

## Chapter 6

# OPERATIONAL AND MANAGEMENT STRATEGIES

SAFETEA-LU legislation emphasizes the inclusion of operational and management strategies to improve the performance of existing transportation facilities to relieve congestion and maximize the safety and mobility of people and goods. The management tools that the Kalamazoo Area Transportation Study uses for these activities are management systems in the following areas:

- Pavement (Asset);
- Bridge;
- Safety;
- Public Transportation; and
- Intermodal.

The Kalamazoo Area Transportation Study uses the Michigan Department of Transportation's management system known as the Transportation Management System. KATS and its members also maintain and use local transportation system management tools similar to the components of the Michigan Department of Transportation's system but containing local data exclusively. The transportation management systems used by KATS were developed as a result of a requirement introduced by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) with continued emphasis in the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21). KATS has replaced its previous Pavement Management System with the Asset Management System that was implemented statewide. The Study has added tools available from Michigan State Police and the Roadsoft asset management programs to augment its Safety Management System.

The relationship between the management systems and development of metropolitan transportation plans is clearly expressed by two of the general policy statements in the regulations:<sup>8</sup>

- “The primary purpose of the management system is to provide additional information needed to make effective decisions on the use of limited resources to improve the efficiency of, and protect the investment in, the nation's existing and future transportation infrastructure at all levels of jurisdictional control.”
- “The output of the individual management systems shall be integrated into the metropolitan and statewide transportation planning process . . . and shall be considered in the development of metropolitan and statewide transportation plans and improvement programs and in project selection decisions. . .”

These policy statements express both the importance and linkage between the management systems and the metropolitan and statewide transportation planning processes.

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<sup>8</sup> 23 CFR Section 500.105

The Kalamazoo Area Transportation Study is not a designated Transportation Management Area (TMA) and has not developed a specific congestion management process as an integral part of the planning process but does conduct work with congestion management activities.

## **OVERVIEW OF MDOT MANAGEMENT SYSTEMS ACTIVITIES**

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required State Highway Agencies (SHA) to develop management systems in the following areas: Pavement, Bridge, Safety, Congestion, Public Transportation, and Intermodal. The Michigan Department of Transportation (MDOT) collectively refers to the management systems as the Transportation Management System. This system will provide a source of information addressing both the condition and the performance of the existing and future transportation networks. This overview of MDOT management system activities presents a review of the development process and product.

The Transportation Management Systems (TMS) designed and implemented by MDOT serve as an integral decision support tool to feed a comprehensive project prioritization process and to provide a clear link showing how proposed projects use of funds support the State Long Range Plan and the Transportation Plans of the urban areas and other agencies within Michigan.

It is designed as a single management system with six subsystems. These systems include: Bridge, Congestion, Intermodal, Pavement, Public Transportation, and Safety.

This allows the TMS to include a common shared database, a common set of decision support tools and functionality, and the use of a robust and consistent user interface. Data collected, processed, and maintained at the working levels are stored using an enterprise database management system.

MDOT maintains a website on a web page dedicated to these management systems. It can be accessed at <http://mdotwas1.mdot.state.mi.us/public/tms/> more detailed information and guidelines as to how to access this information and guidelines to access this information, contact the Michigan Department of Transportation.

The management systems are a support tool to provide information to make informed decisions.

## **OVERVIEW OF KALAMAZOO AREA TRANSPORTATION STUDY MANAGEMENT SYSTEMS ACTIVITIES**

The primary purpose of the management systems is to provide the information and data needed to make effective decisions on the use of limited resources to improve system efficiency and protect existing and future infrastructure investments. The states have been assigned the lead role in developing and implementing the management systems. In metropolitan areas, state-MPO cooperation is emphasized. Recognizing that decision making on over 90% of the system miles is vested in local officials at various levels, this cooperative or joint effort is important to the successful implementation and application of the management systems.

Within the Kalamazoo metropolitan area, the local transportation agencies have advanced their management system activities, acting in coordination with and cooperatively through the MPO. Coordination with the system development efforts by MDOT has focused on that same approach. The Kalamazoo Area Transportation Study has been both a direct and indirect participant in the development of the management systems.

## **THE TRANSPORTATION MANAGEMENT SYSTEMS USED BY KATS AND ITS MEMBERS**

Each local agency uses a combination of their own and other management systems for their planning, operation, and management of their systems. The Kalamazoo Area Transportation Study also uses a combination of local and state systems for its planning and programming purposes. The following describes the management systems that the KATS and/or its members use.

### **Asset (Pavement) Management System**

The Pavement Management System provides for a systematic process that analyzes and summarizes pavement information for use in selecting and implementing cost-effective pavement construction, rehabilitation, and maintenance projects. The system KATS uses most is the PASER<sup>9</sup> system provided through the Transportation Institute housed at Michigan Technological University. The PASER System is included in a software package called RoadSoft GIS. Pavement condition information, traffic volumes, and National Functional Classification information is maintained and updated for all federal aid eligible streets and many non-federal aid eligible streets in Kalamazoo County. The pavement condition for the federal aid system is currently surveyed every year. This management system provides system condition information on an annual basis and is used to evaluate various preservation programs to see how funds can best be allocated to preserve the existing road system. Road condition data is obtained using a team made up of individuals from the Michigan Department of Transportation, the Kalamazoo County Road Commission, the Kalamazoo Area Transportation Study, and the local cities. Currently, data for the federal aid eligible system has been gathered annually since 2003. The Michigan Department of Transportation uses its own pavement management system in addition to the RoadSoft PASER system.

### **Bridge Management System**

The Kalamazoo Area Transportation Study relies on the Bridge Management System developed and maintained by the Michigan Department of Transportation. MDOT's Design Division has maintained a computerized bridge inventory in accordance with National Bridge Inventory Standards (NBIS) for over 25 years. This inventory covers all Michigan bridges over 20 feet in length, regardless of jurisdiction. MDOT periodically conducts bridge condition surveys. Identical surveys are conducted by the responsible road agency for bridges in county and local jurisdictions and submitted to MDOT. Surveys of all bridges in the State are required as a condition for receipt of federal funding.

The Bridge Management System supplies an analysis and summary of data, uses mathematical models to make predictions and recommendations, and provides the means by which alternative policies and programs may be efficiently considered.

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<sup>9</sup> PASER is a product of the University of Wisconsin and uses a surface rating system that links type, number and severity of defects with the type of maintenance needed.

## Highway Safety Management System

The highway safety management system addresses all modes of highway transportation safety. Specifically, it addresses safety on public roads, and similar to the other management systems, is integrated into the decision making process. The overall goal of this management system is the reduction of the number, and severity, of highway crashes.

Effective management and reduction of highway related injuries and fatalities is the intent of the highway safety system. This management system may recommend that responsible agencies direct their limited resources to safety projects to receive maximum return on their investment.

KATS initiated crash database development, starting with the new UD-10 crash reporting form, in January, 1992. Local enforcement agencies within the metropolitan area boundary provide KATS the traffic crash accident forms for manual data entry and data scanning.<sup>10</sup> This internal process was initiated based on early unknowns regarding data availability and has continued based on timing, completeness of accident incident coverage, and extent of data elements coded. With the system at Michigan Tech University and the Michigan State Police Data System being improved in their coverage, reporting, features, and availability to local MPOs, this process will be continually reviewed for value.

The Kalamazoo Area Transportation Study and its members use the Kalamazoo Area Transportation Study crash database, safety management features contained in RoadSoft, and the CRASH data system from the Michigan State Police to identify, assess, and program improvement strategies to address transportation safety issues in Kalamazoo County. This system is used in planning and programming activities of the Kalamazoo Area Transportation Study.

In addition to the routine activities on transportation safety performed by KATS and its members, the Office of Highway Safety Planning is funding a transportation safety review and study of Kalamazoo County using resources from Wayne State University. This study is being conducted with the cooperation of local road agencies. It is scheduled to be completed in 2007. The recommendations will also be reviewed and incorporated, as appropriate, in future projects and operation modifications.

The Safety Management System is one of the tools used to allow the activities of the Kalamazoo Area Transportation Study and its members to coordinate with the State of Michigan Strategic Highway Safety Plan.

In order to mitigate any known or potential hazards, Kalamazoo County developed a Hazard Mitigation Plan in accordance with state and federal government. The purpose of this plan is to create an ongoing document to “protect the health, safety, and economic interests of the Kalamazoo County residents and businesses by reducing the impacts of natural and technological hazards through hazard mitigation planning, awareness, and implementation.”<sup>11</sup> The plan was formally adopted by the Federal Emergency Management Agency on January 5, 2007.

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<sup>10</sup> The data scanning is performed by Western Michigan University (WMU) under an agreement with KATS. This has been a cost effective and time effective process, with scanning turn around of 1 - 2 hours.

<sup>11</sup> Kalamazoo County Hazard Mitigation Plan, Executive Summary

The plan identifies nine key hazard categories, each with subcategories and action items. The nine hazard items are:

- Civil Unrest and War
- Weather
- Flooding and Drought Hazards
- Infrastructure Failures
- Transportation Accidents
- Geological
- Fire Hazards
- Hazardous Material Incidents
- Public Health Emergencies

Through the planning process, KATS will continue to consult with Kalamazoo County and its individual units of government in order to assist in mitigating transportation related safety issues.

### **Congestion Management System**

TEA-21 required that needs identified by the congestion management system be considered in developing metropolitan and statewide transportation plans and improvement programs. The MDOT Congestion Management System includes the identification of alternative strategies to alleviate congestion while enhancing the mobility of persons and goods.

The State may decide to address congestion management for all transportation modes and not focus solely on the movement of vehicles. The congestion management system must assure that the efficient movement of people and goods is addressed and that consideration is given to other strategies and various modes, including parking management and bicycle and pedestrian facilities. The system will propose strategies which are critical to preserving the effectiveness and efficiency of the overall transportation system, in both metropolitan and non-metropolitan areas statewide. The determination of congestion and potential congestion will be based on an area's definition of congestion and the results of forecasts. If population and land use changes are anticipated that could result in increased levels of travel, the evaluation of strategies to manage congestion will be warranted. Early recognition of the potential problem should lead to more effective solutions, including the timing, location, and design of proposed land use development and transportation facilities.

The congestion management system will be coordinated with the development and implementation of the other management systems. The congestion management system and public transit management system will identify and analyze transit performance measures and operation. The public transit management system will deal solely with transit capital assets. It will be the responsibility of MDOT, in cooperation with the MPOs, transit operators, and other affected agencies, to determine coverage and applicability of these three systems with regard to system performance.

Under the Congestion Management System regulations, general purpose road widening can only be considered after a careful evaluation of the congestion reduction impacts of low-cost improvements, such as traffic signal projects, local traffic engineering projects, and transit and/or ridesharing improvements. Capital improvements, when applied under a program that utilizes reasonable strategies to manage a facility, can be a solution under the congestion management system. However, before decisions can be made, non-capital strategies must be considered and appropriately analyzed.

The congestion management system will require a continuous program of data collection and system monitoring. The extent of this program will be determined by MDOT in cooperation with MPOs, local officials, transit operators, and other transportation officials. Consequently, the driving force

will be a function of the magnitude of congestion and the area's performance measures. If existing sources are not adequate, new sources will need to be developed to implement an effective congestion management system.

Some of the issues to be addressed as the congestion management system is further developed include:

- Evolution toward uniform performance measures across modes and jurisdictions for the use and analysis of traffic volume and congestion data among all major users (responsible road agencies, MDOT, the MPOs and others); and
- Development of explicit ties between the final methodologies for ranking deficient congestion locations and programming decisions.

### **Public Transit Management System**

The intent of the Public Transit Management System (PTMS) is to evaluate strategies and project alternatives for inclusion into appropriate transportation plans and improvement programs. The Kalamazoo Area Transportation Study and its member public transportation system operator use the Michigan Department of Transportation developed and maintained Public Transit Management System for this activity. The local public transportation service provider uses the system, updating it with local data. This system is used to maintain capital equipment data, operational data, and to determine future operational and capital needs.

### **Intermodal Management System**

SAFETEA-LU emphasizes intermodal aspects of the transportation system. MDOT has an Intermodal Management System through the Transportation Management System database. The purpose of this management system is to improve integration and coordination in planning and implementing air, water, and ground transportation systems. This management system includes all facilities, both public and private, necessary to establish an efficient intermodal transportation system. An effective intermodal system will consider private sector issues, and many capital decisions affecting transportation facilities and systems made by the private sector. However, government policies and programs have an impact on private sector operations and decision making.

The State is required to develop, establish, and implement an intermodal management system that meets the federal legislation requirements. The data requirements of the intermodal system mandates coordination and integration with metropolitan and statewide transportation planning, the private sector, and other management systems. Because of the complexities of quantifying the intermodal management system, a task force has been formed at the state level to provide for local input into developing this system.

### **FUTURE DIRECTIONS**

The Kalamazoo Area Transportation Study will continue to cooperate with its members and partners to maintain and improve the transportation management systems that it uses in its planning and project development processes.

**Revising the Transportation Plan:** Recommendations from each of the 6 fully-developed management sub-systems will be incorporated into future updates of the statewide Long Range Plan and the metropolitan areas Transportation Plans.