# White Paper:

# The Congestion Management Process for State and Metropolitan Transportation Planning

Prepared for:

## Meeting Federal Surface Transportation Requirements in Statewide and Metropolitan Transportation Planning: A Conference

***Requested by:***

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## Introduction

The Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) made several changes to metropolitan and statewide transportation planning provisions, ranging from an increase in the percentage of funding available for metropolitan planning, to modifications of the transportation planning factors to be considered in long range planning. Among the most significant changes was the updated requirement for a "congestion management process" (CMP) in Transportation Management Areas (TMAs – urban areas over 200,000 in population), as opposed to "congestion management systems" (CMS). The change in name (and acronym) is intended to be a substantive change in perspective and practice, to address congestion management through a process that provides for effective management and operations, an enhanced linkage to the planning process, based on cooperatively developed travel demand reduction and operational management strategies as well as capacity increases.

Examination of the available data on congestion and highway usage over the past decade leads to the conclusion that congestion is getting worse. Traditionally, State DOTs have concentrated on mitigating recurring congestion by removing bottlenecks and improving poor signal timing. Congestion reduction was often achieved by increasing system capacity to meet demand, but building new roadways or adding additional lane miles requires major financial investments and focuses on the long-term. However, the source of congestion in the United States is increasingly related to non-recurring forms of congestion, such as traffic incidents, work zones, bad weather, and special events. Although non-recurring congestion is a regular phenomenon, it is often inefficient, impractical, or counterproductive to apply standard capacity additions to these types of problems. As a result, new approaches and relationships are necessary to effectively diminish congestion and enhance mobility.

This paper will investigate the provision of SAFETEA-LU and objectives-driven, performance-based approach to the congestion management process.

## Traffic Congestion

Congestion is relatively easy to recognize—roads filled with cars, trucks, and buses, sidewalks filled with pedestrians. The definitions of the term congestion mention such words as "clog," "impede," and "excessive fullness." For anyone who has ever sat in congested traffic, those words should sound familiar. In the transportation realm, congestion usually relates to an excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower – sometimes much slower – than normal or "free flow" speeds. Congestion often means stopped or stop-and-go traffic. Previous work has shown that congestion is the result of seven root causes, often interacting with one another.

- Physical Bottlenecks ("Capacity") – Capacity is the maximum amount of traffic capable of being handled by a given highway section. Capacity is determined by a number of factors: the number and width of lanes and shoulders; merge areas at interchanges; and roadway alignment (grades and curves).

- Traffic Incidents – Are events that disrupt the normal flow of traffic, usually by physical impedance in the travel lanes. Events such as vehicular crashes, breakdowns, and debris in travel lanes are the most common form of incidents.

- Work Zones – Are construction activities on the roadway that result in physical changes to the highway environment. These changes may include a reduction in the number or width of travel lanes, lane "shifts," lane diversions, reduction, or elimination of shoulders, and even temporary roadway closures.

- Weather – Environmental conditions can lead to changes in driver behavior that affect traffic flow, such as slower traveling speeds and greater spacing of vehicles.

- Traffic Control Devices – Intermittent disruption of traffic flow by control devices such as railroad grade crossings and poorly timed signals also contribute to congestion and travel time variability.

- Special Events – Are a special case of demand fluctuations whereby traffic flow in the vicinity of the event will be radically different from "typical" patterns. Special events occasionally cause "surges" in traffic demand that overwhelm the system.

Fluctuations in Normal Traffic – Day-to-day variability in demand leads to some days with higher traffic volumes than others. Varying demand volumes superimposed on a system with fixed capacity also results in variable (i.e., unreliable) travel times.

National estimates of congestion by source are useful to guide FHWA's program and to identify which areas should be emphasized (Figure 1). However, local conditions vary widely – developing methods for estimating congestion sources and understanding local sources of congestion on individual highways is necessary to decide how to craft mitigation strategies.

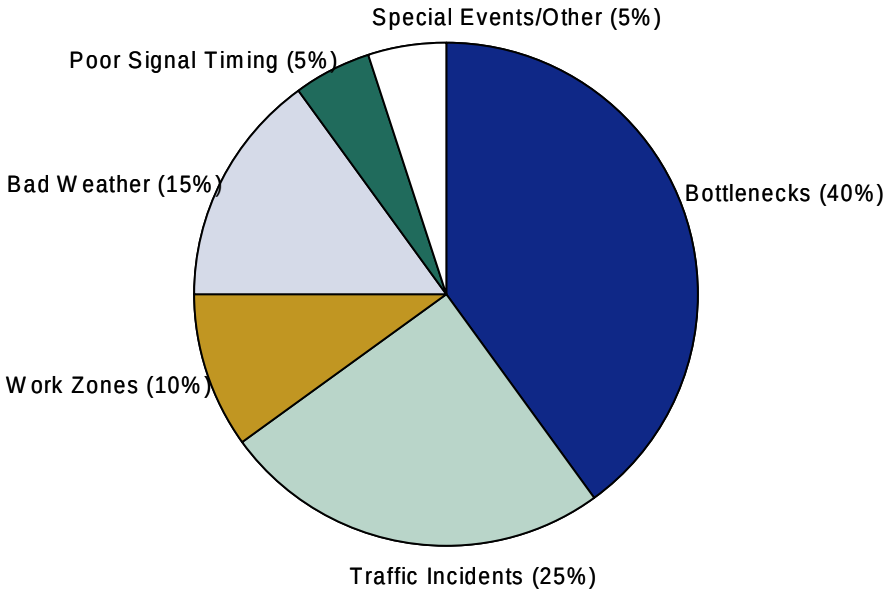


Figure 1: Sources of Congestion: National Summary[1]

Congestion results from one or more of the seven sources on the highway system. The interaction between multiple sources is complex and varies greatly from day-to-day and highway-to-highway. The problem is that with the exception of the physical bottlenecks, the sources of congestion occur with maddening irregularity – nothing is ever the same from one day to the next! One day commuters might face low traffic volumes, no traffic incidents, and good weather; the next day traffic might be heavier than normal, it might be raining, and a severe crash may occur that blocks lanes on the roadway. As if the congestion picture was not complicated enough, consider further that some events can cause other events to occur. For example:

- Abnormally high congestion can shift traffic to other highways or cause travelers to leave later, go to other destinations, or choose not to go at all.
- High congestion levels can lead to an increase in traffic incidents due to closer vehicle spacing and overheating of vehicles during summer months.
- Bad weather can lead to crashes.
- The traffic turbulence and distraction to drivers caused by an initial crash can lead to other crashes.

Because of the interconnectedness of the sources, significant payoffs can be expected by treating them. In addition to causing delay to travelers, the sources of congestion also produce another effect: variability in congestion conditions. This variability in congestion is known as travel time

[1] ***Traffic Congestion and Reliability: Linking Solutions to Problems***, FHWA (July 2004)

reliability, in other words, how "reliable" travel conditions are day-to-day, and is of intense interest for transportation professionals dealing with congestion.

## Travel Time Reliability

We all can agree that congestion has not only grown over the past two decades, it has become more volatile as well. Congestion levels are never the same from day-to-day on the same highway because the variety of traffic-influencing events that influence congestion are never the same. Because travel conditions are so unreliable on congested highways, travelers must plan for these problems by leaving early just to avoid being late. This means extra time out of everyone's day that must be devoted to travel – even if it means getting somewhere early, that's still time we could be using for other endeavors. Commuters could be late for work or after work appointments, business travelers could be late for meetings, and truckers could incur extra charges by not delivering their goods on time. And all because of unreliable travel conditions on our highways!

Transportation agencies are increasingly finding that systems operations and management is a highly important aspect of delivering transportation services to customers, beyond simply building and maintaining highways. A good analogy is the electric utility industry. After power plants and transmission lines are constructed, a utility's focus shifts to operating the system by balancing loads and ensuring that peaks are handled, all with an eye to providing service. The same model can be used in transportation, where effective systems operations and management provide several benefits to agencies and superior service to our customers, as discussed below:

- Travel Time Reliability is a Major Component of the Congestion Problem. Both anecdotal and technical studies indicate that average congestion levels have – and are continuing – to grow in our cities. In their 2005 report, Texas Transportation Institute researchers found that congestion levels in 85 of the largest metropolitan areas have grown in almost every year in all population groups from 1982 to 2003. But it's not just the typical or average condition that's important. The notion of ***travel time reliability*** – how consistent (or variable) travel conditions are from day-to-day – has taken on increasing importance. The variation in travel times is now understood as a separate component of the public's and business sector's frustration with congestion problems. Travelers adjust to variability by planning for additional time beyond what is typical, to ensure that they arrive on time. This extra planning time has costs associated with it that have not traditionally been accounted for in transportation analyses. Because systems operations and management deal directly with the root causes of unreliable travel (e.g., incidents, weather, work zones, demand surges) they can reduce the travel variability experienced by our customers.
- Operations and Management Provide Cost-Effective Congestion and Safety Solutions. In many areas, expanding highways and building new ones is cost-prohibitive or too environmentally disrupting. Operating and managing highways more efficiently is not

only the sole option in many cases, but provide large benefits in relation to their modest costs (compared to capital expansion).

- Operations and Management Can Become the Everyday Face of Modern DOTs. Our customers will encounter O&M strategies on a daily basis whereas they will only encounter other DOT activities sporadically. Especially when advanced technologies and service patrols are visible, O&M demonstrates a DOT's presence in dealing with problems every day.

What we envision for the modern transportation agency is a three-pronged approach to delivering transportation service: build, maintain, and operate. In this model, each of the three functions are equally important to an agency's mission. The three functions are not distinct but integrated so that coordination can be achieved. For example, maintenance and operation concerns should be considered when highways are in the planning process.

Responding to the challenges and impacts of congestion and reliability requires cooperation among practitioners within different divisions of a state DOT and among Federal, State, regional, and local levels. Creating and sustaining linkages between planning and operations staff can help MPOs and State DOTs to efficiently manage congestion. Resource limitations both in terms of funding and available land for new infrastructure investment require that planning and operations staff focus on the efficient use of the transportation system.

Management and operations focus on regionally integrated programs that optimize the performance of existing infrastructure. These systems are multimodal and intermodal in nature, cross jurisdictional boundaries seamlessly and include regional operations collaboration and coordination activities between transportation and public safety agencies. Examples of management and operations strategies include:

- Traffic incident management
- Traveler information services
- Road weather management
- Freeway management
- Traffic signal coordination
- Work zone management
- Electronic payment systems
- Transit signal priority
- Emergency response
- Freight management
- Travel demand management
- Transit fleet management and dispatching

There are many opportunities to advance objectives-driven, performance-based planning for operations. The attention to planning for operations in SAFETEA-LU and within the transportation community has resulted in several recently published documents from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). These documents focus on reference materials that address linking planning and operations for State DOTs, the benefits and the means to facilitate a cooperative relationship between planning

and operations, and provide guidance on the congestion management process in metropolitan transportation planning. Recently published documents by the FHWA and FTA include [2]:

- Statewide Opportunities for Linking Planning and Operations – A Primer (FHWA-HOP-008-028)
- An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning (FHWA-HOP-08-008)
- Interim Draft: Management & Operations in the Metropolitan Transportation Plan: A Guidebook for Creating an Objectives-Driven, Performance-Based Approach (FHWA-HOP-08-007)

Two of these documents are published as "interim" guidebook as the FHWA and FTA Wish to work with the transportation community to incorporate the experiences of MPOs with the new SAFETEA-LU provisions and will incorporate additional guidance when as those lessons are learned. These three publications follow closely the work of several other FHWA publication that promote linking planning and operations and reaching out to a variety of stakeholders. Other valuable publications for learning more about linking planning and operations include:

- Getting More By Working Together (FHWA-HOP-05-016)
- Regional Transportation Operations Collaboration and Coordination (FHWA-OP-03-008)
- The Regional Concept for Transportation Operations: A Blueprint For Action (FHWA-HOP-07-122)

## Congestion Management Process

The Congestion Management Process (CMP), which has evolved from what was previously known as the Congestion Management System (CMS), is a systematic approach, collaboratively developed and implemented throughout a metropolitan region, that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies. Transportation Management Areas (TMAs) – urbanized areas with a population over 200,000, or any area where designation as a TMA has been requested – are required to develop and implement a CMP as an integral part of the metropolitan planning process. The CMP represents the state-of-the-practice in addressing congestion, and can contribute to improvements in travel time reliability and reductions in delay in metropolitan areas that are facing current and future congestion challenges.

[2] These publications are available at www.plan4operations.dot.gov

The Congestion Management Process is an "8 Step" process, as shown in Figure 2.

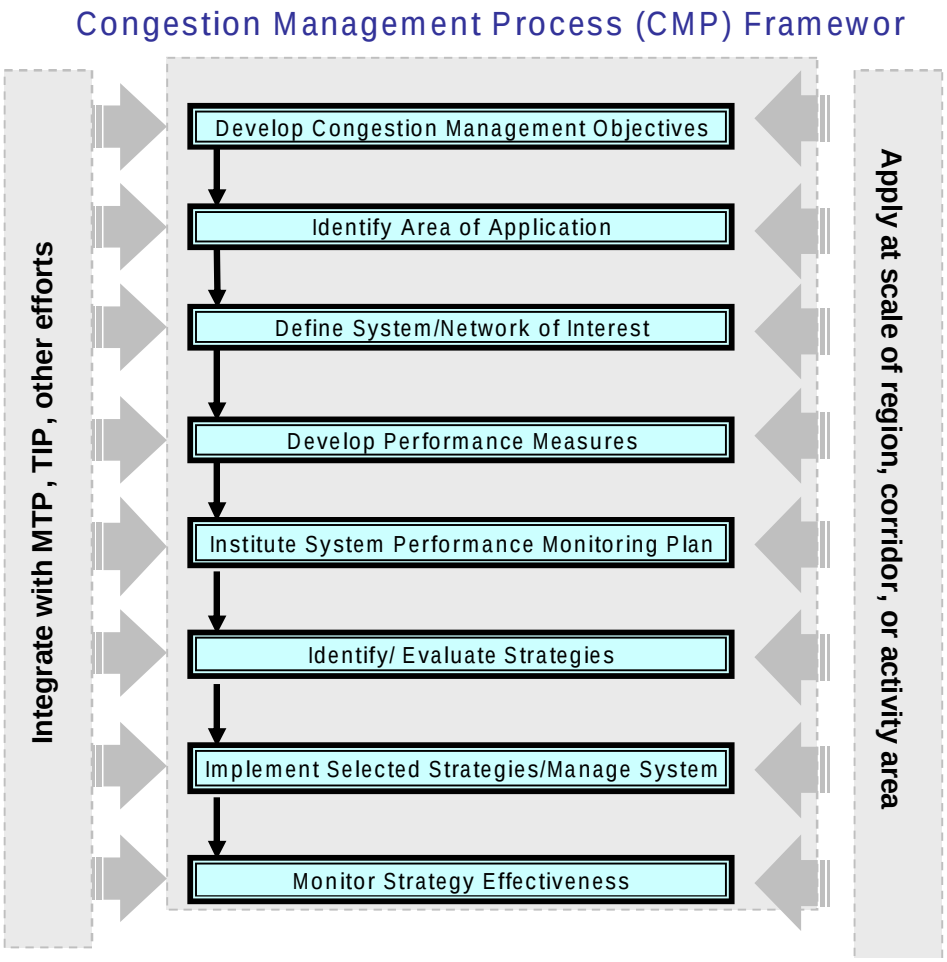


Figure 2 - CMP Framework (the "8 Steps")

A well-designed CMP should help the MPO to:

- Identify congested locations;
- Determine the causes of congestion;
- Develop alternative strategies to mitigate congestion;
- Evaluate the potential of different strategies;
- Propose alternative strategies that best address the causes and impacts of congestion; and
- Track and evaluate the impact of previously implemented congestion management strategies.

Once congestion management strategies have been identified and selected as part of the Metropolitan Transportation Plan (MTP), the CMP can also be used to:

- Set priorities among projects for incorporation into the Transportation Improvement Program;
- Provide information for environmental analysis of proposed projects;
- Develop more detailed assessments of the potential for congestion reduction at the corridor or activity-center level; and
- Assist in the ongoing monitoring and evaluation of projects and programs implemented throughout the region.

***Titles III and VI of SAFETEA-LU, Sections 3005 and 6001, updated the requirement for addressing congestion in Transportation Management Areas (TMAs), mandating the incorporation of CMP within the metropolitan planning process. TMAs are defined as metropolitan areas with a population greater than 200,000, but metropolitan areas can be designated TMAs at the request of the Governor and the MPO responsible for that region. In TMAs, SAFETEA-LU requires that the MPO "shall address congestion management through a process that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities... through the use of travel demand reduction and operational management strategies." The Final Rule on Statewide and Metropolitan Transportation Planning, published on February 14, 2007, states that "The development of a congestion management process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the Transportation Improvement Program (TIP)."***

The Congestion Management Process is intended to be an integral part of the metropolitan planning process, rather than a stand-alone program or system (Figure 3). The CMP can be used to identify specific strategies that make the best use of new or existing transportation facilities, including but not limited to travel demand management, such as changes to land use, mode shifts, or changes to the time of day for travel; transportation systems management and operations, including approaches such as incident management through improved response to crashes, freeway management systems like ramp metering, improvements to arterial management such as traffic signal coordination, and improvements to transit operations; better travel information to help system users plan their trips in advance or respond to changing conditions; or capacity expansion through existing or new facilities as appropriate.

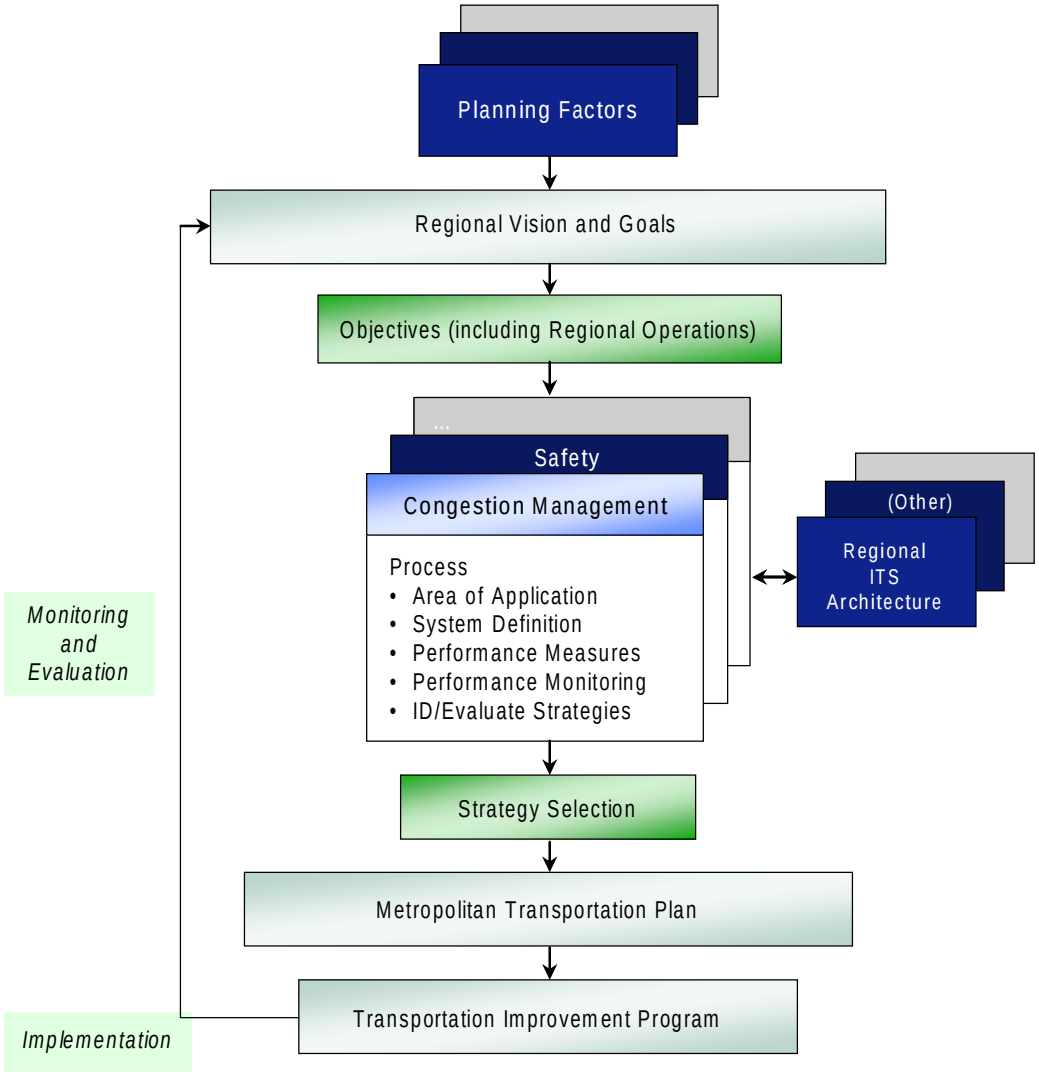


Figure 3 - Objectives-Driven CMP in the Planning Process

The Congestion Management Process is closely aligned with the integration of transportation systems management and operations into the metropolitan planning process. Management and operations (M&O) has emerged as a vitally important approach to addressing both short-range and long-term transportation challenges. SAFETEA-LU specifically requires consideration of M&O in the metropolitan transportation planning process; "Promote efficient system management and operation" is identified as one of eight planning factors that must be taken into account in the development of the MTP (see Section 6001(h)). MPOs must also include "operational and management strategies to improve the performance of existing transportation

facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods." The CMP is intended to fit neatly within objectives-driven, performance-based planning, and emphasizes management and operations as a new focus for metropolitan transportation planning.

The CMP uses a number of analytic tools to define and identify congestion within a region, corridor, activity center or project area, and to develop and select appropriate strategies to reduce congestion or mitigate the impacts of congestion. There are several common characteristics of "state-of-the-practice" congestion management processes, including:

- Links to operations objectives, driven by the goals expressed in the MTP;
- Defines systematic methods to monitor and evaluate system performance;
- Focuses comprehensively on management and operations, demand management, land use, and new capacity as ways to manage congestion;
- Uses performance measures to identify, evaluate, and monitor congestion and congestion management strategies;
- Defines a program of data collection and management, preferably incorporating existing data sources (including archived ITS data if available), and coordinated with system operations managers throughout the metropolitan area;
- Details technical capabilities for evaluating the potential effectiveness of demand management and operational strategies;
- Defines implementation schedules or timetables for delivery of M&O strategies, including assignment of resources and responsibilities;
- Defines procedures for periodic review of the effectiveness of strategies selected for implementation, as well as assessments of the usefulness of performance measures and supporting data; and
- Considers congestion, its causes, and possible remedies in a holistic way, encompassing a broad range of multimodal transportation and non-transportation elements.

The CMP benefits greatly from a systematic approach to collecting and managing data for performance measurement. The Congestion Management Process also requires analysis and strategy development components. The CMP may yield reports on congested locations, congestion mitigation strategies, and system performance, but such stand-alone "congestion management plans" are not the focus of the Congestion Management Process. The CMP is intended to provide strategies for inclusion in the metropolitan long-range transportation plan, and may also be used for intermediate and short-term planning purposes. For instance, the CMP can be applied to the development of the Transportation Improvement Program, using CMP analyses as one input into the project prioritization process.

The congestion management process contributes to achievement of regional congestion management objectives, and can deliver a number of collateral benefits as well. By addressing congestion through a comprehensive process, the CMP provides a framework for responding to congestion and other operational issues in a consistent, coordinated fashion. The CMP also enables MPOs to bring an objective basis to the process to pinpoint those congestion management strategies that will allow the region to target the most congested areas and achieve the greatest benefit by targeting the investment.

The CMP comprises a number of different elements that add up to a coherent, objectives-driven, performance based approach to solving congestion problems. These components are described in the Final Rule on Statewide and Metropolitan Transportation Planning. The Rule states that the CMP shall include:

- Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring congestion, identify and evaluate alternative strategies, provide information supporting the implementation of actions, and evaluate the effectiveness of implemented actions;
- Definition of congestion management objectives and appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures should be tailored to the specific needs of the area and established cooperatively by the State(s), affected MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area;
- Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area;
- Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combinations of strategies, are some examples of what should be appropriately considered for each area:
    - Ø Demand management measures, including growth management and congestion pricing;
    - Ø Traffic operational improvements;
    - Ø Public transportation improvements;
    - Ø ITS technologies as related to the regional ITS architecture; and
    - Ø Where necessary, additional system capacity;
- Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation; and
- Implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures. The results of this evaluation shall be provided to decision-makers and the public to provide guidance on selection of effective strategies for future implementation.[3]

[3] 23 CFR 450.320(c)

## Best Practices

A recent Transportation Research Board (TRB) Conference[4] highlighted the best practices of Congestion Management Practices. Below are three examples of agency development, process, lessons learned, and maintenance of the CMP.

### *Hampton Roads Metropolitan Planning Organization*

### *Ms. Camelia Ravanbakht, Deputy Executive Director*

The Hampton Roads MPO region is located in southeastern Virginia and includes nine cities and four counties (including Norfolk, Virginia Beach, and Williamsburg). The economy in the region is heavily influence by tourism, the military, and seaports. The region's Congestion Management Process (CMP) and transportation system is influenced by four unique factors in the region:

- A 4-lane tunnel facilities carry over 100,000 vehicles / day
- Many drawbridges
- Ports produce high truck volumes
- Traffic fluctuates greatly due to tourist volumes and military deployments

The CMP includes a database with various traffic characteristics for each roadway segment and the agency frequently provides data from the database to other jurisdictions, businesses, and the media. Products from the CMP include a CMP Technical Report and a State of Transportation Report. The CMP Technical Report contains a congestion analysis on the roadways as well as additional analysis on bridges and tunnels and congestion mitigation strategies and evaluation. The State of Transportation Report is a less technical, more graphical summary of regional transportation trends for all modes. This report is designed to be used by planners, decision makers, and the public.

Other outputs of the CMP include:

- CMP Special Report – a glossy mass distribution piece;
- Regional Safety Study – crash data, trends, and countermeasures;
- Corridor / Subarea Studies; and
- Transit and Travel Demand Management Studies.

The Hampton Roads MPO has found great value in developing a Regional Concept of Transportation Operations (RCTO). The RCTO together with the CMP frame the shared regional objective for transportation operations and what is needed to achieve the regions transportation objectives. Specifically, the RCTO helps agencies think through and reach consensus on what they want to achieve in the next 3 to 5 years and how they are going to get

[4] TRB Meeting Federal Surface Transportation Requirements in Statewide and Metropolitan Transportation Planning: A Conference. September 3 – 5, 2008 Atlanta, Georgia.

there. Developing the RCTO provides and strengthens the linkage between regional planners and managers responsible for transportation operations.

Future updates of the CMP will include additional emphasis on non-roadway factors, such as land use, transit, TDM, bike and pedestrian facilities, and ITS/operations. The process will place a greater emphasis on evaluating strategies for the CMP High Priority Corridors and use software packages such as DYNASMART-P.

### *Delaware Valley Regional Planning Commission*

### *Ms. Zoe Neaderland, Senior Transportation Planner*

The Delaware Valley Regional Planning Commission (DVRPC) in the Greater Philadelphia region encompasses a nine-county, two-state area. DVRPC Member agencies work together to address key issues including transportation, land use, environmental protection, and economic development. Within DVRPC the Long Range Planning & Congestion Management Unit of the Comprehensive Planning Section is responsible for developing the congestion management process (CMP).

DVRPC's CMP enhances the existing concept of a Congestion Management System (CMS) with emphasis on being an ongoing cycle and other refinements. It identifies congested corridors and identifies multimodal strategies to mitigate congestion and enhance mobility in the region. Where additional single-occupancy vehicle capacity is appropriate, the CMP includes supplemental strategies to reduce travel demand and get the most value from the investment. It completes the cycle by evaluating the effectiveness of transportation improvements, coordinating with other planning processes, and providing updated analysis of the performance of the transportation system.

DVRPC has found great value in developing the CMP for their region as it has helped structure the discussion for where to invest limited funds for congestion reduction and achieving regional goals. The agency has worked with the flexibility of the CMP and tailored the defined "eight steps" to the region by condensing the steps down to four. The four steps or stages for their CMP are:

- Planning/ Advisory Committee – key stakeholders discussing ideas and coming to agreement;
- Analysis – region-wide approach to the analysis elements of the process;
- Action – includes implementation tables for DVRPC and stakeholders; and
- Evaluation – evaluates the successes and defines what can be improved in the next cycle.

After almost two full cycles of the CMP, two key lessons reported were to keep it simple and communicate. Keeping the CMP as simple as reasonably possible allowed for effective and multimodal steps to be accomplished which then allowed for further enhancements at future revision cycles. Also, communications within the agency, with member agencies, and the

broader public were key to making progress on the CMP. Multiple approaches were used, with various groups, for a comprehensive communications effort - which greatly benefited the process.

### *Southeast Michigan Council of Governments*

### *Mr. Tom Bruff, Transportation Coordinator*

The Southeast Michigan Council of Governments (SEMCOG) is a membership organization of local governments serving the Greater Detroit Area. SEMCOG supports local government planning on regional issues in the areas of transportation, environment, community and economic development, and education. As the region's transportation planning agency, SEMCOG is responsible for coordinating the vision for a transportation system that is safe, accessible, and reliable, and contributes to a higher quality of life.

The Congestion Management Process (CMP) is intended to be an integral part of the planning process together with the regional long-range transportation plan. SEMCOG realized an important part of their CMP would be to link the process with the Long Range Plan/Regional Transportation Plan, Intelligent Transportation System Architecture, and Regional Concept for Transportation Operations.

SEMCOG found great value in working with the flexibility detailed in the eight-steps of the CMP framework detailed in the FHWA/FTA Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning. The eight-steps of a CMP framework are to develop congestion management objectives, identify area of application, define system/network of interest, develop performance measures, institute system performance monitoring plan, identify/ evaluate strategies, implement selected strategies/manage system, and monitor strategy effectiveness. From this framework the SEMCOG CMP implemented the following steps:

- Establish Goals and Objectives
- Performance Measures
- Performance Monitoring Plan
- Identify Mitigation Strategies
- Evaluate Mitigation Strategies
- Regional Transportation Plan Implementation
- CMP Implementation and Management
- Monitor Strategies for Effectiveness

SEMCOG was able to use the framework with their CMP to ensure the eight steps were addressed while allowing the process to be tailored to the Greater Southeast Michigan regional transportation network.

## Summary

Federal requirements combined with local initiative have increasingly stressed the importance and need for integration of operations planning and management and operations. Many agencies have successfully leveraged the Congestion Management Process and have begun planning for operations.

Ultimately, the CMP is intended to be a flexible approach to transportation problem solving that builds upon years of experience in congestion management. It is important to emphasize that the CMP is intended to support transportation decision making, as an integral part of the planning process. While the process may be supported by a program or system of data collection, monitoring, and analysis (a "congestion management system"), and may produce reports detailing alternative strategies and projects designed to address specific congestion problems (a "congestion management plan"), the CMP is a set of tools for identifying and addressing congestion throughout the long range planning and project development cycle. MPOs that have long-standing congestion management programs or systems may be challenged in the transition to a fully integrated long range transportation process that makes congestion management a "core" activity, as opposed to an isolated, stand-alone process.

While there are many available technical methods that can assist in assessing the state of congestion in a given region, MPOs may be challenged in developing and maintaining these tools for their own regions. The ability to acquire and maintain the level of data collection and management is also a significant hurdle in many areas. Different operating agencies may have quite different and distinct data collection and management systems. Even if data is collected into a regional data archive, many of these differences in how each agency collects, processes, and formats data may remain. MPOs may encounter significant barriers in consolidating information and reconciling these different data management practices.

The difficulties inherent in understanding and using data from multiple agencies underscores the need to involve the appropriate players from transportation system operating agencies, both at the policy and technical level. These challenges apply as well to attracting and retaining professional staff to manage the CMP. While obtaining the necessary level of commitment and continuity of involvement from agency staff is a formidable challenge, bringing together operations personnel and policy level representatives from multiple operating agencies can also offer tremendous opportunities for creating formal and informal networks and working relationships. Creating a CMP "team" can deliver real benefits by transforming "stakeholders" into partners in pursuing effective congestion management strategies.

Notwithstanding these challenges, the CMP offers an opportunity to institutionalize a new and strategic mindset toward transportation issues. The objectives-driven, performance-based approach to metropolitan transportation planning embodied in the CMP, and in the new emphasis on management and operations, can strengthen the planning process by directing attention to short- and medium-term measures to mitigate congestion, as well as to measures that will maintain the safety and efficiency of new and expanded transportation facilities into the future. The CMP approach can also be a template for approaching other regional objectives that are established through the planning and visioning process.