Congestion Management Process (CMP) Innovations:

A Menu of Options

Prepared for:

New York State Association of Metropolitan Planning Organizations (NYSMPOs)

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CONGESTION MANAGEMENT PROCESS INNOVATIONS: A MENU OF OPTIONS

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1 INTRODUCTION

This Menu of Options offers information to metropolitan planning organizations (MPOs) to consider in implementing a Congestion Management Process (CMP). The CMP – formerly known as a Congestion Management System (CMS) – was intended by Federal law to be a systematic, transparent way for transportation planning agencies to identify and manage congestion, harnessing performance measures to direct funding toward projects and strategies that are most effective for addressing congestion. The CMP was intended to augment and be folded into the overall metropolitan transportation planning processes.

The Menu provides information on innovative approaches to CMP activities that are relevant for complying with the Federal requirements and for increasing the value of CMP activities within the transportation planning process, including support for regional transportation goals that go beyond addressing congestion. The options presented in this Menu were identified based on a national review of CMS practices, which included a review of articles, presentations, reports, and CMS documents, as well as interviews conducted with staff from MPOs around the country. They also reflect discussions at a workshop held in September 2005 that brought together CMS staff from MPOs throughout New York State, as well as staff from several MPOs outside of New York who had been identified for their innovative practices. Approaches addressed in the Menu offer information on: carrying out required CMP elements; making stronger linkages between CMP and transportation planning and programming processes; and using CMP activities to support other important transportation goals.

1.1 Background

Federal requirements state that regions with more than 200,000 people, known as Transportation Management Areas (TMAs), must maintain a CMP and use it to inform transportation planning and decision-making. These requirements were introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and were continued under the successor law, the Transportation Equity Act for the 21st Century (TEA-21). Whereas previous laws referred to this set of activities as a congestion management system (CMS), the most recent surface transportation authorization law, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), refers to a "congestion management process", reflecting that the goal of the law is to utilize a process that is an integral component of metropolitan transportation planning.

SAFETEA-LU Provisions: 'System' to 'Process'

Under the current authorization law for Federal surface transportation funding, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the provisions on metropolitan transportation planning for Transportation Management Areas (TMAs) refer to a 'congestion management process (CMP)' rather than a 'congestion management system (CMS)', as previous laws have.

FHWA will be developing regulations and guidance on the planning requirements under SAFETEA-LU. The intent of the congestion management requirement has not changed, so the two terms – CMS and CMP – are interchangeable. To reflect the language in SAFETEA-LU, this Menu refers to congestion management processes (CMPs) when referring to current or future efforts relating to the Federal requirements, but describes previous efforts as congestion management systems (CMS).

The Federal regulation at 23 CFR Part 500 Sec. 109 identifies the required components for a CMS (see text box). New metropolitan transportation planning regulations are under development for SAFETEA-LU that will address the CMP. Aside from the change in name, the CMP requirements are not expected to change substantially from the CMS requirements.

Required Elements of a Congestion Management System

Federal regulations (23 CFR Part 500 Sec.109) state that a congestion management system must include:

1. Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of congestion, identify and evaluate alternative actions, provide information supporting the implementation of actions, and evaluate the efficiency and effectiveness of implemented actions;
2. Definitions of the parameters for measuring the extent of congestion and for supporting the evaluation of the effectiveness of congestion reduction strategies for the movement of people and goods;
3. Establishment of a program for data collection and system performance monitoring to define the extent and duration of congestion, to help determine the causes of congestion, and to evaluate the efficiency and effectiveness of implemented actions;
4. Identification and evaluation of the anticipated performance and expected benefits of appropriate traditional and nontraditional congestion management strategies;
5. Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy; and
6. Implementation of a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures.

In TMAs designated as ozone or carbon monoxide non-attainment areas, the Federal regulation prohibits projects that increase capacity for single occupant vehicles (SOVs) unless the project emerges from a CMP. In these cases, the regulation requires that the CMP provide an appropriate analysis of all reasonable – including multimodal – travel demand reduction and operational management strategies for the corridor in which a project that will result in a significant increase in capacity for SOVs is proposed. If the analysis demonstrates that travel demand reduction and operational management strategies cannot fully satisfy the need for additional capacity in the corridor, the CMP is required to identify all reasonable strategies to manage the SOV facility effectively.

The Federal requirements, however, do not specify all aspects of CMP implementation. A CMP can take a variety of forms. Some MPOs document their CMP as part of the documentation of their Long-Range Transportation Plan (LRTP) or Transportation Improvement Program (TIP). FHWA does encourage MPOs to develop a CMP report as a means to bring attention to the role of congestion management strategies, but a separate CMP document is not a requirement. The Federal requirements are also silent on the frequency with which CMP activities are to occur. While some MPOs have conducted CMS activities on an annual basis, others have left two or more years in between CMS updates. Compliance with the CMP requirement is addressed during the metropolitan transportation planning process certification reviews for TMAs.

1.2 Planning a CMP: Framework and Considerations

Although a CMP is required in every TMA, Federal regulations are not prescriptive regarding the methods and approaches that must be used to implement a CMP. This flexibility was provided in recognition that different metropolitan areas may face different conditions regarding traffic congestion. As a result, TMAs across the country have demonstrated compliance with the regulations in different ways. For some metropolitan planning organizations (MPOs), the CMP is an important tool for addressing persistent congestion problems and for prioritizing investments. In a less ideal case, the CMP can become a collection of data and performance measures regarding traffic congestion but does not link closely with the planning process.

Some of New York's medium-sized MPOs are not experiencing rapid growth and have few persistent congestion problems. For these MPOs, the CMP has not developed a close fit with existing planning practices and appears to offer limited benefits while consuming significant staff resources. Even in regions that have congestion and air quality problems, the CMP may not be utilized to its full extent within the planning process. MPO staff from around the state have limited staff resources and budgets, and want to make sure that they are using their resources as efficiently and effectively as possible. As a result, New York State MPOs are attempting to make the CMP a more useful planning tool to help address a diversity of transportation planning challenges while satisfying Federal requirements.

To help guide decisions about CMP implementation, a framework is presented here for considering and developing the various activities relating to CMP. In this framework, it is useful to consider several dimensions.

First, whether or not the agency has developed a CMS or CMP in the past is important. Agencies that may be new to the CMP might consider aiming to put an 'inaugural' CMP in place with basic approaches. Agencies that are revisiting an existing CMS or CMP may be interested in tackling more advanced topics.

Second, the region's general congestion picture is important. Does the region experience significant amounts of recurring congestion? Has there been recent significant growth in population and employment? Is there expected to be in the future? Is there significant non-recurring congestion or seasonal congestion? The importance of congestion issues within the regional context has important implications on the resources and level of effort that MPOs may want to invest in the CMP.

Third, what other transportation goals are receiving increased emphasis in the region? Improving traffic safety? Emergency management planning? Operational issues? There may be benefits to these other goals that arise from conducting CMP activities. Is improving communications with the public a high-priority goal? Is developing a congestion-monitoring system important, such as an Intelligent Transportation Systems (ITS) plan? These considerations should be kept in mind and taken into account in planning for and implementing a CMP.

1.3 How to Use this Document

This Menu recognizes that there are many different situations encountered by transportation agencies, and that there is not one correct way to go about a CMP. Therefore, the Menu offers multiple options and provides information intended to help agencies determine the options that are most suitable to their own situations.

The Menu is intended to provide ideas for approaches to carrying out CMP elements, some details about those approaches, and some examples and sources for further information. The options are presented separately in order to provide information that distinguishes each option, but it should be emphasized that it is often possible, even advantageous, to select more than one option in a particular category. For instance, an agency may select several CMP performance measures to capture several aspects of travel conditions.

The Menu is organized under two main topics.

- *Approaches to Address Required CMP Elements.* This topic explores available options for accomplishing tasks required by Federal regulation, including developing performance measures, collecting data, evaluating strategies, monitoring strategy effectiveness, and documenting the CMP.

- *Putting CMP to Broader Uses.* This topic explores potential broader application of the CMP, including ways to more effectively incorporate the CMP in transportation planning and programming processes, and ways to utilize the CMP to address transportation goals beyond managing congestion.

Subtopics are organized into sections that discuss specific aspects or applications of the CMP. For each section, the Menu includes a brief introduction that includes considerations for selecting options within that section. This introduction is followed by the options themselves, presented as fact sheets that follow a consistent format for ease of comparing among different options. The fact sheets include information that is intended to be valuable for making decisions about which options to select for implementation.

The fact sheet format describes the option, the situations in which the option is most appropriate, important resources and partners for implementing the option, and the critical steps in implementing the option. The fact sheets also make assessments of the strengths and limitations of each option, as well as the level of effort and cost that might be involved in implementing the option. Where applicable, assessments of cost have been divided into initial costs, defined here as any one-time costs associated with implementing the option for the first time, and ongoing costs, defined as costs that would be incurred each time the CMP activity is implemented. The assessments of cost and level of effort have been made on a relative scale and assigned the values of low, medium, and high; actual costs and levels of effort will vary among MPOs based on size, existing data, and other factors. Finally, the fact sheets end with examples where the option has been applied and identify topics that are related to the option being discussed.

2 APPROACHES TO ADDRESS REQUIRED CMP ELEMENTS

This chapter describes a number of different approaches that can be used by agencies to address required CMP elements. The challenge facing agencies is to address the requirements in a way most appropriate and effective for their particular planning contexts and the conditions existing within their regions. Six elements of a congestion management process are discussed:[1]

- Developing Performance Measures
- Using Performance Measures
- Collecting Data / Monitoring Performance
- Identifying and Evaluating Strategies
- Monitoring Strategy Effectiveness
- Documenting CMP Activities

The amount of resources required by each of these elements will depend on the decisions made in implementation and the availability of existing information sources, but of these elements, collecting data generally has the highest potential resource requirements. The remaining elements can generally be implemented with relatively lower cost and levels of effort, although an agency might choose to spend more resources on one or more of these elements.

[1] In presentations given by its Resource Center staff, FHWA has identified seven CMP components: area of application; system definition; performance measures; performance monitoring plan; identification and evaluation of strategies; monitoring strategy effectiveness; and implementation and management. Clearly there are other issues regarding required CMP elements that warrant consideration beyond the topics discussed here. However, because the research conducted for the Menu found that the elements discussed here represent the CMP activities that agencies have noted as the most critical, the Menu limits discussion to these elements.

2.1 Developing Performance Measures

One of the first and most important decisions in implementing a CMP is that of selecting the performance measures an agency will use to identify congestion. Decisions about performance measures will have implications for data collection, the element here with the highest potential for incurring major costs. And while the cost implications of performance measure decisions might encourage a least-cost approach, it is also worthwhile to note that performance measures can be a high-profile and systematic way to frame discussions about congestion and transportation investments. It therefore may be worthwhile to spend resources on developing and implementing performance measures that depict travel conditions in a well-rounded way, rather than simply use a least-cost approach.

A number of considerations are notable in choosing performance measures. Because there are many aspects of congestion, many different ways to measure performance have been suggested. The Federal requirements do not offer guidance here, leaving agencies to develop their own definition of congestion. Many agencies are migrating away from traditional roadway measures, such as volume-to-capacity ratios, to travel-time-based measures. Many are also measuring travel conditions for transit, biking, and walking, including whether those modes are available, how much the modes are used, and how the modes perform regarding the traveler experience. In some areas, addressing non-recurring congestion is an important priority, prompting agencies to choose measures that shed light on travel time reliability. In selecting performance measures, agencies should consider the following:

- ability of the measure to track roadway congestion for the region overall, as well as for individual transportation facilities;
- ability of the agency to collect data to track the measure;
- ability of the measure to relate the data to traveler perceptions in a readily understandable way;
- opportunities for addressing different aspects of congestion that are important to users of the transportation system, such as non-recurring traffic congestion, impacts of congestion on freight movement, and the availability of alternatives to avoid traffic congestion (e.g., transit, bicycle, and pedestrian options).

Although a wide range of measures are available, agencies should select performance measures with a clear recognition of the availability of data and cost of data collection and analysis. Agencies should also consider the trade-offs associated with the advantages and disadvantages of opting for more complex measures. While some agencies utilize a wide range of performance measures in their CMP, others specifically limit their focus to the most important measures and collect data only on those measures. It may be worthwhile for agencies to consider a hierarchy of priority in selecting performance measures. For instance, since the public's perception of transportation system performance is often based on recurring traffic conditions, measures of recurring congestion might be the first priority. An agency may choose also to measure non-recurring roadway congestion, alternative-mode availability and use, freight travel, or accessibility measures only after utilizing recurring roadway congestion measures.

The Menu discusses the following options for performance measures.

Types of Performance Measures

A-1. Traditional volume-to-capacity ratios and level of service measures

A-2. Travel time measures

A-3. Congestion duration and extent measures

A-4. Reliability (non-recurring congestion) measures

A-5. Transit travel condition measures

A-6. Availability / service level measures for non-motorized travel

A-7. Accessibility measures

A-8. Freight performance measures

2.1 Developing Performance Measures

Option A-1: Traditional Volume-to-Capacity Ratios and Level of Service Measures

Description

These measures gauge the intensity of roadway congestion at a particular location (roadway or intersection), and include traditional measures such as volume-to-capacity (V/C) ratio and level of service (LOS). They are used frequently because data on traffic volumes are usually relatively easy to obtain and often already exist. Sometimes these measures are converted to travel time through a series of theoretical relationships, and derivative indicators that address travel time—such as excess delay—are sometimes calculated from volume-based measures. In addition, LOS indicators with a simple, often-standardized "A" through "F" grading system are sometimes assigned based on these calculations. Note that metrics and methodologies for intersections are different than those for roadway segments.

Applicability

- Generally applicable for all metro areas. Especially suited when resources are unavailable for collecting additional information beyond existing traffic counts.
- Most appropriate for individual highway segments or intersections, rather than corridor or regional analysis.

Resources/ Partners Needed

Depending on measures selected and availability of existing traffic count data: cities, counties, and state DOTs.

Implementation Steps

- Select facilities of interest, including highway segments and major intersections.
- Select time period of interest – popular analysis periods include the a.m. and p.m. peaks and daily conditions.
- Obtain volume data.
- Calculate measures using standard methods, such as in *Highway Capacity Manual*.

Strengths

- Generally accepted as reasonable measures.
- Large existing body of experience in defining and applying.
- Data generally readily available.
- Can serve to 'screen' the roadway system quickly to identify congested locations.

Limitations

- Tends to focus on movement of vehicles, rather than people.
- Somewhat engineering-focused – may not be readily understood by the public.
- Potentially deceptive; when high, volume may be dictated by roadway capacity rather than demand.

Cost

Low to Medium (Cost depends on data collection method and extent)

Level of Effort

Low

Example

Many agencies across the country have selected these traditional performance measures, mainly relying on state DOTs and local jurisdiction traffic counts for their data. For its CMS document, the Mid-Region Council of Governments in Albuquerque, New Mexico, has implemented a simplified interpretation of LOS using V/C ratios and standard assumptions regarding roadway characteristics, producing a list of congested links according to a V/C threshold of 0.65. For more information:

www.mrcog-nm.gov/index.htm.

Related Topics 2.3 Collecting Data / Monitoring Performance, specifically, traffic count data (Option C-1)

2.1 Developing Performance Measures

Option A-2: Travel Time Measures

Description

Travel time measures focus on the time needed to travel along a selected portion of the transportation system. Common variations of travel time metrics include:

- travel time – the amount of time needed to traverse a segment or corridor;
- travel speed – the length of a segment divided by the travel time;
- average delay – the difference between travel time and acceptable or free-flow travel time; and
- travel time index – ratio of peak-period to non-peak-period travel time.

These measures may be used at any of various levels – for specific road segments, intersections, corridors, or at the regional level. Note that the measures referred to here are based on actual travel speeds, rather than speeds calculated from speed-volume relationships.

Applicability

Generally applicable for all TMA areas.

Resources/ Partners Needed

Depending on measures selected and availability of data:

- Traffic Management Centers or state DOT staff, if archived data are available.
- Travel time surveys, if no archived data are available for desired corridors.

Implementation Steps

- Select specific forms of travel time measure(s) and approach for identifying congestion, i.e., travel speed below a predetermined acceptable speed.
- Select facilities or areas of interest (may not choose to monitor entire CMP network).
- Select threshold speeds, delay, or time, based on type of facility (arterial, freeway, etc.) and type of area (downtown, suburb, etc.).
- Determine data requirements and potential sources, including collection plan (i.e., through existing archived sources, or new travel time surveys).

Strengths

- Metrics are easily understood by the traveling public.
- Can also be easily translated into other measures like user costs.
- Can be used to validate travel demand forecasting models.

Limitations

- Generally does not address amount of travel supplied or demanded (some measures, such as travel delay, may account for total amount of time experienced by drivers – see discussion of measures of congestion duration and extent (Option A-3)).
- May require substantial data collection resources, especially if ITS archived data unavailable. Even if archived data are available, significant re-formatting or post-processing may be required.

Cost

Low to Medium (Cost depends on data collection method and extent)

Level of Effort

Low to Medium (depending on extent to which data need to be manipulated)

Example

The Capital Area Metropolitan Planning Organization (CAMPO), in Austin, Texas, utilizes travel-speed-related measures to identify congested locations. For roadway segments, CAMPO has defined minimum threshold acceptable speeds, based on the type of road and the type of area through which that road travels, with lower speeds more acceptable in a central business district location than in a rural area. For more information: Rachel Everidge-Clampffer, rachel.clampffer@ci.austin.tx.us.

Related Topics 2.3 Collecting Data / Monitoring Performance, specifically, GPS technologies for conducting travel time surveys (Option C-2), archived ITS/operations data (Option C-3), and other electronic data (Option C-4)

2.1 Developing Performance Measures

Option A-3: Congestion Duration and Extent Measures

Description

These metrics identify the length of time over which a facility is congested, the portion of the transportation system that experiences congestion, or the total amount of delay time experienced by drivers. Sample measures include:

- Hours of delay – total regional hours of delay experienced by drivers (average time delayed per driver times volume of traffic)
- Lane miles at LOS F
- Hours per day at LOS F (for specific facilities)

Applicability

- Generally applicable in all metro areas, but particularly useful in areas with significant recurring congestion.
- Most appropriate for regional, sub-area, or corridor analysis.

Resources/ Partners Needed

- These measures are derived from direct measures such as travel time and traffic volumes, so data for those direct measures would be needed in order to implement congestion duration and extent measures.
- Providers of traffic data, such as state DOTs, cities and counties, and traffic management center operators.

Implementation Steps

- Obtain data on direct measures such as travel time or volume-to-capacity; if measuring duration, measurements at successive times during congested periods or over a 24-hour period may be needed. If direct data are unavailable, the travel demand forecasting model may be able to supply simulated data.
- If desired, select performance goals or standards, e.g., fixed targets or percent reductions from previous years.
- Calculate/estimate congestion duration and extent.

Strengths

- Provides another dimension of congestion analysis, allowing further distinctions to be made
- Particularly valuable to show changes in performance in locations where it is not possible to eliminate congestion

Limitations

May require more extensive data collection efforts.

Cost

Low to Medium (note that these measures have implications for data collection; for instance, if longer or more collection efforts are needed, costs could increase substantially).

Level of Effort

Low

Examples

The East-West Gateway Coordinating Council (EWGC) in St. Louis, Missouri, measured its CMS network via aerial photography. Multiple photographs were taken during three-hour a.m. and p.m. peak periods, producing traffic volume and density numbers for several time points at the same location. This information allowed EWGC to track the duration of congestion along congested links, distinguishing links with prolonged congestion from those that are congested over short portions of the peak periods. For more information: www.ewgateway.org/trans/transportation.htm.

The Maricopa Association of Governments (MAG) in Phoenix, Arizona, has conducted an analysis of intersection and highway segment LOS. MAG used 24-hour traffic counts and

aerial photography to determine the duration of congestion at congested locations. MAG also tabulated the number of monitored intersections operating under congested conditions, as well as the number of miles of the designated CMS network. For more information: www.mag.maricopa.gov.

Related Topics 2.3 Collecting Data / Monitoring Performance, specifically, traffic count data (Option C-1), GPS technologies to conduct travel time surveys (Option C-2), archived ITS/operations data (Option C-3), other electronic data (Option C-4), and travel demand forecasting model (Option C-6)

2.1 Developing Performance Measures

Option A-4: Reliability (Non-Recurring Congestion) Measures

Description

Reliability metrics focus on the level of variation in travel time stemming from incidents, special events, construction, weather, and other factors that vary from day to day. This category includes direct measurements of travel time variation, simulated indicators, and proxy measures – such as the number or extent of construction activities, the number of breakdowns and accidents, or the average clearance time for incidents. These proxy measures can give some insights to the extent of non-recurring congestion, even if they do not measure congestion directly.

Applicability

- Generally appropriate for all metro areas.
- Applied to specific roadways.

Resources/ Partners Needed

- ITS data or operations data related to travel reliability, such as number or frequency of roadway incidents and average duration of incidents. If no other data are available, some travel demand forecasting models may be able to supply simulated data.
- ITS operators; operations providers; traffic information service providers.

Implementation Steps

- Select facilities of interest; major regional roadways are generally the best candidates.
- Identify potential available data sets, such as continuously recorded data from traffic sensors, travel model output, or operations statistics.
- Calculate measures based on data; possibilities include: actual measures of reliability; simulated indicators; or proxy measures.

Strengths

Focuses attention on a major component of travel delay that is often overlooked in traditional transportation analyses and modeling; non-recurrent delays are estimated by FHWA to be responsible for nearly half of traveler delays. Addresses the aspect of congestion that is most frustrating to travelers and that is particularly important to freight shippers.

Limitations

Data needs are intensive (large amounts of traffic volume and/or speed data on a continual basis collected throughout the analysis period) or specialized (e.g., the number and duration of incidents) ; few readily available sources of data

Cost

Medium (Note that these measures have implications for data collection)

Level of Effort

Medium

Example

The North Jersey Transportation Planning Authority (NJTPA) has selected a reliability index that compares non-recurring delay to total delay. NJTPA uses a special post-processing module to its travel demand model to help produce this indicator. For more information: www.njtpa.org/planning/strat_eval/strat_eval.html.

Related Topics

2.3 Collecting Data / Monitoring Performance, specifically, GPS technologies for conducting travel time surveys (Option C-2), archived ITS/operations data (Option C-3), other electronic data (Option C-4), and data from traffic reporting organizations (Option C-5).

2.1 Developing Performance Measures

Option A-5: Transit Travel Condition Measures

Description

Transit travel condition measures provide information on the conditions experienced by transit travelers. Aspects of transit travel conditions include load capacity and reliability of performance (availability and accessibility of transit services is addressed under Option A-7). Examples of specific measures include passenger overcrowding, measured by passenger loads relative to vehicle capacities, and schedule adherence, measured by percentage of on-time performance. In most areas, passenger overcrowding is not a major transit issue, but schedule adherence is generally an important aspect of transit conditions.

Applicability

Generally appropriate for all metro regions, but most effective where transit use is high and high roadway congestion exists.

Resources/ Partners Needed

- Transit operating performance and ridership data
- Transit agencies

Implementation Steps

- Identify major rail and bus routes of interest; a general rule-of-thumb might be to select only frequent, all-day services, plus major commute-oriented routes.
- Select specific measures, such as percent on-time performance, total daily boardings, passenger miles traveled, and average percent of seat capacity filled. Note that HCM features a transit Level of Service indicator that measures only the relative crowdedness of a transit vehicle.
- Select benchmarks as a basis from which to compare performance.
- For each route, obtain data on ridership and capacity, and on-time performance and calculate measures.
- If desired, calculate system-wide measures.

Strengths

Focuses attention on transit travel and needed improvements.

Limitations

- There may sometimes be political sensitivity to showing transit performance.
- Data may not be readily available. Transit agencies submit system-wide data to the National Transit Database, but may not keep statistics by individual route.

Cost

Low (note that these measures have implications for data collection).

Level of Effort

Medium

Example

The Boston MPO measures peak-period passenger crowding and on-time performance by transit line. Using data collected on the regional transit system, the Massachusetts Bay Transportation Authority (MBTA), the Boston MPO reports number of passengers per seat on transit lines in the peak period as well as the percentage of trips operating within five minutes of scheduled times. For more information: www.ctps.org/bostonmpo/resources/reports.htm.

Related Topics

2.3 Collecting Data / Monitoring Performance, specifically, archived ITS/operations data (Option C-3) and other electronic data (Option C-4)

2.1 Developing Performance Measures

Option A-6: Availability / Service Level Measures for Non-Motorized Travel

Description

These measures provide an indication of the extent to which travelers are able to choose an alternative mode of travel to single-occupancy vehicles. Measures include the extent of the bicycle, pedestrian, or transit network, and usage of those networks. On these networks, in most regions the general issues tend to be ones of completeness and comfort to the user, rather than of use. Measures can capture either effect.

Applicability

Generally appropriate for all metro regions.

Resources/ Partners Needed

- Strong mapping capabilities such as Geographic Information System (GIS) software; inventories of facilities for networks of interest; counts of users or riders.
- Land use jurisdictions such as cities and counties; transit providers.

Implementation Steps

- Identify where short trips might occur; travel demand model may be a good resource.
- Inventory and map selected areas on the relevant network(s): bicycle, pedestrian, and/or transit.
- Measure travel conditions and/or usage: e.g., bicycle or pedestrian counts, transit ridership, or biking or walking levels of comfort; Level of Service or Comfort measures can be rigorously quantitative, using facility characteristics, or qualitative, using public input and/or MPO staff for ratings based on local knowledge

Strengths

- Balances the focus on roadway congestion by providing a way to evaluate transit, bicycle, and pedestrian needs.
- Focuses attention on driving alternatives, which relates to managing congestion by curbing demand for roadway use.
- Can identify the most critical improvements needed for improving availability/service for alternative travel modes.

Limitations

Data may not be readily available.

Cost

Low to Medium (depending on whether there is an existing inventory)

Level of Effort

Medium

Examples

Hampton Roads Planning District Commission (HRPDC) in Chesapeake, Virginia, provides an inventory of regional bicycle facilities in its CMS, as well as maps of planned and programmed bicycle projects. For more information: Keith Nichols, knichols@hrpdc.org, www.hrpdc.org.

The Wilmington Metropolitan Area Planning Council (WILMAPCO) in Delaware provides an inventory of all existing non-motorized facilities, including sidewalks, crosswalks, footpaths and dedicated bike lanes along the CMS network. The purpose is to show the extent to which non-motorized facilities have been provided and the further potential for addressing congestion by promoting non-motorized travel, as represented by gaps in the non-motorized system. For more information: Dan Blevins, dblevins@wilmapco.org, www.wilmapco.org.

The Boston MPO evaluated bicycling and walking conditions in its 2004 CMS. For commuter and light transit stations, the agency analyzed bike access and parking facilities, as well as pedestrian access. The agency also analyzed all CMS roadways for bicycling conditions, using a suitability rating system based on FHWA's Bicycle Compatibility

Index. For more information: www.ctps.org/bostonmpo/resources/reports.htm.

Related Topics 2.3 Collecting Data / Monitoring Performance

2.1 Developing Performance Measures

Option A-7: Accessibility measures

Description

This broad set of measures describe the ability to reach the labor force, employment sites, retail centers, activity centers, and other land uses that produce or attract travel demand. Accessibility measures frame travel as a means to access desired goods, services, and activities that is affected by multiple factors – proximity as well as mobility. Measuring accessibility can involve calculating the number or share of population that can access desired destinations within a specific amount of time and by different travel modes – e.g., percentage of the labor force within 40 minutes of employment centers by motor vehicle – or the percentage of employment in the region within a five-minute walk of transit service.

Applicability

Generally appropriate for all metro areas.

Resources/ Partners Needed

- Strong mapping capabilities such as Geographic Information System (GIS) software; high-quality land use data; transportation network and service inventories; travel conditions data.
- Land use jurisdictions such as cities and counties; US Census Bureau; private-sector managers of land use data.

Implementation Steps

- Designate areas of interest, such as major trip producers or attractors.
- If desired, gather data on geographic distribution of population, employment.
- Determine important travel routes and/or transit routes.
- Measure transportation or travel condition characteristics associated with areas of interest and population and/or employment distributions.

Strengths

- Focuses attention on the link between transportation and land use.
- Addresses the demand side of travel mobility.

Limitations

Data are often not readily available.

Cost

Medium (note that these measures have implications for data collection)

Level of Effort

Medium

Example

The Regional Transportation Commission of Southern Nevada (RTC) in Las Vegas reports the percentage of the region's housing units that are located within ¼ mile of transit service. RTC used census data and a GIS to develop the analysis. For more information: www.rtcsouthernnevada.com/mpo/documents/pdf/rtptip/.

Related Topics

2.3 Collecting Data / Monitoring Performance, specifically GPS technology for conducting travel time surveys (Option C-2)

2.1 Developing Performance Measures

Option A-8: Freight performance measures

Description

Measures that focus on goods movement involve the use of other performance measures, such as volume-to-capacity ratios or travel time measures, but focus on roadways with a high volume of trucks or designed freight corridors. The purpose of these measures is to highlight congestion that affects freight since special consideration of solutions to freight traffic concerns may be needed.

Applicability

Most appropriate in areas with substantial inter-regional freight routes or facilities, such as rail lines, ports, or intermodal facilities.

Resources/ Partners Needed

- Truck-related traffic data, such as commercial vehicle traffic counts; data on locations of major freight facilities such as ports, inter-modal facilities, and truck transfer and regional distribution centers
- State DOTs; port and rail operators; private carriers

Implementation Steps

- Identify major freight routes. If regional truck routes have not been designated by the MPO or the DOT, routes may be identified using ITS infrastructure, or by identifying major freight centers such as such as ports, intermodal facilities, and truck transfer centers, and determining major truck routes to and from those centers.
- Use other congestion measures to identify locations, extent, duration of congestion along major freight routes.

Strengths

Focuses attention on freight impacts of congestion, and vice versa.

Limitations

Data may not be readily available for measuring freight-related performance.

Cost

Low (note that these measures have implications for data collection)

Level of Effort

Medium

Examples

The Wilmington Metropolitan Area Planning Council (WILMAPCO) in Delaware reports truck volumes on major CMS routes. Using data from Delaware DOT, WILMAPCO maps the information to display the daily truck traffic experienced by CMS routes. The data range from less than 500 trucks per day to over 5,000 trucks per day. For more information: Dan Blevins, dblevins@wilmapco.org, www.wilmapco.org.

The Chicago Area Transportation Study (CATS) CMS devotes separate analysis to truck traffic. Taking data from Illinois DOT regarding commercial vehicle traffic, CATS identified the routes most heavily used by trucks, estimated commercial vehicle miles traveled, and compared the totals year-by-year as well as county-by-county. For more information: www.catsmpo.com.

Related Topics

2.3 Collecting Data / Monitoring Performance

2.2 Approaches to Using Performance Measures

Selecting one or multiple performance measures is only one step to implementing a CMP. Agencies also face decisions about how those measures will be used and applied. The performance measures described in the previous section can be utilized in a variety of ways, with implications on cost and other outcomes. This section describes some options and approaches to using performance measures. Some of these considerations are addressed below.

Where the measures will be applied. While it might be ideal to apply the selected measures to all major transportation facilities, this approach may be beyond the resources of many agencies. Another approach would be to apply less resource-intensive measures across the entire system, while reserving the more resource-intensive measures for corridors or areas that warrant more intense scrutiny.

What, if any, additional processing of the measures is needed to understand the congestion picture. For instance, measuring travel time on a particular facility does not itself provide much insight about travel conditions. Comparing measured travel time to a benchmark such as expected or free-flow travel time adds considerable insight. Agencies should consider what kinds of comparisons or benchmarks they will utilize for their chosen performance measures.

What thresholds constitute congestion. There is still the matter of determining thresholds for what is considered a congested condition. Since Federal regulations are not prescriptive about thresholds, agencies are free to determine for themselves what is considered congestion. What is 'acceptable' to the public may vary by metropolitan region, as well as by facility type (major collector versus limited-access freeway), the type of land uses around which the facility is located (central business district versus suburban areas), and time of day.

How measures of travel conditions on individual facilities will be used to understand overall regional congestion trends. While performance measures are clearly useful for identifying specific congested facilities, it may also be of interest to characterize the general state of the transportation system in the spirit of measuring overall system performance.

The following options describe these considerations in more detail.

Approaches to Using Performance Measures

B-1. Use multiple and derivative measures

B-2. Use measures for screening, along with additional measures for congested locations

B-3. Use different definitions of congestion for different locations or time-frames

2.2 USING PERFORMANCE MEASURES

OPTION B-1: USE MULTIPLE AND DERIVATIVE MEASURES

Description

Use multiple measures and indicators to capture the various aspects of congestion. Since there are multiple aspects to congestion, including intensity, duration, and extent, representing a full picture of congestion may best be served by using multiple measures. Results can also be combined into a single index or other derivative measure that represents a full congestion picture.

Applicability

- Most effective for agencies interested in creating a system of prioritization or a holistic set of indicators to measure congestion
- Applicable for areas where congestion is expected to remain significant, but where agencies are nonetheless interested in measuring changes in travel conditions

Implementation Steps

- Identify measures of interest, to cover such desired aspects as congestion duration, extent, intensity, and reliability
- Determine appropriate comparisons between measured performance and selected benchmarks; comparisons might include: ratio between off-peak and peak travel time, percentage of capacity
- If desired, combine measures into derivative index or create point system

Strengths

Allows agencies to create a balanced overall view of the transportation system from many factors, addressing not only traffic congestion but transit, bicycles, and pedestrians.

Limitations

More time- and data-intensive than simply focusing on one or two key performance metrics.

Level of Effort

Medium to High

Examples

The Mid-Region Council of Governments in Albuquerque, New Mexico, utilizes a Combined Congestion Index that combines three measures: volume to capacity, delay in seconds per mile, and duration of delay. The agency defines categories of performance for this index, ranging from No Congestion to Beginning, Moderate, and Severe Congestion, and sets thresholds for each category. The result is that the agency is able to map its CMS network and portray the performance of each network link according to the Combined Congestion Index. For more information: www.mrcog-nm.gov/index.htm.

The Capital District Transportation Committee in Albany, New York, utilizes a wide range of measures, reflecting its perspective that reducing traffic delay is one of multiple performance objectives that must be balanced. Measures addressed include access to travel alternatives, level of exposure to congestion by mode, flexibility, and safety. For more information: www.cdtcmpo.org.

Related Topics

2.1 Developing Performance Measures

2.2 USING PERFORMANCE MEASURES

OPTION B-2: USE MEASURES FOR SCREENING, WITH ADDITIONAL MEASURES FOR CONGESTED LOCATIONS

Description

Use less resource-intensive measures, such as volume-to-capacity ratios, on major corridors throughout the network to identify the most congested areas; apply additional measures to congested corridors, such as travel time or availability/service levels of driving alternatives. This approach allows agencies to focus scarce resources directly on the areas that benefit most from more in-depth analysis, while also providing coverage for the entire system.

Applicability

Most appropriate for cases where resources are scarce but where there is interest in analyzing congested conditions in some detail.

Implementation Steps

- Use a less resource-intensive measure, such as traditional volume-to-capacity ratios for which data are generally readily available, for the entire transportation system.
- Identify sub-areas, corridors or specific facilities with significant congestion.
- Select measures for in-depth analysis of identified congested locations, such as travel time, availability / service levels of driving alternatives, or accessibility of major destinations within the identified areas.

Strengths

- Allows in-depth analysis at critical locations
- Allows resources to be deployed cost-effectively

Limitations

Does not provide comprehensive coverage of entire CMP network for all measures

Level of Effort

Low to Medium

Examples

The Hillsborough County MPO in Florida has developed a tiered structure for performance measures that is intended to monitor the transportation system effectively while expending monitoring resources strategically. The program measures performance by corridor, first applying Primary Performance Measures, including basic performance measures for roadway (volume-to-capacity), transit (ridership and frequency), bicycle (extent of corridor with bicycle facilities), and pedestrian travel (extent of corridor with sidewalks). For identified congested corridors, a more in-depth set of measures is tracked, drawing on data such as travel time surveys, pedestrian counts, employer rideshare programs, and transit on-time performance. For more information: www.hillsboroughmpo.org.

The Regional Transportation Commission of Southern Nevada (RTC) in Las Vegas features an analytical process for identifying congestion that is structured for use in a mitigation strategy screening process. The agency uses volume-to-capacity ratio to identify congested roadways, and then calculates four different components of congestion:

- Intensity – based on V/C ratio for freeways, interstates, and ramp links; based on percent reduction in speed for arterial and collector links;
- Duration – the number of hours congestion exceeds the intensity threshold;
- Extent – the number of persons or vehicles affected by congestion, calculated based on car and truck volumes and an estimate of occupancy rate;
- Reliability – based on crash rates and non-crash related incidents, obtained from the Freeway Service Patrol operated by the Nevada Department of Transportation

The agency determined weights for the four components and created a scoring process for each component on a 0 to 100 scale, which helps to prioritize needs among corridors. For

more information: www.rtcsouthernnevada.com/mpo/documents/pdf/rtptip/.

Related Topics 2.1 Developing Performance Measures

2.2 USING PERFORMANCE MEASURES

OPTION B-3: USE DIFFERENT DEFINITIONS OF CONGESTION FOR DIFFERENT LOCATIONS OR TIME-FRAMES

Description

Different thresholds can be used to define congestion, based on location, facility type, and/or time frame. This option recognizes that the public may find different levels of congestion acceptable based on these parameters. Clearly an arterial might be expected to experience slower travel speeds than a limited-access freeway. Facility location may also influence expectations; a central business district might be expected to experience slower travel speeds than a rural area. Differentiating between location types also recognizes that eradicating congestion may not be the sole community goal in all areas; higher levels of traffic congestion may be acceptable, for instance, in downtown areas with high levels of transit service and high quality pedestrian environments. Lastly, although transportation planning processes often focus on weekday commute periods when examining congestion, there may be other periods of interest, such as weekend periods or specific seasons that are associated with heavy shopping or recreational travel. It may be important to examine traffic patterns during these specific periods in order to adequately capture the traffic congestion problems that are of concern to the public.

Applicability

Appropriate for all metro areas, but most useful in regions containing sub-areas varying widely in land use character and intensity, and where there are distinct seasonal traffic patterns (such as to beach or ski resort areas).

Implementation Steps

- Determine the situations for which congestion definitions may differ. These situations might include the type of facility, the location of the facility, or time of day.
- For each type of situation, develop a definition of congestion, using the established performance measures.

Strengths

- Allows the community to determine acceptable standards based on local preferences, rather than using a blanket definition of congestion.
- Reflects public perceptions, and supports a balanced approach to congestion.

Limitations

Using different definitions adds complexity to the congestion monitoring process and can make it more complicated to communicate to the public

Level of Effort

Low to Medium

Example

The Capital Area Metropolitan Planning Organization (CAMPO) in Austin, Texas utilizes travel-speed-related measures to identify congested locations. For roadway segments, instead of holding all roads to the same standard, CAMPO has defined minimum threshold acceptable speeds, based on the type of road or transit service and the type of area through which the road or transit service travels. For instance, lower speeds are considered more acceptable in a central business district location than in a rural area. These thresholds are shown in the table below.

CAMPO's Established Speed Thresholds (miles per hour)

Area Type	Freeway Mainline	Freeway HOV	Major Arterial	Bus On Street	Rail In Street	Bicycle
Central Business District (CBD)	32	60	18	9	10	9
CBD Fringe/ Urban Residential	40	60	24	12	15	10
Suburban	50	60	29	15	20	14
Rural	55	60	32	17	25	18

For more information: Rachel Everidge-Clampffer, rachel.clampffer@ci.austin.tx.us, www.campotexas.org.

Related Topics 2.1 Developing Performance Measures

2.3 Collecting Data / Monitoring Performance

Clearly, since the performance measures discussed in the previous section cannot be implemented without access to data, performance measure decisions often hinge on agencies' ability to access or collect data. Agencies are faced with the challenge of balancing data needs for their CMP with resource limitations in amassing the data required to implement performance measures.

Two main considerations in decisions about data collection for the CMP are data availability and cost. These considerations are particularly important because data collection can represent the biggest portion of costs in a CMP effort. In light of this cost, an important step before determining a plan for collecting data is to identify existing sources of data. After all, additional data may not need to be collected if existing sources are sufficient to characterize performance and can be shared for CMP purposes. To this end, a review of existing and potential data sources may be fruitful. Potential partners with relevant information sources might include:

- State Departments of Transportation
- Local jurisdictions
- Traffic Management Center operators
- Transit operators
- Private traffic information service providers

If the relevant data do not already exist, the main consideration becomes the cost of acquiring data in the field. Data collection relating to traffic conditions is generally conducted in one of two broad ways: roadside techniques, in which traffic is observed from the roadside, and vehicle techniques, in which traffic conditions are observed by a 'probe' vehicle traveling with the traffic flow.

Recent technology advances have vastly improved the prospects for data collection, primarily through the automation of specific data collection functions. For instance, roadside techniques have benefited greatly from the evolution of automated roadside vehicle counters and, more broadly, Intelligent Transportation Systems, which are composed of the kinds of information technology infrastructure that allow for continuous, automated roadside data collection. Meanwhile, vehicle techniques, which entail little or no initial capital expense compared with roadside techniques, but which require substantial operating expense, have also benefited from automation technologies. Global Positioning Systems (GPS) and portable digital recording devices have made vehicle techniques much easier, more accurate, and less resource-intensive than manual collection. But since staff time is still required for these field surveys, the operating cost associated with vehicle techniques, while diminished, has not disappeared. A combination of data sources may be worthwhile to use in order to make the highest amount of data available with the least amount of resources.

Options for Collecting Data / Monitoring Performance

C-1. Traffic count data

C-2. GPS technologies to conduct travel time surveys

C-3. Archived ITS/operations data

C-4. Other electronic data

C-5. Data from traffic reporting organizations

C-6. Travel demand forecasting model

2.3 COLLECTING DATA / MONITORING PERFORMANCE

OPTION C-1: TRAFFIC COUNT DATA

Description

Major arterial street intersections and highway segments are sometimes counted on a regular basis by state DOTs and/or local land use jurisdictions. These counts are sometimes done for other purposes, but sharing agreements can be made that would allow the data to be used in a CMP. New counts can also be taken for CMP purposes.

Applicability

Effective where strong traffic count programs are maintained, and in smaller metro areas where the critical locations for congestion may be small enough in number to be covered with periodic spot counts.

Resources/ Partners Needed

Local jurisdictions, state DOTs

Strengths

Requires minimal resources; data are often readily available

Limitations

- May not provide coverage of all critical transportation facilities or time periods
- May not reflect variations in travel conditions

Cost

Initial: Low; Ongoing: Low

Level of Effort

Low

Example

The vast majority of agencies use existing traffic count data in the CMP. As one example, the Syracuse Metropolitan Transportation Council (SMTC) conducted its 2005 CMS using traffic counts at 200 roadway segment locations and 31 intersections. The count data were provided by the New York State Department of Transportation, which uses permanent and portable traffic sensors to collect data statewide. For more information: Danielle Krol, dkrol@smtcmpo.org; www.smtcmpo.org.

Related Topics

2.1 Developing Performance Measures, specifically, traditional volume-to-capacity ratios and level of service measures (Option A-1). Also 3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes, specifically, using CMP data to update the travel demand forecasting model (Option G-4)

2.3 COLLECTING DATA / MONITORING PERFORMANCE

OPTION C-2: GPS TECHNOLOGIES FOR CONDUCTING TRAVEL TIME SURVEYS

Description

Data on travel times are collected in the field using GPS technology. Field surveyors drive 'probe' vehicles to match traffic flow, recording digitally the time required for each segment of their travel time runs.

Applicability

Most effective in metro areas that do not have automated vehicle counting systems or other ITS infrastructure (particularly major arterials that may not be on a freeway monitoring network), and smaller areas with limited amounts of regionally significant transportation facilities. A combination of the two approaches might be used to maximize coverage of the transportation system.

Resources/ Partners Needed

- Automated GPS-enabled data collection equipment.
- External partners may be useful in broadening the number of surveyed routes, such as transit agencies, emergency responders, or on-demand paratransit providers.

Implementation Steps

- Procure GPS equipment. Ease of use is very important if multiple field data collectors will be utilized.
- Select routes, corridors and facilities of interest (may not need to measure the entire CMP network); the list should include the major commute routes.
- Enlist data collectors; beyond agency staff, potential partners may include transit agencies, emergency responders, on-demand paratransit providers, or even volunteers from the community at-large.
- Conduct surveys; using staff commutes or slight deviations from their commutes is an easy way to obtain travel time runs.
- Download data to desktop computers, convert to GIS format.
- Process data to calculate measures.

Strengths

- Some equipment requires minimal training, allowing agencies to call on a wide range of potential partners to help collect data.
- Allows agencies to select routes of interest.

Limitations

- Surveys are time-intensive, even with automated collection equipment. Tracking the data collection may be labor-intensive if many routes were chosen, and if data are downloaded manually. Some potential solutions might be to partner with organizations involved with travel on a regular basis, such as vanpool organizations, car rental companies, or taxicab companies.
- Large amounts of storage space and high computer power are needed to store, collect, and format the collected data.
- Data quality is a concern, especially if multiple surveyors are involved and are not familiar with transportation issues. A strong emphasis on training can address this issue, as well as selecting a technology that is easy to use.

Cost

Initial: Low; Ongoing: Medium

Level of Effort

Medium

Example

The Capital Region Council of Governments (CRCOG) of the Hartford, CT, metro area used a $12,000 Technology and Innovation Funding grant from FHWA to purchase GPS equipment to monitor travel times and speeds during peak hours on arterial roads. CRCOG

evaluated various types of equipment and selected Bluelogger, a simple and cost-effective GPS unit that allows direct download of the data to a GIS. CRCOG utilized its own staff to collect data with the GPS units as part of their normal commute routines along several key arterial corridors. Some staff deviated from their normal routes in order to conduct the travel time study. For more information: Thomas Maziarz, tmaziarz@crcog.org, www.crcog.org.

Related Topics 2.1 Developing Performance Measures, specifically travel time measures (Option A-2)

2.3 COLLECTING DATA / MONITORING PERFORMANCE

OPTION C-3: ARCHIVED ITS / OPERATIONS DATA

Description

Operators of Intelligent Transportation Systems (ITS) equipment and traffic management centers (TMCs) rely on continuous collection of vehicle speed and volume data to make their systems work. These large and continuous data sets can provide a much more detailed picture of travel conditions than sampling procedures such as annual counts, if the time and effort are taken to archive them for congestion planning purposes.

Applicability

Areas that have existing ITS deployments and TMCs, which are generally larger metro regions.

Resources/ Partners Needed

- High data storage and computing capability
- TMC and other ITS operators, which may be state DOTs or local jurisdictions

Implementation Steps

- Identify and assess available data sources, including local and DOT TMCs and local signal interconnect systems. Some sources may not be sufficiently reliable for CMP purposes.
- Determine desired data format; for instance, agencies may want hourly or daily totals, rather than the continuous raw data that many automated systems record.
- Secure data-sharing agreements with data owners; some restrictions may need to be written into the agreements regarding privacy of individual travelers.
- Develop data re-formatting, quality-control, and submittal process; additional software or other automated methods can help in archiving and formatting data.

Strengths

- In some cases, data can describe overall traffic conditions that include recurring as well as non-recurring congestion, allowing agencies to address reliability measures.
- When ITS facilities are in place, data collection may involve relatively little ongoing effort.

Limitations

- Data re-formatting may require significant initial investment if automation is pursued, or significant ongoing investment if conducted manually.
- Susceptible to data quality issues because of malfunctioning data collection equipment; broken detector loops and other malfunctions may be often common enough to render the data collected inaccurate for planning purposes.
- Raises privacy and liability issues if the data collected include information about individual travelers or video footage. Such information can be controversial, as in when police departments request video footage as evidence. There may also be limitations on what MPOs are able to do with the shared data. Arrangements can be made which clarify privacy and liability issues. MPOs can request processed data with individual traveler information or video footage removed.

Cost

Initial: Low (assuming ITS already in place); Ongoing: Low to Medium (depending on re-formatting requirements)

Level of Effort

Low

Example

The Capital Region Council of Governments (CRCOG) in Hartford, CT, uses ITS data from Connecticut DOT's Regional Traffic Management System, which covers 60 centerline miles of freeway with 144 traffic flow monitors. The volume of raw data was so tremendous that CRCOG required a software utility that re-formatted and summarized the data. The result

was highly accurate speed data from which delay and vehicle miles traveled could be calculated. For more information: Thomas Maziarz, tmaziarz@crcog.org, www.crcog.org.

Related Topics 2.1 Developing Performance Measures, specifically travel time measures (Option A-2), congestion duration and extent measures (Option A-3), and reliability measures (Option A-4)

2.3 COLLECTING DATA / MONITORING PERFORMANCE

OPTION C-4: OTHER ELECTRONIC DATA

Description

Other electronic traffic datasets could be used in a CMP beyond the traditional sources collected and managed by local jurisdictions and transportation agencies. Examples include E-ZPass, SmartCards, and other automated toll or transit fare collection services. In addition, cell phone location technologies are available, which use cell phone data collected by phone companies along highway corridors to calculate travel speeds. Cell providers and joint ventures with other private companies have begun to offer this service to some transportation agencies across the country.

Applicability

Locations where electronic media and facilities exist.

Resources/ Partners Needed

- Strong mapping capabilities such as GIS; strong database support skills for data re-formatting that may be necessary.
- Toll agencies, state DOTs, cell phone providers, and private traffic data providers.

Implementation Steps

- Identify and assess relevant available electronic traffic data.
- Determine desired data format; for instance, agencies may want hourly or daily totals, rather than the continuous raw data that many automated systems record.
- Secure data-sharing agreements with data owners; some restrictions may need to be written into the agreements regarding privacy of individual travelers.
- Develop data re-formatting, quality-control, and submittal process; additional software or other automated methods can help in archiving and formatting data.

Strengths

Can save on resources or expand the amount of available data for a CMP by using data that already exist.

Limitations

- May not be available everywhere or coverage may be limited; private data managers may demand high prices for data.
- May not be representative of all travelers within a corridor.

Cost

Unknown (dependent on the price demanded by private data managers)

Level of Effort

Low to Medium

Examples

Maryland DOT has entered into a public-private partnership with Delcan/NET Corporation to implement a cell phone data collection system in the Baltimore metro area. The project, called the Multi-Modal Travelers Information System (MMTIS), will calculate traffic information using data from cell phone companies, without requiring new automated data collection infrastructure. The project will not track individual phones; instead, it will analyze anonymous data that cell phone companies already collect to manage their cell network, calculating speeds based on movements between cells. The terms of the partnership enable Maryland DOT to receive the data without cost to the state, in return for granting rights to Delcan/NET to market the traffic flow information to the traveling public. For more information: www.delcanusa.com.

The Chicago Area Transportation Study (CATS) uses data from the Illinois State Toll Highway Authority (ISTHA), which uses a methodology to convert toll revenue collection data into traffic volume data. For more information: www.catsmpo.com.

Related Topics 2.1 Developing Performance Measures, specifically, traditional volume-to-capacity ratios and level of service measures (Option A-1), travel time measures (Option A-2), and reliability measures (Option A-4)

2.3 COLLECTING DATA / MONITORING PERFORMANCE

OPTION C-5: DATA FROM TRAFFIC REPORTING ORGANIZATIONS

Description

Organizations exist that dedicate resources to reporting traffic conditions as a real-time service to road travelers, such as radio and television stations and other private companies. If archived, their data could be a valuable source of travel condition data for use in a CMP.

Applicability

Locations where private traffic conditions reporting organizations exist and are kept in an easily usable format, particularly if archived ITS data are not available.

Resources/ Partners Needed

Traffic reporting organizations such as television and radio stations

Implementation Steps

- Identify available archived traffic data and/or organizations
- Determine re-formatting requirements for use in a CMP
- Secure data-sharing agreements with private organizations

Strengths

Provides a way to address monitoring needs for nonrecurring congestion

Limitations

- Not available in all metro areas, or for all facilities of interest
- Data quality and reliability issues may limit use

Cost

Unknown (dependent on data-sharing agreements)

Level of Effort

Low to Medium (depending on whether further data processing is required)

Example

The Miami Valley Regional Planning Commission (MVRPC) in Dayton, Ohio, reports nonrecurring congestion (e.g., delay caused by accidents, construction zones, and weather-related problems) based on data for five major corridors in the Dayton Region. This information was reported through a voluntary program in which drivers call a local radio station about observed problems on the road. MVRPC organizes data received from the radio station into a database and links the data to its GIS. Other sources of data included articles in the Dayton Daily News and Ohio DOT's yearly construction database. For more information: www.mvrpc.org/tr/trCMS.php

Related Topics

2.1 Developing Performance Measures, especially reliability measures (Option A-4)

2.3 Collecting Data / Monitoring Performance

Option C-6: Travel Demand Forecasting Model

Description

Current travel conditions, in the form of volume-to-capacity ratios or travel speeds, can be obtained from travel demand forecasting model using current-year land use assumptions. Travel models are usually validated using current conditions as a baseline from which to forecast future conditions. Validation processes usually employ traffic counts at relatively few strategic locations in the transportation network, and after validation, models can simulate current travel conditions on the entirety of the network based on the validation.

Additionally, travel models are indispensable for supplying predictions about future congestion, which FHWA has suggested as a component for the CMP to address. Finally, travel models with specialized post-processing modules can also provide simulated data to predict the reliability of the network.

Applicability

Most effective where resources are not available to collect sufficient field data, and where the travel demand model is robust.

Resources/ Partners Needed

Travel demand model and current-year land use assumptions; future land use assumptions are needed if predicting future congestion locations; specialized modules are needed if predicting reliability

Implementation Steps

- Input current land uses and transportation network into travel demand model.
- Run model and output results as desired.

Strengths

Low cost and effort, since the model is already used as part of the planning process.

Limitations

- Provides simulation, rather than actual measurements, of travel conditions.
- Requires a robust regional travel model.

Cost

Initial: low (assuming the model is robust or requires little improvement); Ongoing: low

Level of Effort

Low

Examples

The Pioneer Valley Planning Council (PVPC) in Springfield, Massachusetts, used its travel demand model to supply data for the CMS. For current-condition monitoring, the model provided volume-to-capacity comparisons of CMS roadways, allowing identification of congested locations. Staff used local knowledge and travel time surveys to refine the list of congested locations, adding and removing locations accordingly. The model also provided forecasts for future congestion. In this case, the future locations were the same as the current ones, only more severe, so for each location PVPC identified short- and long-term congestion issues in its CMS. For more information: Gary Roux, gmroux@pvpc.org, www.pvpc.org.

The North Jersey Transportation Planning Authority has used a post-processing module from its travel demand model to produce simulated predictions of travel reliability. For more information: www.njtpa.org.

Related Topics

2.1 Developing Performance Measures, especially traditional volume-to-capacity measures (Option A-1) and travel time measures (Option A-2)

2.4 Identifying and Evaluating Improvement Strategies

The function of this element in the CMP is to translate the congestion information obtained from performance monitoring into specific strategies that can be pursued to address congested conditions. For agencies that already have existing protocols for scoring or ranking projects, the goal will be to make this CMP activity a useful part of the LRTP process, rather than a duplication of it. Some MPOs may not have formalized scoring protocols for any number of reasons. There could be political resistance to an 'objective' identification of problem areas. There may be resistance to using quantitative scoring or ranking procedures if this seems to favor certain geographic parts of the metropolitan area. In addition, there may be concern about prioritizing projects on the basis of traffic congestion if the metropolitan area is a slow-growing region where traffic congestion is not seen as the most pressing transportation problem.

While congestion is an important factor in planning, it is not the only factor that MPOs need to consider. Agencies address broader goals beyond congestion. A process or framework may be needed for clarifying how the agency and community will address, balance, and prioritize these multiple goals.

Given the context of these challenges, accomplishing the step of identifying and evaluating strategies requires close coordination with the broader transportation planning functions of MPOs, especially the long-range transportation plan (LRTP). After all, it is the LRTP that is charged with resolving multiple goals into an overall program of transportation projects and initiatives. The CMP strategy step should be seen as a component of that larger process. As such, the options presented here address how CMP activities might work with any existing processes or policies that govern project selection, whether formalized or not. Note that Chapter 3 of the Menu contains more discussion of how CMP might be integrated with the LRTP and TIP processes.

Some major considerations for selecting approaches to identifying and evaluating strategies include:

- Which agencies have jurisdiction over the CMP strategies to be developed. Some congestion strategies may be best formulated and implemented by other agencies, or by a combination of agencies. The MPOs and TMAs charged with implementing the CMP may need to rely on the actions of other governmental partners. In these cases, the CMP agency will need to coordinate with potential partners by framing desirable strategy types and defining roles in implementation.

- How the CMP will be integrated into the LRTP. Agencies will need to decide what role the CMP will play in the planning process. For instance, it may serve as a generator of specific projects and strategies to be evaluated in the LRTP, or as a pre-screening step to narrow down the list of strategies considered by the LRTP.

- How congestion relates to other regional priorities. Clearly, other goals may be important to the public, such as housing affordability, community livability, system preservation, economic development and safety. How congestion fits into the local and regional government response to community preferences and to demographic and traffic trends will affect how agencies select and evaluate congestion strategies.

- The regional vision for how to manage congestion. When evaluating strategies, agencies will need to determine their approach to managing congestion, in terms of how roadway capacity investments will be used in conjunction with demand management strategies and improvements to alternative modes.

As a final note, this CMP element cannot be considered in isolation from the selection of performance measures. The performance measures selected will ultimately have an effect on how congestion problems are framed, which in turn affect prevailing perspectives on the best strategies for managing congestion.

Options for Identifying and Evaluating CMS Strategies

D-1. Characterize strategies based on practicality, strategy type, or other factors

D-2. Use a hierarchy for selecting strategies

D-3. Develop a CMS strategy toolbox or other guidance for partner agencies

2.4 Identifying and Evaluating Improvement Strategies

Option D-1: Characterize Strategies Based on Practicality, Strategy Type, or Other Factors

Description

This option provides a way to frame and analyze congestion strategies and issues by identifying key characteristics of strategies for use in evaluation. For instance, categorizing strategies as practical or impractical according to conditions in the metro area allows an agency to further prioritize CMP strategies with other transportation strategies in a broader planning process, such as the LRTP. It may determine that only the practical strategies emerging from the CMP should be further evaluated for funding.

Characterizing strategies by type allows agencies the flexibility to determine (possibly within a broader planning process) where and under what circumstances a particular strategy is deemed appropriate. For instance, an agency may determine that roadway capacity projects are not appropriate in dense urban cores, or that bicycle and pedestrian projects should receive priority in newly developing areas.

Applicability

Appropriate for linking CMP strategy evaluation with broader planning processes.

Resources/ Partners Needed

Transportation funding stakeholders, such as cities, counties, and state DOTs.

Implementation Steps

- Develop and/or gather input for congestion strategies based on data collection and performance measurement.
- Identify characteristics by which to categorize strategies. Examples include:
  - Practicality: very practical, practical, or not practical at this time
  - Strategy type: that eliminate trips through land use changes or similar actions (e.g., growth management, telecommuting); that cause a mode change, removing the trip as an auto trip; that increase auto occupancy by encouraging ridesharing that improve the operation of the existing highway system; and that add highway capacity
- Group strategies based on selected characteristics.

Strengths

- Prepares strategies for consideration in LRTP or TIP processes.
- Increases transparency in decision-making.

Limitations

Creates a systemized way to evaluate and prioritize strategies, requiring good documentation of cases in which flexibility in prioritizing is desired.

Level of Effort

Medium

Example

In its 2003 CMS, the Harrisburg Area Transportation Study in Harrisburg, PA, identified over two dozen potential strategies, which were then grouped into three categories based on an assessment of their potential use in the region: very practical strategies, practical strategies, and not presently practical strategies. For each CMS corridor, very practical and practical strategies were assessed and identified for potential application based on the major sources of congestion (e.g., recurring peak period congestion, special events congestion), the key congestion points, current traffic conditions and transit services, and planned and programmed improvements. For more information: www.tcrpc-pa.org/HATS.htm.

Related Topics

3.1 Strengthening Linkages Between CMP and LRTP, STIP, and Other Processes.

2.4 IDENTIFYING AND EVALUATING IMPROVEMENT STRATEGIES

OPTION D-2: USE A HIERARCHY FOR SELECTING STRATEGIES

Description

A hierarchy can be developed to serve as a framework for considering congestion strategies. Such a hierarchy can be based on groupings of strategies (see Option D-1, Characterizing CMP Strategies). For instance, an MPO may decide that roadway capacity strategies should only be pursued after all other options have been exhausted. Other dimensions can be added to the framework, including geographic location, e.g., transit improvement strategies might receive the highest priority in urban centers.

Applicability

Appropriate where agencies desire to screen or prioritize CMP alternatives.

Resources/ Partners Needed

Traditional transportation funding stakeholders, such as local jurisdictions and state DOTs.

Implementation Steps

- With public input, develop a regional vision for how congestion will be addressed within the larger context of transportation, land use, economic development, and livability; responses to congestion can be different for different types of land uses or different areas around the region.
- Identify goals that support the vision; goals should address specific congestion strategies, e.g., supporting higher levels of bicycling activity by providing a robust bicycle network for commute travel.
- Based on goals, identify important factors for prioritizing CMP and other strategies. Multiple sets of factors can be used, such as geographic location and strategy type.
- Use factors to create hierarchy for selecting CMP strategies. If multiple factors are selected, a matrix can be created that assigns priority to strategies based on the selected factors.

Strengths

Increases transparency in transportation decision-making.

Limitations

Creates a systemized way to evaluate and prioritize strategies, requiring good documentation of cases in which flexibility in prioritizing is desired.

Level of Effort

Low

Example

The Regional Transportation Commission of Southern Nevada (RTC) in Las Vegas conducts an initial screening of alternatives and develops a list of appropriate actions for corridors and sub-areas. The CMS strategy evaluation groups the list of actions into hierarchical categories:

1. Strategies that eliminate trips through land use changes or similar actions (e.g., growth management, telecommuting)
2. Strategies that cause a mode change, removing the trip as an auto trip
3. Strategies that increase auto occupancy by encouraging ridesharing
4. Strategies that improve the operation of the existing highway system
5. Strategies that add highway capacity

The screening method addresses these groups of strategies in order and applies the following three levels of screening: plausibility, feasibility, and effectiveness. The last two tiers are automated using an Excel spreadsheet and have been made economical in their need for data collection. Each strategy has feasibility and effectiveness thresholds. If a strategy does not pass the feasibility threshold, additional information does not need to be collected for effectiveness. For more information: www.rtcsouthernnevada.com/mpo/documents/pdf/rtptip/.

The Maricopa Association of Governments (MAG) in Phoenix, AZ, has implemented a project evaluation process that is used within the CMS and for TIP development. This process utilizes the concept of Mobility Zones, which defines four types of zones: Core Zones (the densest areas); Developed Zones (existing developed zones); Developing Zones (mixes of vacant and developed land); and Rural Zones (not expected to develop in the next 15 years). Within each zone, preference is given to particular kinds of transportation strategies. In this way, different kinds of congestion strategies receive different priorities based on the kind of land uses where the strategy will be applied, so that strategies can be applied to the places where MAG and its local government partners believe they will be the most effective. For more information: www.mag.maricopa.gov.

Related Topics

3.1 Strengthening Linkages Between CMP and LRTP, STIP, and Other Processes, specifically require projects to be CMP-compliant (Option G-1) and use CMP in criteria for prioritizing projects (Option G-2).

2.4 IDENTIFYING AND EVALUATING IMPROVEMENT STRATEGIES

OPTION D-3: DEVELOP A CMP STRATEGY TOOLBOX OR OTHER GUIDANCE FOR PARTNER AGENCIES

Description

A strategy toolbox provides guidance for agencies that are essential partners to MPOs in managing congestion. It offers MPOs an opportunity to communicate a framework for responding to congestion. For instance, MPOs can suggest in the toolbox that roadway capacity projects be considered only after other strategies, such as demand management or operations, have been exhausted. A toolbox also serves as a guide to inform implementing agencies about issues that may arise in implementing the strategies, as when strategies involve planning local land uses to best support efficient transportation. Finally, a toolbox allows MPOs to promote regional efforts such as rideshare support, and coordinate local corridor- and project-level implementation.

Applicability

Appropriate where multiple partners are involved in proposing, funding, and implementing congestion strategies, especially strategies that do not involve roadway infrastructure.

Resources/ Partners Needed

- Access to information about the full range of congestion strategies to be considered in the metro region.
- Implementation partners such as land use jurisdictions and state DOTs.

Implementation Steps

- Create list of tools for toolbox. Potential tools might include:
  1. Transportation demand management measures
  2. Traffic operational improvements
  3. Measures to encourage high occupancy vehicle use
  4. Transit capital improvements
  5. Transit operational improvements
  6. Measures to encourage the use of non-motorized modes
  7. Congestion pricing
  8. Growth management
  9. Access management
  10. Incident management
  11. Intelligent Transportation Systems
  12. General purpose capacity expansion
- For each tool, gather helpful analysis methods, needed partners, approaches, and other implementation issues.
- Develop toolbox document, keeping in mind the intended audience and using a user-friendly layout.

Strengths

Documents clearly for implementation partners as well as FHWA the MPO's framework for responding to congestion

Limitations

Does not guarantee that implementing agencies will carry out any CMP strategies, let alone ones that are preferred by the MPO.

Cost

Initial: Low to Medium; Ongoing: None (one-time cost to develop resource materials)

Level of Effort

Medium

Examples

The Chicago Area Transportation Study (CATS) created a CMS Handbook as a way to foster inter-agency cooperation in implementing project-level and regional CMS strategies. The Handbook provides a systematic congestion management approach for agencies in the region. It describes 40 congestion strategies, divided into 12 classes, and

describes how, when, and where the strategies are most effective, as well as how to measure effectiveness. For more information: www.catsmpo.com/prog-cms.htm.

The San Diego Association of Governments' (SANDAG) developed three related products as part of its CMS, with an emphasis on helping individual jurisdictions implement strategies: 1) a CMS Toolbox, 2) a Trip Reduction Ordinance Framework, and 3) Trip Reduction Guidelines. The CMS Toolbox is an extensive menu of traditional and innovative congestion mitigation strategies that includes a functional description of each strategy, a suggested unit to measure effectiveness, a statement on regional applicability, and implementation requirements (e.g., requires ongoing operating funds, or requires coordination with local transit agency). The Trip Reduction Ordinance (TRO) Framework guides local jurisdictions in developing and implementing their own trip reduction ordinances. Finally, the Trip Reduction Guidelines provide methodologies for incorporating selected CMS Toolbox strategies into a traffic impact assessment process and estimating their effectiveness in terms of trip reduction potential. For more information: Mario Oropeza, mor@sandag.org, www.sandag.org.

Related Topics

3.1 Strengthening Linkages Between CMP and LRTP, STIP, and Other Processes, specifically require projects to be CMP-compliant (Option G-1), use CMP in criteria for prioritizing projects (Option G-2), and explicitly set aside funding for congestion management projects (Option G-3).

2.5 Monitoring Strategy Effectiveness

A CMP is expected to include provisions to monitor the performance of strategies implemented to address congestion. Regulations require "a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures." Monitoring the effectiveness of CMP strategies can serve two goals: it can demonstrate whether operational or policy adjustments are needed to make the current strategies work better, and it can provide information about how various strategies work in order to inform future approaches within the region.

Monitoring strategy effectiveness can be the most challenging part of the CMP to implement. Traffic congestion is the result of multiple factors, including available transportation capacity and the demand for travel, which interplay in complex ways. It can be difficult to parse the effects of a particular strategy from other factors that might influence congestion. Possibly as a result, there is less accumulated experience with monitoring strategy effectiveness than other CMP elements. Although a number of regions now systematically report about congested conditions, few focus any monitoring efforts on specific CMP strategies to determine whether they have had the predicted or desired effect.

Options for Monitoring Strategy Effectiveness

E-1. Conduct or fund evaluation studies

E-2. Develop guidance for evaluation studies

2.5 Monitoring Strategy Effectiveness

Option E-1: Conduct or Fund Evaluation Studies

Description

Evaluation studies are designed to assess the effectiveness of a particular congestion strategy or project by examining conditions before and after, or with and without, a strategy of interest. A study could be conducted to quantify vehicle-miles-traveled (VMT) reductions or mode shifts of a transportation demand management (TDM) program, to quantify the speed improvements associated with traffic flow improvement projects, to examine the reduction in vehicle delay associated with operational strategies, or other similar types of impacts.

Applicability

Generally appropriate in all metro areas.

Resources/ Partners Needed

- Data specific to congestion project or strategy of interest.
- Implementing agencies of CMP strategies, such as local jurisdictions and state DOTs.

Implementation Steps

- Determine performance measures of interest; these measures will depend on the strategy being evaluated, and may be the same as those used in the system monitoring component of the CMP, but others may also be relevant. For instance, for a TDM strategy, instead of volume-to-capacity ratios, a more appropriate measure might be the number of employees taking advantage of employer-sponsored TDM benefits, or level of VMT reductions attributable to the strategy. Agencies may also want to analyze cost-effectiveness of a strategy, in which case an estimate of the cost of implementing a strategy will need to be made, including both capital costs and operating costs.
- Collect 'before' data in advance of implementing the CMP strategy.
- Collect 'after' data following strategy implementation.
- Calculate performance measures and conduct assessment.

Strengths

Clarifies the actual effects of congestion strategies, which can help in future refinements and selecting the most effective CMP strategies.

Limitations

- Requires additional resources for data collection.
- Methods of analysis may not be standardized for some strategies.

Cost

Initial: None; Ongoing: High

Level of Effort

High

Example

The City of Lincoln, Nebraska, provides staff support to the Lincoln MPO. As part of its congestion management efforts, the City conducted travel time runs through designated corridors, before and after a set of signal timing modifications being implemented as a congestion strategy. Studies were conducted on eight corridors and at 46 signalized intersections. This study closely followed procedures recommended for signalized intersection evaluation in the *2000 Highway Capacity Manual*. For more information: www.lincoln.ne.gov/city/pworks/engine/trafsaf/its/index.htm.

Related Topics

2.1 Developing Performance Measures; 2.3 Collecting Data / Monitoring Performance

2.5 Monitoring Strategy Effectiveness

Option E-2: Develop Guidance for Evaluation Studies

Description

Written guidance on performing evaluation studies provides a way to promote consistency in future studies by the MPO or any other agency. Guidance can be provided on when an assessment should be done, what measures should be used, how data should be gathered, what methods should be used to analyze the data, and other aspects of evaluation studies.

Applicability

Appropriate where partner agencies are responsible for implementation of CMP strategies, or where MPOs do not currently have sufficient resources to conduct studies but plan to in the future.

Resources/ Partners Needed

CMP strategy implementing agencies, such as local jurisdictions and state DOTs

Implementation Steps

- Develop list of CMP strategies or strategy types to be covered by the guidance. For instance, an agency may be most interested in the effects of operational improvements, or in transportation demand management initiatives.
- For each strategy, identify necessary steps and resources for conducting studies. Information to be gathered would include: performance measures to be used in monitoring effectiveness; what kinds of data to collect, and how to collect it; and descriptions of analysis tools and methods required to assess performance.
- Produce guidance document, keeping in mind ease-of-use and intended audience.

Strengths

- Promotes standardization in methods to study congestion effects within the region, which may be helpful for air quality or accountability purposes.
- Supports increased use of strategies for which benefits are not widely known.

Limitations

Does not guarantee that studies will be conducted.

Cost

Initial: Medium; Ongoing: None

Level of Effort

Medium

Example

The East-West Gateway Coordinating Council (EWGCC) in St. Louis, Missouri, provides guidance to localities on when a focused evaluation of strategy effectiveness is warranted, and how to conduct them. For example, if little is known about the actual benefits of the project, effectiveness evaluation can determine whether such strategies should be implemented more broadly (e.g., a trip reduction program that has not previously been used in the region), or if changes are required in the implementation of the strategy to produce the desired benefits.

In addition to advice, the EWGCC's *CMS Handbook* includes a useful appendix that describes analysis tools including appropriate simulation and travel demand modeling tools. Some of the specific tools are dated, but this example provides a helpful model for how to think about analysis tool criteria. For more information: www.ewgateway.org/pdffiles/library/trans/cmshandbook.pdf.

Related Topics

2.1 Developing Performance Measures; 2.3 Collecting Data / Monitoring Performance

2.6 Documenting CMP Activities

CMP activities must be documented, but the Federal requirements do not stipulate exactly how the documentation is to be done. Agencies have generally chosen one of two paths: creating a stand-alone CMP document, or incorporating the CMP into the long-range transportation plan (LRTP). While a stand-alone CMP document is useful for showing stakeholders and interested parties the results of CMP activities, incorporating the CMP as an element of the LRTP may be the more cost-effective option. In fact, doing so is clearly in the spirit of the Federal requirements. A number of CMP elements parallel common LRTP activities, such as identification of performance measures, analysis of congested locations, and identification of strategies. Documentation of these activities is therefore a natural fit for the LRTP.

Whichever path an agency selects regarding documentation, a separate consideration is the option of producing a scaled-down executive summary for public distribution. Some agencies have produced glossy summaries of the CMP as a way to inform the public about the state of transportation. These publications could also be used to raise the public profile of potential congestion strategies, such as ITS or demand management strategies.

Options for Documenting CMP Activities

F-1. Produce a stand-alone report on regular cycle

F-2. Produce a user-friendly summary

F-3. Incorporate the CMP as an element of the long-range plan

2.6 Documenting CMP Activities

Option F-1: Produce a Stand-Alone Report on Regular Cycle

Description

A CMP document is produced and published as a stand-alone report on a regular basis, such as once every two years.

Applicability

Appropriate where agencies wish to conduct and highlight their congestion management activities on a more frequent basis than the long-range transportation plan (LRTP) update, which is mandated by SAFETEA-LU to be done on a four-year cycle for non-attainment areas and a five-year cycle for attainment areas.

Resources/ Partners Needed

Traditional transportation funding stakeholders such as local jurisdictions and state DOTs.

Implementation Steps

- Conduct CMP activities (selecting measures, gathering data, strategies, etc.).
- Develop CMP report. Sections could be organized to correspond to the required CMP elements, or by component or mode of the transportation system.

Strengths

- Clearly shows compliance with Federal requirements.
- Increases transparency of transportation analysis and decision processes.

Limitations

- Producing a separate report requires additional resources.
- Elected officials may be sensitive to publicizing congestion data. A key to success is bringing such individuals on-board early, before the document is released.

Cost

Medium (staff time; printing)

Level of Effort

Medium

Examples

Numerous agencies have produced separate CMS documents. Some examples:

The Hampton Roads Planning District Commission's (HRPDC's) document is expansive; divided into two separate parts, Part 1 addresses broad regional transportation issues such as commute statistics from the Census and aggregate mobility statistics from the Texas Transportation Institute. It also includes statistics characterizing the use of other modes and the state of transportation financing. Part 2 focuses specifically on the roadway system and reports data collected by HRPDC and Virginia DOT. Each part is accompanied by an extensive technical appendix. For more information: Keith Nichols, knichols@hrpdc.org, www.hrpdc.org.

The Boston MPO's CMS report is structured around transportation facilities, dedicating a chapter each to roadways, public transit, park and ride lots, HOV lanes and TDM programs, and bicycle and pedestrian facilities. The final chapters contain conclusions, summaries of the data collection efforts, and recommendations for improving travel conditions. For more information: www.ctps.org/bostonmpo/resources/reports.htm.

The Pioneer Valley Planning Commission (PVPC) in Springfield, Massachusetts, organized its CMS to begin with needs identification, including performance measurement. After summarizing congested locations by geographic area, including identifying jurisdictional responsibility, the CMS defines a process for identifying, prioritizing, and implementing congestion strategies. For more information: Gary Roux, gmroux@pvpc.org, www.pvpc.org.

2.6 DOCUMENTING CMP ACTIVITIES

OPTION F-2: PRODUCE A USER-FRIENDLY SUMMARY

Description

A user-friendly summary of CMP results is produced in order to educate the general public about the state of traffic congestion in the region, to highlight key congestion points and congested facilities, and to identify actions being taken to address congestion. This type of document is generally short, contains many graphics, and is designed with the general public and elected officials in mind. An MPO may title the report differently to distinguish it from other CMP or broader planning documents. A summary would not replace other documentation, such as inclusion in the LRTP or a stand-alone, full CMP report, but would be an additional document aimed at the public, which might not be expected to read through a thick and technical document but would nonetheless be interested in a summary of travel conditions.

Applicability

Appropriate where agencies are interested in improving communication with the public and with critical stakeholders.

Resources/ Partners Needed

Graphic design expertise

Implementation Steps

- Conduct CMP activities as usual.
- Determine important points and messages to convey regarding transportation system performance and congestion strategies selected to address system performance.
- Create a document with summary graphics and text that will be appealing and easy to understand for the general public. Background and technical information can be included as a separate technical appendix.

Strengths

- Allows MPOs to frame a regional discussion about congestion, including what is important (not just roadway congestion, but access and other modes as well), putting congestion in context (how does the region compare with other regions), and potential ways to address congestion (agencies can showcase certain congestion strategies to raise awareness and build support for them).
- Increases transportation decision-making transparency.
- Builds confidence and strong relations with the public by communicating key points about the state of travel and the transportation system.

Limitations

- Requires additional expense to produce.
- Elected officials may be sensitive to publicizing congestion data. A key to success is bringing such individuals on-board early, before the document is released.

Cost

Initial: None; Ongoing: Medium

Level of Effort

Medium

Example

In 2001, the Hampton Roads Planning District Commission (HRPDC) in Chesapeake, Virginia, produced an 18-page CMS document entitled “Managing Traffic in Hampton Roads: A Special CMS Report”. This document summarizes the results of CMS monitoring in graphical format and briefly describes strategies being implemented to help manage congestion. The report also showcases ITS concepts that are being used, describing what they are, what they do, and how they benefit traffic flow. For more information: Keith Nichols, knichols@hrpdc.org, www.hrpdc.org.

2.6 Documenting CMP Activities

Option F-3: Incorporate the CMP into the Long-Range Transportation Plan

Description

An MPO can include a description of the CMP as part of the long-range transportation plan (LRTP), either as a separate chapter, in an appendix, or with aspects incorporated throughout. Since in many cases the LRTP is developed in part based on information from CMP activities, documentation of the CMP within the LRTP can be an effective way to demonstrate the linkages between the CMP and the broader transportation planning process.

Applicability

Appropriate for all agencies that have incorporated CMP components into the LRTP process.

Resources/ Partners Needed

None

Implementation Steps

- Select performance measures to be used in the CMP and LRTP, and collect relevant data. These steps and their findings can be described within the overall structure of the LRTP, or in a separate chapter devoted to CMP, or in an appendix.
- Identify strategies. This step can also be documented within the CMP element or chapter, an appendix, or in the portion of the overall LRTP that describes the needs assessment process.
- Evaluate strategies. An initial screening or prioritization step might be done within the CMP element if one will be created for the LRTP, with final prioritization as part of the overall LRTP strategy evaluation. Alternatively, the portion of the LRTP describing the evaluation process can include a description of the role of the CMP.

Strengths

Avoids potential duplication of work by conducting LRTP and CMP activities in coordination.

Limitations

Forces CMP activities to be undertaken on the LRTP update cycle.

Cost

Initial: Low; Ongoing: Low (if cost is considered as part of LRTP)

Level of Effort

Low (if effort is considered as part of LRTP)

Examples

The Rhode Island Statewide Planning Program (RISPP) in Providence has integrated its CMS activities with the region's LRTP process. As part of the integration, RISPP produced its LRTP with CMS documentation in a 23-page appendix that includes a narrative of the process and information graphics showing major findings. For more information: Michael Moan, mmoan@planning.state.ri.us, www.planning.ri.gov.

In its 2004 update to its LRTP, the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) in Cincinnati devoted a chapter to CMS. The chapter describes the purpose and goals of the CMS, details data collection findings, and notes elsewhere in the LRTP where congestion strategies are described. For more information: www.oki.org/transportation/2030update04.html.

Related Topics

3.1 Strengthening Linkages Between CMP and LRTP, STIP, and Other Processes

3 PUTTING CMP TO BROADER USES

This section discusses two topics related to using the CMP more broadly. First, it discusses potential approaches for strengthening the linkages between the CMP project and the long-range transportation plan (LRTP) process and the Transportation Improvement Program (TIP) process. Second, it discusses potential approaches to using the CMP to aid in meeting regional transportation objectives that might be related to congestion but also reach beyond solely addressing congestion issues.

3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes

The intent of the Federal CMP requirement is to ensure that congestion is examined and addressed in the transportation planning process. The CMP is meant to be coordinated with the regional planning and programming processes, and be a useful, not duplicative or ancillary, part of planning. By approaching the CMP as an integral part of the transportation planning process, MPOs can make the CMP more useful and utilize scarce resources more efficiently.

At the same time, the transportation planning process takes into account a wide range of factors beyond congestion relief. In fact, the history of transportation planning in the U.S. demonstrates that a singular focus on eliminating traffic congestion may not produce effective or efficient transportation systems, and often can have harmful effects on the human and natural environment. Federal transportation authorization bills since ISTEA have emphasized the importance of considering multiple factors in establishing transportation investment priorities, in considering multimodal planning, and in considering accessibility, reducing the emphasis on highway congestion as the primary determinant of investment priorities. Consequently, agencies have come to recognize the importance of balancing congestion relief as one factor in the metropolitan transportation planning process, but not necessarily as a primary means to prioritize transportation investments.

In light of these issues, it is useful for MPOs to develop an explicit role for the CMP within the broader planning process. Identifying clearly how the CMP fits can help planners consider what analysis and products will be most useful for making investment and policy decisions in the context of the broader regional agenda.

Some key considerations for strengthening the linkage between CMP and other planning processes include:

- How the LRTP and TIP processes should link with the CMP. The CMP can serve as a source for generating promising congestion strategies and projects that then advance to the LRTP for further evaluation. CMP performance measures, data, and analysis can be used in the LRTP evaluation process to prioritize project investments and screen alternative improvement strategies. It may be desirable to link the CMP to the TIP by prioritizing projects based in part on their performance in the CMP evaluation process. The approach might consist of screening transportation improvements based on a hierarchy of priorities that focus first on alternatives to increasing the physical capacity of the highway system. MPOs with less severe congestion problems may not want to formally prioritize projects using outputs of the CMP. However, the data from the CMP may be used for various planning purposes, such as to identify the need for specific in-depth corridor studies, or to define criteria for rapid allocation of funds to solve straightforward congestion problems.

- How CMP can inform other planning processes. As noted above, CMP outputs could be used to identify sub-areas or corridors that warrant detailed further study.

- Whether CMP strategies are appropriate for inclusion in the annual Unified Planning Work Program (UPWP). Many of the strategies discussed in a typical CMP are well suited to short-term MPO activities. Similarly, strategies commonly addressed within the UPWP, such as TDM programs and ongoing regional management and operations programs, are appropriate for inclusion in a CMP.

- Whether the travel demand model can be used in the CMP, and whether data from the CMP can benefit the model. Some CMPs include predicting locations of future congestion using a travel demand model. Conversely, the travel time surveys and traffic counts sometimes taken as part of CMP can be used to calibrate travel demand models for use in other planning efforts.

The following are options for some of these considerations.

Ways to Strengthen Linkages
Between CMP and LRTP, TIP, and Other Processes

G-1. Require projects to be CMP-compliant

G-2. Use the CMP in criteria for prioritizing projects

G-3. Explicitly set aside funding for congestion management projects

G-4. Use CMP data to update travel demand forecasting model

3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes

Option G-1: Require Projects to be CMP-Compliant

Description

Create an eligibility requirement for projects to be entered into the LRTP or TIP that requires projects that add capacity must also include considerations for transportation demand management (TDM) and transportation system management (TSM) techniques.

Applicability

Appropriate for areas with substantial recurring congestion, and in particular areas interested in balancing roadway capacity expansion with other congestion management options

Resources/ Partners Needed

Traditional transportation funding stakeholders, such as local jurisdictions and state DOTs.

Implementation Steps

Develop or modify eligibility requirements for the LRTP and/or TIP process to require projects to undergo analysis within the CMP. Requirement might stipulate that if roadway capacity projects are included in the CMP, then alternatives to capacity increases must also be evaluated in the CMP.

Strengths

Guarantees that individual roadway capacity projects are evaluated in a systematic look at congestion, and that alternatives to roadway capacity are also evaluated.

Limitations

Places all potential projects on the CMP update timeline, which may not be desirable for projects that are intended as quick-response efforts.

Level of Effort

Low

Example

The Capital Area MPO (CAMPO) in Austin, TX, has integrated CMS into its TIP development process. Every project within the TIP must be 'CMS compliant', meaning that in order to receive Federal funds, a project must be a stand-alone congestion strategy, identify TDM/TSM strategies to be implemented with the project, or have received a waiver. Waivers are granted for any of the following reasons:

- The project is not Federally funded
- The project is a safety improvement only
- The project is a bottleneck elimination project only
- The project advanced beyond the National Environmental Policy Act (NEPA) prior to April 6, 1982 and has been actively advancing since then
- The project does not consist of a new general-purpose facility in a new location or the addition of general-purpose lanes to an existing facility

This CMS compliance requirement is a particularly important mechanism to ensure that projects are selected to help manage congestion, because in the Austin area, it is other agencies, rather than CAMPO itself, who submit projects for potential inclusion in the TIP. For more information: Rachel Everidge-Clampffer, rachel.clampffer@ci.austin.tx.us, www.campotexas.org.

Related Topics

2.4 Identifying and Evaluating Improvement Strategies

3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes

Option G-2: Use the CMP in Criteria for Prioritizing Projects

Description

MPOs can use congestion as a criterion for prioritizing projects in the long-range transportation plan (LRTP) and/or the transportation improvement program (TIP). In a formal scoring process, points could be allotted based on a number of factors, including the potential for the project to address and manage congestion. Scoring systems could treat projects differently based on location or strategy type according to congestion levels, or community goals. For instance, more points might be allotted to projects in very congested locations, or, specifically to certain types of projects in the urban core than to projects in areas where further development is not desired.

Applicability

Appropriate in areas where congestion relief is desired as an important consideration in project selection.

Resources/ Partners Needed

Traditional transportation funding stakeholders, such as local jurisdictions and state DOTs.

Implementation Steps

- Determine maximum point score to be given for congestion management in prioritization criteria.
- Identify project aspects on which scores would be based, such as project effectiveness, amount of congestion at the project location, or type of project, any of which might be supplied by a CMP.
- Create categories representing these aspects, and assign points to each category according to desired amount of priority to be given. For instance, projects could be assigned different scores based on the level of congestion experienced by the project's location.
- Assign projects to categories and distribute points accordingly.

Strengths

Creates a systematic way to consider congestion in the prioritization process.

Limitations

Does not guarantee that congestion projects will receive funding.

Level of Effort

Low to Medium, depending on whether existing prioritization processes can easily be modified to incorporate CMP criteria and data.

Example

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI) in Cincinnati developed a scoring process for selecting worthy highway and transit projects in its LRTP. The process ranks projects using three sets of criteria; 1) overall, 2) roadway or transit, and 3) benefit cost, which are added together for a maximum of 100 points. Level of congestion was a criterion in the roadway project scoring. Staff produced two maps to assist in scoring congestion: a V/C ratio plot of 2000 highway conditions for all links in the OKI travel demand model; and a map showing total delay results from the travel time study. Both the model V/C data and delay data were placed into three congestion categories: None or Low, Medium, and High. All projects under consideration for the LRTP were located on the maps and given points corresponding to category. Projects in the None or Low category were given 0 points, Medium projects scored 3 points and projects in High congestion locations scored 5 points. For more information: www.oki.org/transportation/2030update04.html.

Related Topics

2.4 Identifying and Evaluating Improvement Strategies

3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes

Option G-3: Explicitly Set Aside Funding for Congestion Management Projects

Description

An MPO can establish a program designed to fund relatively small congestion management projects. The CMP can be used to define criteria for rapid allocation of funds to solve straightforward congestion problems. This can be useful not only for improving mobility, but also for elevating the MPO's visibility among stakeholders that are primarily interested in short-term implementation, such as freight shippers and developers. It may be useful to identify geographic areas of need based on congestion data, in which projects would then be eligible for funding under such a program.

Applicability

May be useful in larger areas with numerous large projects competing for transportation funding, where smaller projects may have difficulty competing on their own, and in areas where quick-response projects may arise in between regular TIP cycles.

Resources/ Partners Needed

Local jurisdictions and other transportation funding stakeholders

Implementation Steps

- Determine eligibility requirements. MPOs may choose to make only small projects eligible for the dedicated fund program. Programs might require a local match, and define the types of projects eligible for funding.
- Create project evaluation criteria. Might be based on percent local match, expected effectiveness, cost, location, or other factors.
- Select funding cycle. If the TIP cycle is deemed too long, the fund program might be distributed on a faster cycle to facilitate implementation of quick-response projects.
- Determine amount of funding to be allocated within TIP cycle.

Strengths

Ensures that congestion management projects will receive funding in the prioritization process.

Limitations

Requires additional work compared with evaluating projects within a broader funding category.

Level of Effort

High

Example

The Miami-Dade MPO in Florida has developed the RUSH (Resourceful Use of Streets and Highways) program to address congestion bottlenecks that do not justify a full corridor study. Projects that cost less than $500,000 and that are determined to have insignificant environmental impacts are prioritized by member agencies. A lump sum of TIP money is set aside for projects that will be selected through the RUSH process, allowing for swift implementation of the designated improvements. The CMS is used to establish criteria for such funds and to conduct evaluations to determine eligible projects. For more information: www.co.miami-dade.fl.us/mpo/.

Related Topics

2.4 Identifying and Evaluating Improvement Strategies

3.1 Strengthening Linkages Between CMP and LRTP, TIP, and Other Processes

Option G-4: Use CMP Data to Update Travel Demand Forecasting Model

Description

MPOs can use the data collected for CMP for updating the travel demand model. Travel time data and traffic volumes can be used to validate existing conditions and calibrate the model.

Applicability

Appropriate where agencies are collecting travel time and traffic volume data for the CMP and also maintain a travel demand model.

Resources/ Partners Needed

- CMP travel conditions data such as speeds and volumes.
- The travel demand model, and modeling staff.

Implementation Steps

- Collect or gather travel time and/or traffic volume data from CMP.
- Validate current conditions in travel demand model and calibrate other assumptions if desired.

Strengths

- Provides another way to keep the travel demand model up-to-date regarding current conditions.
- May save on resources if other validation/calibration processes can be eliminated as a result.

Limitations

None

Level of Effort

Low to Medium, depending on whether updating process would occur regardless of CMP activities.

Related Topics

2.3 Collecting Data / Monitoring Performance

3.2 Using the CMP to Serve Multiple Objectives

Although the CMP focuses mainly on congestion management, it also offers opportunities that go beyond mitigating traffic congestion. The CMP provides an opportunity to examine a wide range of solutions to mobility and accessibility problems. The process of collecting data, monitoring performance, and developing strategies can in turn lead to benefits in meeting non-congestion goals and in helping to inform considerations of other factors. These types of applications of the CMP can be particularly important in mid-sized metropolitan areas that may not experience a great deal of recurring traffic congestion. Examples of such opportunities include:

- Strengthening understanding of operations strategies and demand management, which often are less expensive than traditional infrastructure investment;
- Promoting and linking to asset management approaches, by considering options to maximize the efficiency of existing infrastructure before constructing new facilities;
- Improving understanding of travel conditions and factors affecting goods movement, which has implications for regional economic development and efficient freight operations;
- Enhancing safety of the transportation system through an improved understanding of traffic incidents that contribute to traveler delays;
- Promoting greater land use and transportation coordination, including defining land-use-focused strategies to increase accessibility to services to reduce transportation demand;
- Better characterizing multimodal transportation system performance for investment planning and for communicating with the public; and
- Identifying and evaluating strategies for Federal Congestion Mitigation Air Quality funding or in quantifying emissions reductions for conformity requirements.

While not all of these opportunities have been exploited in current CMP practice, MPOs that have approached the CMP as an opportunity for innovation have had significant success in using their CMP to address their broader objectives. This section discusses several types of non-congestion related goals that the CMP can help to address.

Transportation Planning Objectives that can be Supported by the CMP

H-1. Operations and Emergency Management
H-2. Freight
H-3. Safety
H-4. Land Use / Transportation Integration
H-5. Bicycle and Pedestrian Modes
H-6. Air Quality

3.2 USING THE CMP TO SERVE MULTIPLE OBJECTIVES

OPTION H-1: OPERATIONS AND EMERGENCY MANAGEMENT

Description

Operations and emergency management considerations have not traditionally been well integrated into the transportation planning process. The transportation planning process tends to focus on long-term investments, while transportation operations considerations focus on short-term solutions. However, as congestion continues to grow and as infrastructure solutions become more difficult to implement, operations strategies offer large potential benefits as congestion management options. Operations strategies can also address non-recurring congestion, helping to increase the reliability of the transportation system. Emergency management has become a high priority as well, prompting agencies to consider how the transportation system relates – and should respond – to emergencies.

New emphasis is being placed on "planning for operations" in order to focus more attention on the role of operations strategies and investments in the transportation planning process. For instance, Intelligent Transportation Systems (ITS), which include traffic monitoring and control, and real-time traveler information systems, have been implemented in many regions, and the past few years have seen many MPOs engaging in ITS planning – in the form of ITS regional architectures and deployment plans. However, agencies are in many cases still in preliminary stages of ITS planning and in more broadly developing a regional concept of operations. CMP activities can be useful in planning for these strategies.

Linkage to Congestion Management

Operations strategies can be employed to manage congestion as an alternative to increasing roadway capacity. Many operations strategies also focus on non-recurring congestion, which is often not closely examined in the planning process.

Potential Roles of CMP Activities

- Use activities to generate data and background information required to develop or update an ITS deployment plan or a Concept of Operations. Identification of congested locations indicates where ITS investments are most needed and offers an opportunity to analyze the causes of congestion which then can inform ITS and operations planning.
- Use activities to generate data required to identify traffic bottlenecks and the availability/level of service of key transit routes, which are critical steps in evacuation planning for emergency management purposes. Also, identifying heavily used truck routes indicates where hazardous materials might be traveling.
- Propose and evaluate ITS and other operations-related initiatives as CMP strategies.
- Other potential agency activities: establish relationships between MPO staff, emergency management personnel, and other related stakeholders; determine available freight- and emergency-related information (local agencies might be a good source) and make arrangements to share; and coordinate with land use for issues such as locating businesses, warehouses and other freight-related facilities.

Implementation Issues

Emergency management staff may be difficult to engage in the planning process. Data for emergency management planning may be difficult to obtain. Solutions center on building relationships.

Example

Several metropolitan areas have proposed and evaluated ITS projects as CMS strategies, including the Boston MPO, the Harrisburg Area Transportation Study, the Hampton Roads Planning District Commission, the Delaware Valley Regional Planning Commission, the Southwestern Pennsylvania Commission, and the Lackawanna-Luzerne Transportation Study.

3.2 USING THE CMP TO SERVE MULTIPLE OBJECTIVES

OPTION H-2: FREIGHT

Description

The efficient movement of freight is important to regional economic health and the Nation's economy as a whole. The volume of freight has grown dramatically, affecting not only the efficient movement of goods, but creating congestion on roadways used by the traveling public. Transportation planning processes, however, have been set up largely to address passenger transportation, and adjustments are needed to enable agencies to address freight concerns in a more rigorous way. The CMP could help in developing tools, data, and processes to address freight movement.

Linkage to Congestion Management

Freight is relevant to congestion management in two ways:

- Congestion, especially the non-recurring type, adversely affects goods movement in that businesses that ship and receive goods prefer certainty in when the goods will arrive. This issue is of growing importance as businesses continue to move from a warehousing model to a just-in-time model.
- Trucks constitute a significant portion of traffic in some areas, require special treatment in terms of roadway design, and raise compatible-use issues.

Potential Roles of CMP Activities

- Use activities to measure or predict freight travel conditions, such as the travel time reliability of heavily used fright routes. ITS technology can identify commercial vehicles for data collection, and travel time surveys can be designed to capture conditions along truck routes. Regional economic models can be used as part of the CMP to estimate current or future freight travel demand in the region.
- Consider freight-focused congestion strategies in the CMP. Possible strategies include: truck-only lanes, support for rail and barge modes to alleviate traffic on truck routes, and traffic flow improvements targeted to freight corridors. The CMP can also lead to targeted traffic studies near terminals, and more attention toward predicting and improving the reliability of travel.

Implementation Issues

- It may be challenging to engage the freight community in the planning process because of the difference between the long-range nature of the planning process and the short-range nature of business planning; nonetheless, MPOs could create freight committees and recruit members from the freight industry.
- There are few sources of readily available freight data. Private companies are reticent to share their operations information publicly for competitiveness and privacy reasons, and tracking freight travel can be costly if an ITS is not yet in place. MPOs might address these issues by building relationships with private shippers, creating a freight focus group, distributing shipper surveys, or memoranda of understanding (MOUs) related to the use and disclosure of proprietary data.

Examples

The Atlanta Regional Commission explicitly addresses freight priorities by defining prioritization criteria based on existing truck volumes and presence or absence of parallel rail service, with higher priority going to highway corridors that lack parallel rail service. For more information: www.atlantaregional.com/transportationair/rtp.html.

The North Jersey Transportation Planning Authority (NJTPA) has taken freight concerns into account within its long-range investment prioritization process. In each sub-area within the region, NJTPA evaluated various needs, including freight mobility needs, which it defined as improvements necessary to close the gap between current performance and regional transportation goals formalized in its CMS. In sub-areas where freight mobility needs were greatest compared with other transportation needs, NJTPA gave high priority to strategies that aimed to improve freight mobility. For more information: www.njtpa.org/planning/rtp2030/rtp2030.html.

3.2 USING THE CMP TO SERVE MULTIPLE OBJECTIVES

OPTION H-3: SAFETY

Description

Decreasing crash-related injuries and fatalities is a high regional transportation priority in many areas. Addressing roadway safety by identifying high-crash locations enables agencies to focus any safety-related initiatives on places where those initiatives might be most effective.

Linkage to Congestion Management

- 50% of roadway congestion is caused by non-recurring events such as breakdowns and accidents.
- Identifying high-crash locations and determining appropriate responses may be effective in reducing incidents, and therefore, congestion.

Potential Roles of CMP Activities

MPOs can use traffic volume data from the database of the CMP network (major intersections and major highway segments) with crash data as a basis for crash analysis. CMP network data can be used together with a crash study to control for varying traffic volumes and identify the intersections or roadways with the highest crash rates. The CMP can also identify safety improvement strategies that may also improve traffic flow and reduce crash-related delays.

Implementation Issues

- In many cases, there may not be a central repository for all crash data. Oftentimes, the DOT keeps data on state highways, whereas local agencies keep data on local roadways; these data sources may not be compatible, or even electronic. Some coordination work may be needed to support data compatibility and comparability.
- Some jurisdictions may be sensitive about identifying or publishing information on the highest crash locations due to liability concerns and concerns that it may raise among the public and community groups.

Example

Hampton Roads Planning District Commission (HRPDC) has completed a regional safety study that analyzes crash data at the regional level to identify high-incident locations. Inter-agency coordination was needed to obtain the necessary data, since crash data were kept in different formats and agencies. HRPDC identified CMS highway segments and intersections with the highest severity-adjusted crash rates, using CMS traffic data to control for traffic volume. HRPDC created an integrated crash data management system for the region, and has been coordinating to automate data entry procedures. HRPDC produced maps, collision diagrams, summaries, observations, and remedies for the region's top ten high-crash interstate segments and the top intersection for each jurisdiction. Several localities have since used the results to initiate safety projects. For more information: Keith Nichols, knichols@hrpdc.org, www.hrpdc.org.

3.2 USING THE CMP TO SERVE MULTIPLE OBJECTIVES

OPTION H-4: LAND USE / TRANSPORTATION INTEGRATION

Description

Land use decisions – key drivers of travel demand – are made by local jurisdictions. As the agencies that are responsible for regional transportation planning, MPOs have a clear interest in these decisions. Enhanced coordination between land use authorities and MPOs is critical to crafting and implementing land-use- and demand-based congestion management strategies.

Linkage to Congestion Management

Recurring traffic congestion is the result of travel demand generated by land uses. Integration of land use and transportation decisions enables agencies to coordinate efforts to address this demand side of congestion.

Potential Roles of CMP Activities

- Use the CMP to educate. With CMP data, MPOs become the regional repository of the background data that show the effects of land use on transportation. CMP results can be displayed in a brief, graphically oriented format easy for non-transportation audiences to understand. Land use decision-making bodies often experience high turnover, and may not be familiar with the transportation effects of land use, or the tools available to encourage particular development patterns. A periodic publication – or a companion document to an LRTP update – can be helpful in raising awareness.
- Use the CMP to promote regional land use coordination and influence land use policy. Given their CMP data and their regional perspective, MPOs are well-positioned to convene decision-makers and create a framework for discussing regional land use and transportation goals. The CMP and the travel demand model can show the impacts of current and future land use, focusing dialogue on how land use can improve transportation outcomes. The CMP identifies both over- and under-utilized facilities, clarifying where capacity remains to support more employment and housing growth. The CMP can also promote the idea that congestion is one, but not the only, important transportation consideration
- Suggest land-use-related congestion strategies that aim for land use planning and zoning changes, potentially with model ordinance language or other ‘how-to’ technical assistance.
- Use the CMP to prevent future congestion. MPOs may target funding to areas that the community has agreed should be developed.

Implementation Issues

- Land use jurisdictions may not agree with the idea that MPOs should take an active role in land use planning and development approvals. Local control is often held sacred, and there is often extreme reluctance to share that control with a regional agency. A potential solution is to frame the issue as a way to work together, rather than for the MPO or county to dictate to local jurisdictions.
- If funds are targeted to specified areas of the region, an equity issue may be raised about which areas receive priority.
- Developers wanting to locate new development may not agree with transportation planners about where it should go. The effect of land use on tax revenue also factors into development decisions.
- While citizens may desire better multimodal transportation connections, they may also resist projects such as pedestrian connections when a concrete proposal is presented. One solution is to engage the public early on, and to discuss the benefits of improved multimodal connections – including positive past experiences – to counter-balance any negative fears. Many initial complaints are replaced with satisfaction with the finished project.

Example The Tri-County Regional Planning Commission (TCRPC) in Lansing, Michigan, has employed land use integration as its primary CMS strategy. TCRPC conducted a community-based growth visioning process called Choices For Our Future. This process created two future land use scenarios: one with 'business-as-usual' patterns, and one with 'wise growth' patterns. In coordination with its LRTP, TCRPC analyzed transportation strategy packages for the two land use scenarios using a travel demand model. TCRPC selected the 'wise growth' scenario as its preferred scenario. One end result of the process was a set of projects for the LRTP. Another was a land use policy map that the local land use authorities have been asked to support through revised land use policies. The land use strategy has become the over-arching direction for congestion management in the Lansing area; other CMS strategies grow out of the land use strategy, such as supporting transit and non-motorized travel, demand reduction, and access management. For more information: www.tri-co.org

3.2 Using the CMP to Serve Multiple Objectives

Option H-5: Bicycle and Pedestrian Modes

Description

The CMP can be a way to conduct a formal, rigorous analysis for bicycle and pedestrian modes. The CMP data collection activities can help to inventory networks and characterize current conditions for biking and walking, allowing agencies to identify specific facility gaps and needs. In turn, this information can lead to identification and rigorous prioritization of bicycle and pedestrian projects to focus investment on the most critical pedestrian and bicycle infrastructure needs. The CMP affords the opportunity to plan systematically for these modes, which in some cases may not otherwise receive regional-level planning attention. Note that while pedestrian and bicycle travel are often (rightfully) considered together, there are some characteristics specific to each mode that call for separate treatment.

Linkage to Congestion Management

Supporting modes like bicycle and pedestrian travel can alleviate traffic congestion and create opportunities for non-motorized travel, helping to increase access to jobs, goods, and services for a region's residents and employees.

Potential Roles of CMP Activities

- Use the CMP to identify key bicycle and pedestrian locations, including inventories, counts of users at those locations, and assessments of bicycle and pedestrian facilities from the user perspective.
- Use the CMP to identify critical bicycle and pedestrian infrastructure needs.
- Develop and evaluate CMP strategies that improve bicycle and pedestrian travel.

Implementation Issues

- Considering the fine-grain nature of pedestrian and bicycle travel and the regional purview of MPOs, gathering data can be daunting. It is important to recognize that the entire region does not need to be mapped and monitored. One solution is to select the most critical areas for pedestrian and bicycle travel. Since transit travel necessitates strong pedestrian environments, transit station areas are important areas. And since high density and mixed use correlate to higher walking rates, these areas are also important for inventorying and monitoring.
- Pedestrian strategies in particular are tied closely to land use patterns and building design, and may require coordination with land use jurisdictions and private developers for implementation.

Example

The Miami-Dade MPO in Florida developed a pedestrian plan in 2001 that evaluated the region's pedestrian network for needed improvements. The MPO completed an inventory of 1,500 centerline miles of roadway and evaluated the Pedestrian Level of Service of the network using a methodology developed by the Florida DOT. The agency also applied a Latent Demand Score analysis to the network to predict locations where significant pedestrian activity might occur. The MPO conducted a pedestrian project evaluation process that used these two analysis tools, pedestrian safety data, information about important generators such as schools, and input from a community-based committee. High-ranked segments were analyzed to identify potential projects. The plan also included funding and implementation considerations for identified pedestrian projects. For more information: www.co.miami-dade.fl.us/mpo/mpo8-product-bpp.htm.

Related Topics

2.1 Developing performance measures, specifically Availability / service level measures for non-motorized modes (Option A-6)

3.2 USING THE CMP TO SERVE MULTIPLE OBJECTIVES

OPTION H-6: AIR QUALITY

Description

The factors and conditions associated with traffic congestion – increased vehicle travel, stop-and-go operating conditions, and vehicle idling – are also associated with increased motor vehicle emissions levels. Regions that are in non-attainment or maintenance status for Federal air quality standards must demonstrate that their transportation plans and programs will not contribute to increased violations of the air quality standards or delay timely attainment of the standards, as demonstrated through the transportation conformity process. For ozone and carbon monoxide nonattainment areas, the CMP regulations prohibit projects that increase capacity for single occupant vehicles (SOVs) unless the project emerges from a CMP process.

Linkage to Congestion Management

Many strategies that reduce traffic congestion also reduce motor vehicle pollution, including demand management strategies, incident management strategies, and traffic flow improvements. Efforts to quantify the congestion benefits of transportation strategies, such as what might be done in CMP evaluation or post-implementation monitoring activities, could be a useful resource in quantifying emissions benefits that are needed to comply with air quality requirements.

Potential Roles of CMP Activities

- Use the CMP to develop air quality improvement strategies such as transportation control measures (TCMs) in areas that are in non-attainment of Federal air quality standards. Information regarding effectiveness of strategies might be obtained from CMP monitoring and evaluation activities. Examples include strategies that support ridesharing, transit use, biking, and walking, and strategies that revise signal timing to minimize idling.
- Use the CMP to help quantify the impacts of congestion and air quality strategies as part of the air quality conformity process for transportation. The conformity process specifies that the latest planning assumptions be used in the analysis, including traffic counts, vehicle miles traveled, and travel speeds. The regional emissions analysis should also account for the impacts of congestion mitigation and air quality improvement programs.
- Use the CMP to develop and evaluate proposals for funding under the Congestion Mitigation and Air Quality Improvement (CMAQ) program. CMAQ requires that cost-effectiveness be used in considering projects. The cost-effectiveness calculations can be based in part on information obtained from the CMP, such as average intersection queue length during the peak period and length of congested highway segments.

Implementation Issues

For some strategies, such as some operational strategies, analysis tools and methods for determining their effects on travel and air pollution are not well developed or documented.

Example

In the Washington, DC area, the Metropolitan Washington Council of Governments' long range plan includes many congestion management strategies, including a regional ridesharing and alternative commuting program, called Commuter Connections. The Washington, DC area is an ozone nonattainment area, and the Commuter Connections program is one of several Transportation Emissions Reduction Measures (TERMs) that are identified and analyzed on a regular basis to quantify emission reductions. For more information: http://www.mwcog.org/transportation/.

3 CONCLUSION

The CMP is a systematic process for determining acceptable congestion levels in a region, measuring the congestion performance of the transportation system, and prioritizing strategies for managing that congestion. Federal requirements define the required elements of a CMP and specify that areas with populations over 200,000 must implement and maintain a CMP. However, the Federal regulations are not specific in terms of how to implement these requirements. Consequently, a variety of practices have been implemented across the country.

This CMP Menu of Options provides a wide range of potential options for complying with the required elements of the CMP as well as for making CMP activities useful beyond complying with the requirements, based on the lessons and experience gained by agencies that have been conducting CMP activities over the past several years. Since the inception of CMP requirements, practice has evolved along a number of dimensions. For instance, there has been a migration away from volume-based measures toward ones that are based on travel time. Advances in technology also have created unprecedented opportunities to collect more data and do so more cost-effectively. The CMP has also evolved from being conducted as a stand alone activity to becoming a more integral part of LRTP and TIP processes, as the Federal requirements were intending. Finally, MPOs have begun to put the required CMP activities to effective uses within the planning process, including using the CMP to gather information on non-roadway travel modes and non-capacity congestion strategies, and to formulate strategies to accomplish regional transportation goals that go beyond simply addressing congestion.

These options for approaching the different aspects of a CMP have been presented to encourage MPOs to think about the possibilities. While individual MPO circumstances will determine what is most feasible and appropriate, agencies should consider that the CMP can be adapted and enhanced over time. The Menu offers information that can be referred to periodically over time, when agencies are ready to consider different approaches. The key point underlying the options presented here is that, approached with a broad perspective, the CMP can be a useful part of the planning process.

4 APPENDIX: MPO EXAMPLES AND CONTACT INFORMATION

Organization	Innovation Item	Contact Information
Atlanta Regional Commission, Atlanta, GA	H-2	www.atlantaregional.com/transportationair/rtp.html
Boston MPO, Boston, MA	A-5, A-6, F-1, H-1	www.ctps.org/bostonmpo/resources/reports.htm
Capital Area MPO, Austin, TX	A-2, B-3, G-1	Rachel Everidge-Clampffer, Rachel.Clampffer@ci.asutin.tx.us
Capital District Transportation Committee	B-1	www.cdtcmpo.org
Capital Region Council of Governments, Hartford, CT	C-2, C-3, D-3	Thomas Maziarz, tmaziarz@crcog.org, www.crcog.org
Chicago Area Transportation Study, Chicago, IL	A-8, C-4	www.catsmpo.com
City of Lincoln, Nebraska	E-1	www.lincoln.ne.gov/city/pworks/engine/trafsaf/its/index.htm
Delaware Valley Regional Planning Commission, Philadelphia, PA	H-1	www.dvrpc.org/transportation/longrange/cms.htm
East-West Gateway Coordinating Council, St. Louis, MO	A-3, E-2	www.ewgateway.org/trans/transportation.html
Hampton Roads Planning District Commission, Chesapeake, VA	A-6, F-1, F-2, H-1	Keith Nichols, knichols@hrpdc.org, www.hrpdc.org
Harrisburg Area Transportation Study, Harrisburg, PA	D-1, H-1, H-3	www.tcrpc-pa.org/HATS.htm

Hillsborough County MPO, Tampa, FL	B-2	www.hillsboroughmpo.org
Lackawanna-Luzerne Transportation Study, Wilkesbarre, PA	H-1	
Maricopa Association of Governments, Phoenix, AZ	A-3, D-2	www.mag.maricopa.gov
Metropolitan Washington Council of Governments, Washington, DC	H-6	www.mwcog.org/transportation
Miami-Dade MPO, Miami, FL	G-3, H-5	www.co.miami-dade.fl.us/mpo/, www.co.miami-dade.fl.us/mpo/mpo8-product-bpp.htm
Miami Valley Regional Planning Commission, Dayton, OH	C-5	www.mvrpc.org/tr/trCMS.php
Mid-Region Council of Governments, Albuquerque, NM	A-1, B-1	www.mrcog-nm.gov/index
North Jersey Transportation Planning Authority, Newark, NJ	A-4, C-6, H-2	www.njtpa.org/planning/strat_eval.html
Ohio-Kentucky-Indiana Regional Council of Governments, Cincinnati, OH	F-3, G-2	www.oki.org/transportation/2030update04.html
Pioneer Valley Planning Council, Springfield, MA	C-6, F-1	Gary Roux, gmroux@pvpc.org, www.pvpc.org

Regional Transportation Commission of Southern Nevada, Las Vegas, NV	A-7, B-2, D-2	www.rtcsouthernnevada.com/mpo/documents/pdf/rtptip/
Rhode Island Statewide Planning Program, Providence, RI	F-3	Michael Moan, mmoan@planning.state.ri.us, www.planning.ri.gov
San Diego Association of Governments	D-3	Mario Oropeza, mor@sandag.org, www.sandag.org
Southwestern Pennsylvania Commission	H-1	www.spcregion.org/trans_cong.shtml
Syracuse Metropolitan Transportation Council	C-1	Danielle Krol, dkrol@smtcmpo.org, www.smtcmpo.org
Tri-County Regional Planning Commission, Lansing, MI	H-4	www.tri-co.org
Wilmington Area Metropolitan Planning Council, Wilmington, DE	A-6, A-8	Dan Blevins, danblevins@wilmapco.org, www.wilmapco.org