative techniques used by two agencies to study traffic and make smart investment decisions.

The guidelines for developing a traffic analysis begin with a scope for the analysis and end with the alternative analysis and final report.

When preparing a scope for the analysis, engineers verify that the study is appropriate for the transportation goal and that resources are available to complete the study. For example, the scope includes identifying transportation objectives, selecting the analytical model, and identifying staff resources. The next step involves the collection of data about vehicles, bicycles and pedestrians, peak and seasonal period traffic, and overall

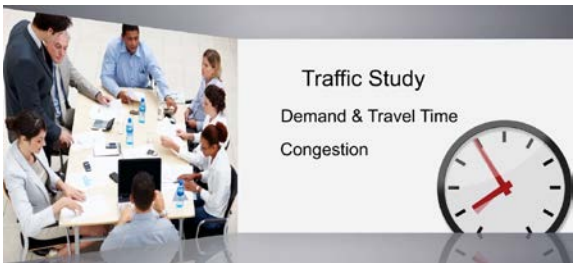
roadway demand. The likelihood that your agency's traffic study will reliably predict the effect of an improvement depends on the data it uses. Rather than relying on overly simplistic data collected during the peak hour, start investigating new and emerging sources. Conduct field checks, reach out to stakeholders who are knowledgeable about local conditions, and investigate the availability of road-user data services. Your State department of transportation or metropolitan planning organization may already subscribe to such a data service.

Next, base-model development, error checking, and calibration help develop a model that will accurately predict changes in travel time and wait-queues for the “What if?” scenarios. Error checking is necessary to eliminate coding errors, while calibration allows the analyst to modify parameters to closely approximate regional or local conditions.

Now, let's see how two agencies approach the questions related to project scope and data collection. In our first example, the developer of a small shopping center in town proposes the addition of a new traffic signal to minimize its impact on the surrounding community.

While the proposed traffic signal is the traditional solution, when a signal was installed at a similar development the previous year, it resulted in long queues and delays. This time, agency personnel want to see a traffic study before making any decisions.

During a preliminary review meeting, the metropolitan planning organization introduces a newly acquired data source for current demand and travel times. The team also learns that road users encounter congestion from 7:30 a.m. to 9:30 a.m.



The team asks the developer to use the new data source to assess overall roadway demand and queue lengths for the rush hour's entire two-hour duration.

The analysis reveals that the proposed traffic signal would create long queues at the entrance to the shopping center, as well as a two-fold increase in travel time on the street. The optimal solution results in the addition of a second entrance to manage access and the coordination of traffic signals for a two-mile stretch of the roadway.

In our second example, a city is considering the addition of a traffic lane and other roadway improvements to alleviate congestion along a busy corridor. Existing data indicates that daily congestion lasts 3 to 4 hours and is exacerbated by roadway incidents and bad weather.

As one of the first steps in the traffic study, the city traffic engineer elects to use a simulation model. The advantage of the model is that it can address long periods of congestion along with any contributing factors, such as traffic incidents and weather effects. This approach requires additional data inputs beyond the city's current records.

While investigating other options, the city traffic engineer learns that the metropolitan planning organization has access to both a regional simulation model and the necessary input data from a commercial, third-party source.

Using the model and data, the city formulated numerous incident management and weather responses. Ultimately, they found significant reductions in congestion by implementing intelligent transportation system technology, which was cheaper than adding more traffic lanes.

As the examples illustrate, agencies should conduct traffic studies to evaluate the costs and benefits of proposed road improvements. As our examples illustrate, when agencies use more robust field data and select the right analysis tool for the project, they develop more reliable analyses to help them make better decisions.

The Highway Capacity Manual and FHWA's Traffic Analysis Toolbox contain methods for conducting traffic studies, and the Federal Highway Administration recommends that agencies use these when working on any traffic analysis.

Additional Resources

- TRB 2010 Highway Capacity Manual
  http://ops.fhwa.dot.gov/trafficanalysistools/
- FHWA Traffic Analysis Toolbox
  http://hcm.trb.org/

The content of this document is not a substitute for information obtained from State departments of transportation, appropriate FHWA Division Offices, and applicable laws. Scenarios have been simplified for emphasis and do not necessarily reflect the actual range of requirements applicable to the scenario or this topic. This document was created under contract number DTFH61-11-D-00025 by the Federal Highway Administration, U.S. Department of Transportation, and is offered to the public to heighten and focus awareness of Federal-aid requirements within the local public agencies community and reinforces the importance of these necessary policies, procedures, and practices.

This Companion Resource is the script content for the video production of the same name.