

Chapter 10: Operation and Management Strategies

Introduction

The intent of operation and management strategies is to improve the efficiency and effectiveness of the transportation system through lower cost operational and management improvements and programs. Two such examples are Intelligent Transportation Systems (ITS) and congestion management. ITS make use of technology in the management of the transportation system while congestion management focuses on reducing congestion through strategies aimed at lowering single occupant vehicle use, promoting alternative modes of travel, and better managing existing transportation facilities and services. These two strategies and their application to the Lawrence/Douglas County MPO are discussed in the following sections.

Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) refers to the application of technologies and communications to manage the existing transportation system more effectively, improve its efficiency, and to make the system more user-friendly.

Under an ITS Program, advanced computing, information systems, and communications technology are applied to the control and management of transportation facilities and services to help achieve (1) a safer transportation system, (2) better informed travelers, (3) improved traffic control systems, and (4) increased efficiency of transportation facilities and services, including the transit system.

ITS includes detection systems and cameras for monitoring traffic conditions on roadways, dynamic message signs to provide real time travel information, and vehicle location systems to track transit and emergency services vehicles. The



benefits of ITS include reduced congestion, fewer transportation-related deaths and injuries, and reduced energy consumption and pollution.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) require the development of a regional ITS architecture for a MPO region to be eligible for federal funding of any ITS projects.



Currently the Lawrence/Douglas County MPO is in the process of developing a regional ITS architecture to ensure that future ITS applications are developed with protocols and standards that allow for complete system integration. A regional architecture ensures that all agencies with an interest in the operation of the transportation system, such as emergency responders, law enforcement, transit agencies, and local and regional transportation agencies, all have the ability to share resources and information to better manage its overall daily operation.

During the development of the draft ITS Architecture, stakeholders in the Lawrence-Douglas County Region identified several high priority needs including:

- Improving traffic signal coordination;
- Having the ability to bring CCTV camera feeds from all agencies back to traffic operations centers and the Douglas County 911 Dispatch Center;
- Having the ability to collect weather-related road condition information;
- Being able to provide system users with automated notification of road closures due to incidents or maintenance to emergency management, public safety, and transit; and
- Being able to track transit vehicles and provide real time bus information to transit users.



As the cost and effort required to expand existing or construct new transportation facilities increases, the use of ITS technologies will become an increasingly important component of the transportation system within Lawrence and Douglas County. ITS provides a means of better managing traffic flows and incidents on heavily traveled roadways today and in the future. ITS improvements, such as signal coordination, traffic monitoring, and message signs, are but a few of the ITS applications that can improve traffic operations within the MPO area by the year

2030. The ITS Regional Architecture Plan for the Lawrence/Douglas County MPO area is scheduled to be completed later in 2008.

Congestion Management

Introduction

The intent of congestion management is to improve the effectiveness of the transportation system through lower cost efficiency-based improvements and programs. Congestion management focuses on reducing single occupant vehicle use, promoting alternative modes of travel, and on making operational improvements to better manage existing resources.

The benefits of congestion management include being able to use the existing transportation system as efficiently as possible, thereby making the most efficient use of limited federal, state and local funds available to expand the system. They also include being able to use each travel mode for its intended purpose and to the greater satisfaction of its users, thereby increasing overall satisfaction with the transportation system.

SAFETEA-LU Elements of a Congestion Management Process

The federal government requires congestion management process (CMP) in urbanized areas with populations over 200,000 persons. Although the Lawrence/Douglas County MPO is not required to develop and implement a full congestion management process, Lawrence and the surrounding area can still benefit from a number of congestion management strategies that can provide logical and sound techniques for managing congestion.

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.



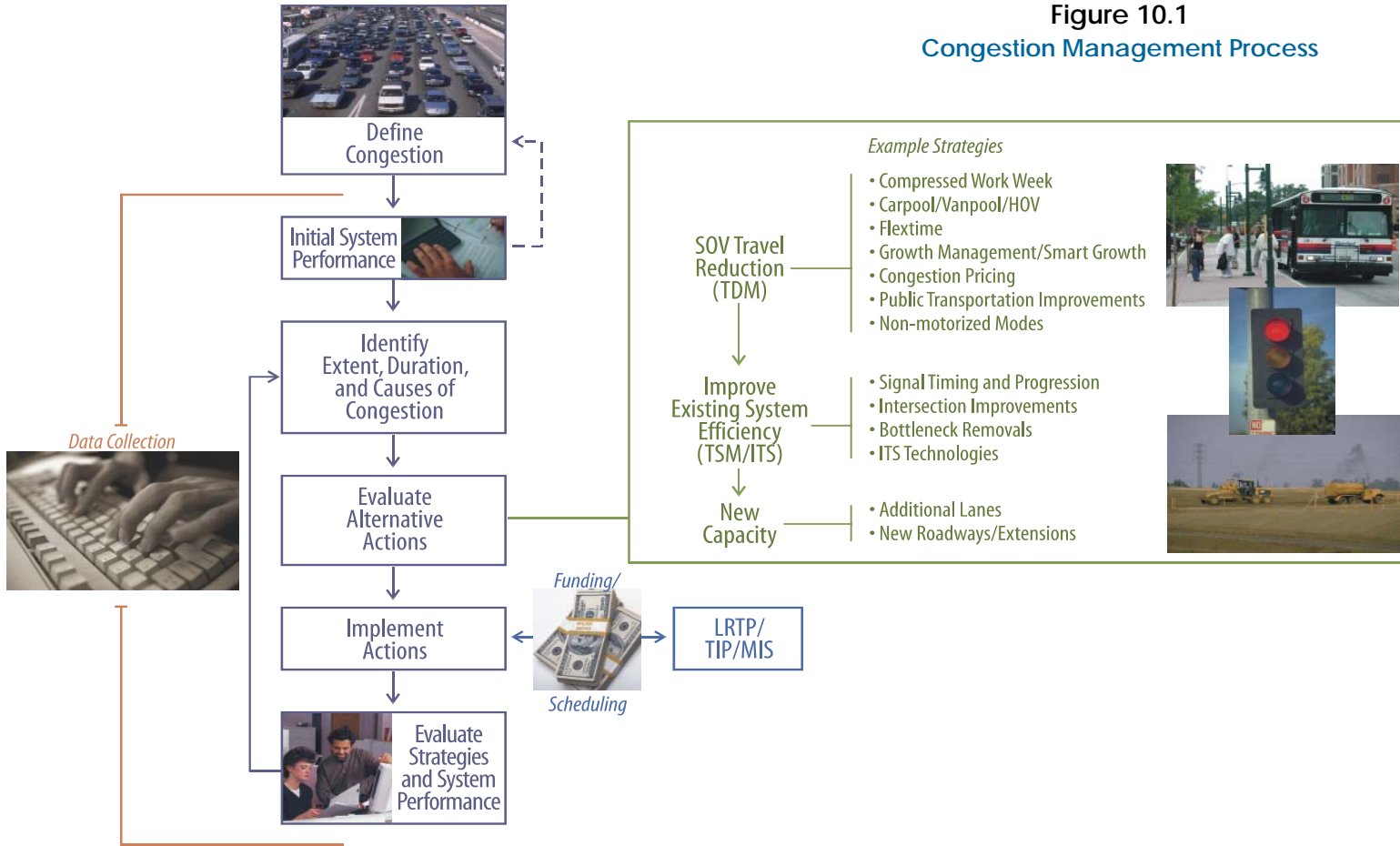
Change from System to Process

The change from TEA-21 to the SAFETEA-LU transportation funding bill brought with it a name change for the term Congestion Management System. Beginning in 2005, the “umbrella” for congestion management activities is now known as the Congestion Management *Process*. While there will be no real change in the activities that are identified as congestion management, the name change does signify a change in thinking. The goal of the name change is to get local MPOs and other units of government to think about including congestion management techniques while planning and implementing a new transportation project. Instead of congestion management being a stand-alone improvement or an afterthought after completion of the transportation system, it is an integral part of

the planning process. Thus, the idea is for congestion management techniques to be considered from the very start of every transportation improvement.

Congestion Management Process

A process for developing, implementing, and monitoring congestion management strategies is presented in Figure 10.1.



Congestion Management Strategies – What’s Possible?

There are numerous congestion management strategies being employed in urban areas across the country. These should be considered for implementation in Lawrence, although many may be beyond the City’s level of need or interest. Congestion Management strategies fall into two basic categories: Travel Demand Management (TDM) and Transportation System Management (TSM).



Travel Demand Management

TDM promotes programs that are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in vehicles, shifting travel to non-automobile modes, influencing the time of or need to travel, and so forth. TDM programs can be voluntary, incentive-based, or mandatory, depending on the level of community desire and government oversight. At a minimum, all TDM programs should include educational and public outreach components.

Potential TDM strategies include the following:

- **Telecommuting:** part-time or full time situation in which employees work at home or another location outside the central office on one or more days a week.
- **Carpooling:** an arrangement in which two or more people share the use and cost of privately owned vehicles while traveling together to and from prearranged destinations.
- **Vanpooling:** provides transportation to a group of individuals traveling directly between their homes, which tend to be in close proximity, and their regular workplaces, which also tend to be in close proximity.
- **School pool programs:** a service that matches students from the same school who live in close proximity to use a single vehicle to commute.
- **Ridematching software:** software that archives commuter profiles and matches up those who live and work in similar locations and desiring to share the commute.



- **Park and Ride Lots:** parking facilities that allow the transfer from low occupancy vehicles to carpools, vanpools, or transit services.
- **Flex Time:** alternative work schedules in which employees choose their own work schedule within set standards in order to avoid congested traffic conditions.
- **Staggered Work Hours:** alternative work schedules in which different groups of employees arrive and depart at different times to offset the congestion impacts of simultaneous trip-making.
- **Compressed Work Week:** a program where an employee works a full-time work week in four (or fewer) days, thus reducing the number of weekly trips to work.
- **Paid Parking and Carpool Incentives:** preferential parking locations, discounted parking, and other monetary incentives provided by employers to encourage drivers to participate in ridesharing.
- **Congestion Pricing:** market-based pricing strategies designed to encourage a shift of peak period trips to off-peak periods or to route traffic away from congested facilities during the peak demand periods. Congestion pricing can also encourage the use of transit or high-occupancy vehicles.
- **Bicycling:** a low-cost alternative that results in healthier, more productive employees and reduced vehicular travel, congestion, parking demand, and cost.
- **Parking Management:** strategies that utilize a variety of factors to balance the availability of parking with the availability of modal alternatives. Residential and commercial parking permits, parking pricing, shared use parking, time restrictions, and other strategies are included in parking management.
- **Public Transit Bus Pass Programs:** community or business-based transit passes that can include promotional and marketing activities oriented toward encouraging commuters to use bus and rail alternatives. Activities include bus route maps, brochures, posters, how-to classes, and free-ride days.





- **Emergency and guaranteed ride home programs:** a program where transit users are provided rides home in a daytime emergency or guaranteed at night after regular transit service has ceased.
- **Electronic and smartcard collection systems:** a fare collection system that uses fare cards with magnetic strips or smartcard technology that allow for electronic payment and the expedited boarding of transit patrons.
- **Advanced marketing and alternate routes for special events or construction:** using the media to inform travelers of alternate routings for special events or long-term construction projects.
- **Transportation Management Organization/Coordinator:** a public or private organization or professional staff that provides information and programs to businesses and individuals to facilitate the increased alternative transportation mode use.

Transportation System Management

TSM is the process of modifying or optimizing the existing transportation system through low-cost means in order to increase system efficiency. These strategies consist of lower cost actions that increase the carrying capacity of existing facilities.

Potential TSM strategies include the following:

- **Traffic Synchronization:** the process of coordinating a group of signals to provide efficient vehicle progression along a corridor.
- **Traffic signal priority systems:** a system of interconnected traffic signals that give priority to certain traffic movements at certain times of day.
- **Traffic signal priority for buses:** an interconnected system of traffic signals along a route that allow for buses to receive a green light or longer green time at an intersection. The signal priority contributes to the overall efficiency of the transit system.
- **Dynamic traffic signal timing systems:** a system of interconnected traffic signals where signal timings are changed based on up to date information on traffic volumes.



- **Reversible and changeable lanes:** lanes whose direction can change with electronic signs based on the commuting pattern or a special event.
- **Dynamic message signs:** message signs that can be updated from a command center based on up to date travel information.
- **Intersection Improvements:** strategies that include changes in traffic control, signal phasing, pedestrian crossings, safety improvements, and flatwork that adds left and right turn lanes and other traffic treatments.
- **Geometric Improvements:** spot roadway and lane improvements that target specific bottlenecks along a corridor.
- **Peak Period Parking Restrictions:** locations along high volume corridors where parking is restricted during peak hours and in the peak travel direction in order to create additional travel lanes.
- **Access Management:** programs that manage a proliferation of poorly located and closely spaced driveways, intersections, and traffic signals, which can severely impact a roadway's ability to move traffic and provide convenient access. Access management will protect safety, capacity, and traffic flow on the transportation network while providing access to adjacent property as appropriate and necessary.
- **Emergency Response:** systems using global positioning system (GPS) information that allows accidents and incidents to be located and facilitated quickly to minimize travel delay.
- **Regional Multimodal Traveler Information:** direct communication that is provided to travelers over the Internet, at kiosks, on message signs, or via radio and television.
- **Citywide Fiber Optics Network:** a network of fiber optics that connects signals, hardware, changeable message signs, and other devices to a computerized system to increase real-time information exchange and updates to signal timing patterns.
- **Dynamic Message Signs:** a system of interconnected signs that can be updated as information is received in real time to inform drivers of congestion trouble spots in the system.



Operation and Management Strategies – What’s Right for Lawrence?

Implementing congestion management and ITS strategies must focus on what’s right for Lawrence, how much budget is available, and how these strategies might fit with other plan actions.

Although there are a number of travel demand, transportation system management and intelligent transportation system improvements and strategies that would improve mobility in Lawrence, some are more important than others today, and some might be more appropriate in the future. As an example, periodic retiming of the City’s signal system to improve traffic flow and progression would be important today, whereas major upgrades to the signal timing software and hardware, such as fiber optic interconnects, would be more appropriate for future consideration and implementation.

As can be seen in Table 10.1, each of the TDM and TSM strategies noted above have been evaluated as to what might be appropriate for Lawrence today and in the future. The strategies have been ranked low, medium, and high. As the MPO develops and updates the Transportation Improvement Program, ITS and congestion management strategies should be considered along with projects that add to the capacity of a roadway.



Table 10.1
Operation & Management Strategies - What's Right for Lawrence?
Travel Demand Management

Strategy	Now		Future	
	Yes	No	Yes	No
TDM: Travel Demand Management				
Telecommuting	H		H	
Carpooling	H		H	
Vanpooling	M		H	
School Pool	L		M	
Ridematching Software	L		M	
Park and Ride Lots	M		H	
Flex Time/Staggered Work Hours/Compressed Work Week	M		H	
Paid Parking and Carpool Incentives	M		M	
Congestion Pricing		✓		✓
Bicycling	H		H	
Parking Management	M		H	
Public Transit Bus Pass Programs	M		M	
Emergency/Guaranteed Ride Home	L		M	
Electronic Collection System	L		M	
Route Notification for Special Events or Construction	M		M	
Transportation Management Organization/Coordinator	L		L	

Table 10.1 (continued)
 Operation & Management Strategies - What's Right for Lawrence?
 Transportation System Management

Strategy	Now		Future	
	Yes	No	Yes	No
TSM: Transportation System Management				
Traffic Synchronization	H		H	
Traffic Signal Priority	L		M	
Traffic Signal Priority for Buses	L		M	
Dynamic Traffic Signal Timing	L		L	
Reversible/Changeable Lanes		✓		✓
Dynamic Message Signs		✓	L	
Intersection Improvements	H		H	
Geometric Improvements	H		H	
Peak Period Parking Restrictions		✓	L	
Access Management	H		H	
Emergency Response	L		M	
Regional Multimodal Traveler Information	L		M	
Citywide Fiber Optic Network	L		H	

Recommended Actions

The following actions outline the efforts needed to further employ ITS and congestion management strategies within the Lawrence/Douglas County area.

Operation and Management Action 1: Implement ITS Deployment Plan Recommendations

Work with the Lawrence/Douglas County member agencies and other planning partners to implement the recommendations from the ITS Deployment Plan that is under development as part of the Regional ITS Architecture.

Operation and Management Action 2: Consider Congestion Management Strategies

Work with the Lawrence/Douglas County MPO member agencies and other planning partners to integrate the consideration of demand and systems based management activities into the planning, programming and project development processes.

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