Corridor Traffic Management Challenges

Entering the 21st century, our nation's transportation system has matured. Physical infrastructure is expanded by a fraction of a percent each year. Yet congestion continues to grow at an alarming rate, increasing the potential for crashes, undesired long delays, pollution, higher operating costs, and adverse sociological effects.

As our transportation system becomes more sophisticated and complex, transportation professionals must adopt innovative ways of managing existing systems more efficiently. These professionals are called upon to increase the productivity of existing transportation systems through the use of operational improvements. As we deploy the highly sophisticated technologies of hardware and software systems, there will be an increasing need to:

- Fully understand, evaluate, and optimize traffic flow patterns

- Respond to recurring and non-recurring congestion in a proactive fashion

- Predict and evaluate the outcome of various improvement plans without the inconvenience of a field experiment

- Assist Traffic Management Center (TMC) operators in their decisionmaking by developing strategies and plans both on-line in real time, and off-line

- Integrate freeways and surface streets with various control and managing strategies

The Role of Traffic Analysis Tools

Traffic analysis tools have emerged as one of the most efficient methods to optimize, evaluate, and simulate the operations of transportation facilities and systems. Traffic analysis tools are designed to assist transportation professionals in evaluating strategies that best address the transportation needs for their jurisdiction. Specifically, traffic analysis tools can help practitioners:

- Evaluate innovative transportation management concepts

- Improve the decision making process

- Decrease time and cost for evaluation and design

- Reduce risk and disruption to traffic caused by field experimentation

- Provide better relative evaluation of design and operational improvements

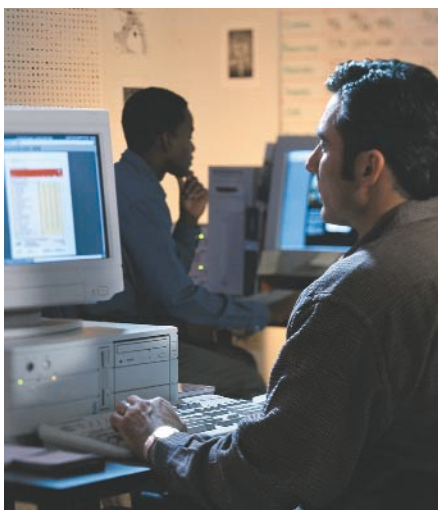- Monitor the performance of transportation facilities and systems
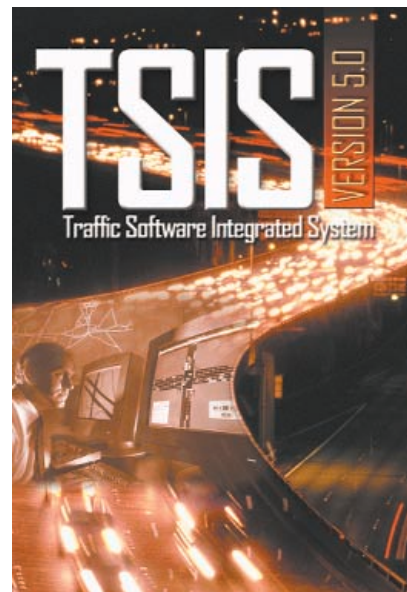
What We've Learned

The transportation community is facing two fundamental but interrelated challenges. First, we must accelerate and expand the utilization of traffic analysis tools. Second, we must ensure that the tools developed can be easily validated to demonstrate that the output is accurate and reliable. Tools need to give the user results that are consistent with current traffic management practices and principles, not to mention real-world traffic patterns. They need to produce results that are perceived as trustworthy by the typical traffic professional.

Part of the solution to these challenges rests in the development of traffic analysis tools that are easier to use, more robust in their application, and more reliable in their results. The

other part requires a deployment strategy for tools that is sensitive to the concerns and needs of the user community as well as committed to encouraging the growth and vitality of the model development and consultant community.

Rather than speculate as to the needs and concerns of the transportation community, the Federal Highway Administration's (FHWA) Office of Operations has reached out to the traffic analysis stakeholder community for feedback. Many stakeholders think that FHWA should continue to promote the deployment of traffic analysis products and also provide assistance for specific development activities but not engage in activities that would place FHWA in direct competition with the commercial market. Many feel that it is incumbent upon FHWA to explore strategies so that a balance between the development and deployment of traffic analysis tools is achieved. They have further stated that less involvement by FHWA has limited their ability to get training on traffic analysis tools in recent years. It is imperative for FHWA to find an overarching principle of a deployment paradigm developed in parallel with a rapidly evolving model development strategy.

Future Program Direction

The Office of Operations formulated the Traffic Analysis Tools Program in an attempt to strike a balance between efforts to develop new, improved tools in support of traffic operations analysis and efforts to facilitate the deployment and use of existing tools. There are two tracks under the Traffic Analysis Tools Program: the development track and the deployment track.

The **Development Track** focuses on models that are easier to use, more robust in their application, and more reliable in their results. This track concentrates on:

- **The Next Generation Simulation (NGSIM) Program:** developing a core of open behavior algorithms in support of traffic simulation with supporting documentation and validation data sets.

- **The Dynamic Traffic Assignment (DTA) Program:** developing real-time and off-line traffic estimation and predictive systems to support real-time and network planning and operations decisions in the Intelligent Transportation Systems (ITS) and non-ITS environments.

- **Traffic Software Integrated System (TSIS):** a collection of sophisticated software tools for use by traffic engineers and planners to simulate traffic conditions and evaluate alternative operational improvements in a corridor of freeways and surface streets.

The **Deployment Track** is intended to ensure sensitivity to the needs and concerns of the traffic analysis stakeholder community. This track concentrates on:

- **Guidance:** developing a *Traffic Analysis Tools Primer* to provide an overview of traffic analysis tools; a *Selection Guide* to assist traffic engineering professionals in the selection of the correct traffic analysis tool for the job at hand; *Traffic Simulation Guidelines* for the application and use of traffic simulation; *CORSIM Application Guidelines* to provide varying practices, methodologies, and applications for CORSIM users; *Traffic Analysis Tools Case Studies and Best Practices* to illustrate the usefulness and strengths of traffic analysis tools

- **Training:** Providing training for the *Highway Capacity Manual, CORSIM Simulation, Selection Methodologies and Application Guidelines* through the National Highway Institute

- **Outreach, Promotion, Awareness:** developing plans for distribution of guidance documents, publicizing the documents, and soliciting feedback from customers on the usefulness of the documents

Through the Office of Operations Traffic Analysis Tools Program, our partners and customers will expand their use of analysis tools and innovative analysis approaches that consider a system-level approach and enhance mobility. They will gain insight on best practices and lessons learned in operational analysis. They will also gain a high level of confidence in utilizing the analysis tools for their local needs. In promoting these analytical tools and decision support systems, the FHWA will assist transportation professionals in finding solutions to traffic congestion and management problems.

For more information on FHWA Office of Operations activities, visit our web site at
www.fhwa.dot.gov/operations

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