



2012 National Traffic Signal Report Card *Executive Summary*

National Transportation Operations Coalition



The National Transportation Operations Coalition periodically conducts the Traffic Signal Operations Self Assessment to benchmark current practices and to evaluate how effectively agency programs support the management, operations, and maintenance of traffic signals. The 2012 National Traffic Signal Report Card presents the results from the self-assessment survey from 241 local and state agencies in the United States and Canada.

The 2012 grade of D+ is a slight improvement over grades of a D- in 2005 and a D in 2007. The continuing slow improvement in the national score is meaningful in showing the ongoing progress by agencies that operate the majority of traffic signals in the United States. The responding agencies were weighted equally nationally, which is appropriate when considering the perspective of motorists who have no recognition of jurisdictional boundaries as they drive the roadway network. The size of an agency matters when considering access to the expertise and resources necessary to effectively manage, operate, and maintain traffic signals. An examination of scoring trends indicated that medium and large agencies operating more than 150 traffic signals scored a grade of C on a national basis.



"Performance Measures are a fundamental component of INDOT's vision for active traffic management. They enable us to collect and analyze data, prioritize investment, and implement and assess the most promising solutions."

—**Michael B. Cline**
Commissioner, Indiana Department of Transportation



"Mayor Antonio Villaraigosa and the Los Angeles City Council worked tirelessly to secure state funding and regional grants so that the Los Angeles Department of Transportation can meet the needs of the public by implementing the adaptive traffic control system in the second generation of LADOT's signal synchronization technology developed in-house by our engineers..."

—**Jaime de la Vega**
General Manager, Los Angeles Department of Transportation



"With agencies facing difficult budgetary choices, the traffic signal operations self assessment identifies opportunities that can be delivered through our regional traffic signal program to provide 'seamless' traffic signal operations across jurisdictional boundaries through the creation and support of a centrally coordinated regional traffic signal network."

—**Paul Casertano**
Transportation Operations and Safety Lead,
Pima Association of Governments, Tucson, Arizona



"... With the state of the economy and local budgetary constraints, our resources continue to be reduced while the number of traffic signals continue to increase. This survey is a very functional tool for us to demonstrate how we are managing these limited resources to achieve our vision of providing quality, efficient, sustainable services to the citizens of Pasco County."

—**Robert W. Reck**
Traffic Operations Manager, Pasco County, Florida

Estimated Annual Expenditure and Value

- Number of traffic signals 311,000
- Value of traffic signal infrastructure assets \$82.7 billion
- Annual operating and maintenance program cost \$1.2 billion
- Annual capital program cost \$859 million

Facts on Signal-Related Congestion

Delays at traffic signals contribute an estimated 5 to 10 percent of all traffic delay or 295 million vehicle-hours of delay on major roadways alone.¹ Further, the 2011 *Urban Mobility Report* notes that in its reporting areas 61 percent of the street miles in the cities had some level of traffic signal coordination that reduced delay by 21.7 million person hours.² The U.S. Department of Transportation Intelligent Transportation Systems Joint Program Office maintains a database that documents traffic signal management and operations studies conducted by various agencies demonstrating benefit-cost ratios exceeding 40:1.³

¹ Congestion Reduction Toolbox. U.S. Department of Transportation Federal Highway Administration. Accessible via www.fhwa.dot.gov/congestion/toolbox

² 2011 *Urban Mobility Report*. Methodology-Benefits of Operational Treatments. Texas Transportation Institute, 2011. Accessible via <http://mobility.tamu.edu/files/2011/09/operational-treatments.pdf>

³ ITS Benefits, Costs and Lessons Learned Database. U.S. Department of Transportation (U.S. DOT) Intelligent Transportation Systems Joint Program Office. Accessible via www.benefitcost.its.dot.gov

National Traffic Signal Report Card 2012	
Management	D
Traffic Signal Operations	C
Signal Timing Practices	C
Traffic Monitoring and Data Collection	F
Maintenance	C
OVERALL	D+

Noteworthy Findings

For the most part, agencies continue to face challenges in their efforts to improve traffic signal operations:

- The national score (69) remains low. The impact of the recent economic downturn has affected funding priorities at all levels of government, especially at the local level in some hard hit parts of the country.
- Agencies operating more than 150 signals have an overall grade of C (73). This is an indication of larger staff resources assigned to traffic signal programs as well as a balance of resources compared to the relative complexity and size of the traffic signal system.
- There was little distinction between traffic signal systems with 150 to 450, 450 to 1,000, or more than 1,000 signals; all scored a composite of (73).
- The signal timing practices section scored the highest for all signal system sizes except systems with less than 50 signals, where maintenance scored the highest.
- The maintenance section received the second-highest overall score (73) followed closely by the traffic signal operations section (72). However, for those agencies with more than 450 signals, traffic signal operations received the second highest score.
- The traffic monitoring and data collection section continues to be the lowest-scoring section.
- Very small signal systems (less than 50 signals) scored markedly lower (an overall score of 59) than all other system sizes (ranging from 69 to 73) although they improved from the 2007 overall result of 51.

The low scores demonstrate the continued need for attention and additional resources for traffic signal management and operations.

What Can An Agency Do Right Now?

- Take a rigorous and systematic look at all the components of traffic signal operations in the organization and develop an objectives-driven program management plan that addresses any shortcomings and encourages coordination with neighboring jurisdictions and interaction with the public.
- Engage in workforce development and succession planning for all traffic signal operations staff using available resources from government agencies, universities, professional associations, and content available through the Internet from credible sources.
- As a mechanism to evaluate achievement of objectives, establish or expand a traffic monitoring and data collection program to provide the basis for signal timing updates and feedback to the traffic signal program management plan.
- Develop an outreach strategy for policymakers and the public for the traffic signal program management plan.

What Are We Really Trying To Achieve?

How can agencies provide good basic service even when their resources are constrained?

The first step starts with understanding motorist expectations as they drive through traffic signals. Practitioners must understand those expectations and articulate them as the basis for establishing objectives, using the following principles:

- Field infrastructure reliability
- Signal timing that addresses congestion
- Smooth flow
- Predictable and consistent operation
- Versatility

In addition to the above principles that address clarity of objectives, attainable performance measures, field infrastructure reliability, and signal timing aimed at motorist expectations, the FHWA report, *Improving Traffic Signal Management and Operations: A Basic Service Model*, also suggests additional issues that should be addressed in a traffic signal management plan. These are:

- Objective-based resource allocation
- Clear communication
- Meaningful systems engineering

Benefits of Traffic Signal Management and Operations Programs

Appropriately designed, operated, and maintained traffic signals can:

- Provide for the smooth flow of traffic along streets and highways at defined speeds, thereby **reducing congestion**;
- Effectively manage the traffic-handling capacity of intersections to **improve mobility** through the use of appropriate layouts and control measures and regular reviews and updates to the operational parameters; and
- Reduce vehicle stops and delays, thereby:
 - **lessening the negative impacts to air quality**; and
 - **reducing fuel consumption**.

An objectives and performance-based plan enables the proactive management, operations, and maintenance of traffic signals as well as supporting the analytical foundation to measure success.

Conclusions

Throughout the development of this report, there has been the recognition that an agencies' response to the self assessment should not be, "How do we get an A grade?" Rather, the approach to traffic signal program management should start with the expectations of the motorists to whom the service is being provided. To meet those expectations, agencies are beginning to reorganize, working smarter to focus resources on management and operations, and collaborating regionally to take advantage of distributed expertise and to compete for resources to improve their capabilities more effectively based on the value offered to the community.

The scarcity of reliable resources for both funding and staffing in the current economic environment necessitates that many agencies, especially smaller ones, do what is needed to provide basic functionality. A programmatic approach to traffic signal management and operations establishes realistic operational objectives and defined, documented, and measureable supporting strategies. This better enables agencies to address congestion and fuel consumption as well as lessen the negative impacts to air quality to improve the quality of life within communities. Agencies that perform well on this report card have demonstrated that they employ recognized objectives-based best practices to manage traffic signals in the roadway network. There does appear to be gradual change as shown in the modest improvement in the report card scores. There still seems to be a disconnect between established, stated, measureable objectives and performing signal operations tasks and timing practices. However, well planned traffic signal management, operations, and maintenance practices can save money and provide a high value trade-off compared to other types of infrastructure investment. Success is a strongly correlated combination of effective leadership and a commitment to operations, which in turn has a positive outcome on the street.

For More Information

There are a wide variety of resources available for agencies to improve traffic signal management and operations. Resources are available through government and research organizations, universities, professional associations and their supporting web sites, training, networking, and outreach programs. Visit the 2012 National Traffic Signal Report Card website <http://www.ite.org/reportcard> for more information.

About the National Transportation Operations Coalition

The National Transportation Operations Coalition (NTOC) is an alliance of national associations, practitioners, and private sector groups representing the collective interests of stakeholders at State, local, and regional levels who have a wide range of experience in operations, planning, and public safety. The NTOC website <http://www.ntoctalks.com> and online Community: *NTOC Forums and Traffic Signal Library* <https://ntoctsl.groupsites.com> serve as key resource for institutionalizing management and operations into the transportation industry.



Institute of Transportation Engineers

