

## SUBCHAPTER F—TRANSPORTATION INFRASTRUCTURE MANAGEMENT

### PART 500—MANAGEMENT AND MONITORING SYSTEMS

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#### Subpart A—Management Systems

##### § 500.101 Purpose.

The purpose of this part is to implement the requirements of 23 U.S.C. 303(a) which directs the Secretary of Transportation (the Secretary) to issue regulations for State development, establishment, and implementation of systems for managing highway pavement of Federal-aid highways (PMS), bridges on and off Federal-aid highways (BMS), highway safety (SMS), traffic congestion (CMS), public transportation facilities and equipment (PTMS), and intermodal transportation facilities and systems (IMS). This regulation also implements 23 U.S.C. 303(b) which directs the Secretary to issue guidelines and requirements for State development, establishment, and implementation of a traffic monitoring system for highways and public transportation facilities and equipment (TMS).

##### § 500.102 Policy.

(a) Federal, State, and local governments are under increasing pressure to balance their budgets and, at the same time, respond to public demands for quality services. Along with the need to invest in America's future, this leaves transportation agencies with the task of trying to manage current transportation systems as cost-effectively as possible to meet evolving, as well as backlog needs. The use of existing or new transportation management systems provides a framework for cost-effective decision making that emphasizes enhanced service at reduced public and private life-cycle cost. The primary outcome of transportation management systems is improved system performance and safety. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) strongly encourage implementation of transportation management systems consistent with State, metropolitan planning organization, transit operator, or local government needs.

(b) Whether the systems are developed under the provisions of this part or under a State's own procedures, the following categories of FHWA administered funds may be used for development, establishment, and implementation of any of the management systems and the traffic monitoring system: National highway system; surface transportation program; State planning and research and metropolitan planning funds (including the optional use of minimum allocation funds authorized under 23 U.S.C. 157(c) and restoration funds authorized under §202(f) of the National Highway System Designation Act of 1995 (Pub.L. 104-59) for carrying out the provisions of 23 U.S.C. 307(c)(1) and 23 U.S.C. 134(a)); congestion mitigation and air quality improvement program funds for those management systems that can be shown to contribute to the attainment of a national ambient air quality standard; and apportioned bridge funds for development

and establishment of the bridge management system. The following categories of FTA administered funds may be used for development, establishment, and implementation of the CMS, PTMS, IMS, and TMS: Metropolitan planning; State planning and research, and formula transit funds.

**§ 500.103 Definitions.**

Unless otherwise specified in this part, the definitions in 23 U.S.C. 101(a) are applicable to this part. As used in this part:

*Federal-aid highways* means those highways eligible for assistance under title 23, U.S.C., except those functionally classified as local or rural minor collectors.

*Metropolitan planning organization (MPO)* means the forum for cooperative transportation decision making for a metropolitan planning area.

*National Highway System (NHS)* means the system of highways designated and approved in accordance with the provisions of 23 U.S.C. 103(b).

*State* means any one of the fifty States, the District of Columbia, or Puerto Rico.

*Transportation management area (TMA)* means an urbanized area with a population over 200,000 (as determined by the latest decennial census) or other area when TMA designation is requested by the Governor and the MPO (or affected local officials), and officially designated by the Administrators of the FHWA and the FTA. The TMA designation applies to the entire metropolitan planning area(s).

**§ 500.104 State option.**

Except as specified in § 500.105 (a) and (b), a State may elect at any time not to implement any one or more of the management systems required under 23 U.S.C. 303, in whole or in part.

**§ 500.105 Requirements.**

(a) The metropolitan transportation planning process (23 U.S.C. 134 and 49 U.S.C. 5303–5005) in TMAs shall include a CMS that meets the requirements of § 500.109 of this regulation.

(b) States shall develop, establish, and implement a TMS that meets the requirements of subpart B of this regulation.

(c) Any of the management systems that the State chooses to implement under 23 U.S.C. 303 and this regulation shall be developed in cooperation with MPOs in metropolitan areas, affected agencies receiving assistance under the Federal Transit Act (49 U.S.C., Chapter 53), and other agencies (including private owners and operators) that have responsibility for operation of the affected transportation systems or facilities.

(d) The results (e.g., policies, programs, projects, etc.) of any of the management systems that a State chooses to develop under 23 U.S.C. 303 and this regulation shall be considered in the development of metropolitan and statewide transportation plans and improvement programs and in making project selection decisions under title 23, U.S.C., and under the Federal Transit Act. Plans and programs adopted after September 30, 1997, shall demonstrate compliance with this requirement.

**§ 500.106 PMS.**

An effective PMS for Federal-aid highways is a systematic process that provides information for use in implementing cost-effective pavement reconstruction, rehabilitation, and preventative maintenance programs and that results in pavements designed to accommodate current and forecasted traffic in a safe, durable, and cost-effective manner. The PMS should be based on the “AASHTO Guidelines for Pavement Management Systems.”<sup>1</sup>

**§ 500.107 BMS.**

An effective BMS for bridges on and off Federal-aid highways that should be based on the “AASHTO Guidelines for Bridge Management Systems”<sup>2</sup> and

<sup>1</sup> *AASHTO Guidelines for Pavement Management Systems*, July 1990, can be purchased from the American Association of State Highway and Transportation Officials, 444 N. Capitol Street, NW., Suite 249, Washington, D.C. 20001. Available for inspection as prescribed in 49 CFR part 7, appendix D.

<sup>2</sup> *AASHTO Guidelines for Bridge Management Systems*, 1992, can be purchased from the American Association of State Highway and Transportation Officials, 444 N. Capitol Street, NW., Suite 249, Washington, D.C.

that supplies analyses and summaries of data, uses mathematical models to make forecasts and recommendations, and provides the means by which alternative policies and programs may be efficiently considered. An effective BMS should include, as a minimum, formal procedures for:

- (a) Collecting, processing, and updating data;
- (b) Predicting deterioration;
- (c) Identifying alternative actions;
- (d) Predicting costs;
- (e) Determining optimal policies;
- (f) Performing short- and long-term budget forecasting; and
- (g) Recommending programs and schedules for implementation within policy and budget constraints.

#### § 500.108 SMS.

An SMS is a systematic process with the goal of reducing the number and severity of traffic crashes by ensuring that all opportunities to improve highway safety are identified, considered, implemented as appropriate, and evaluated in all phases of highway planning, design, construction, maintenance, and operation and by providing information for selecting and implementing effective highway safety strategies and projects. The development of the SMS may be based on the guidance in "Safety Management Systems: Good Practices for Development and Implementation."<sup>3</sup> An effective SMS should include, at a minimum:

- (a) Communication, coordination, and cooperation among the organizations responsible for the roadway, human, and vehicle safety elements;
- (b) A focal point for coordination of the development, establishment, and implementation of the SMS among the agencies responsible for these major safety elements;
- (c) Establishment of short- and long-term highway safety goals to address identified safety problems;
- (d) Collection, analysis, and linkage of highway safety data;

20001. Available for inspection as prescribed in 49 CFR part 7, appendix D.

<sup>3</sup>*Safety Management Systems: Good Practices for Development and Implementation*, FHWA and NHTSA, May 1996. Available for inspection and copying as prescribed in 49 CFR part 7, appendix D.

(e) Identification of the safety responsibilities of units and positions;

(f) Public information and education activities; and

(g) Identification of skills, resources, and training needs to implement highway safety programs.

#### § 500.109 CMS.

(a) For purposes of this regulation, congestion means the level at which transportation system performance is no longer acceptable due to traffic interference. The level of system performance deemed acceptable by State and local officials may vary by type of transportation facility, geographic location (metropolitan area or subarea, rural area), and/or time of day. An effective CMS is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet State and local needs. The CMS results in serious consideration of implementation of strategies that provide the most efficient and effective use of existing and future transportation facilities. In both metropolitan and non-metropolitan areas, consideration needs to be given to strategies that reduce SOV travel and improve existing transportation system efficiency. Where the addition of general purpose lanes is determined to be an appropriate strategy, explicit consideration is to be given to the incorporation of appropriate features into the SOV project to facilitate future demand management and operational improvement strategies that will maintain the functional integrity of those lanes.

(b) In addition to the criteria in paragraph (a) of this section, in all TMAs, the CMS shall be developed, established and implemented as part of the metropolitan planning process in accordance with 23 CFR 450.320(c) and shall 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) Definition of parameters for measuring the extent of congestion and for supporting the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures and service thresholds should be tailored to the specific needs of the area and established cooperatively by the State, affected MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area;

(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. To the extent possible, existing data sources should be used, as well as appropriate application of the real-time system performance monitoring capabilities available through Intelligent Transportation Systems (ITS) technologies;

(4) Identification and evaluation of the anticipated performance and expected benefits of appropriate traditional and nontraditional congestion management strategies that will contribute to the more efficient use of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combinations of strategies, should be appropriately considered for each area: Transportation demand management measures, including growth management and congestion pricing; traffic operational improvements; public transportation improvements; ITS technologies; and, where necessary, additional system capacity.

(5) Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation; 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. The results of this evaluation shall be provided to decision makers to provide guidance on selection of effective strategies for future implementation.

(c) In a TMA designated as non-attainment for carbon monoxide and/or ozone, the CMS shall 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 (adding general purpose lanes to an existing highway or constructing a new highway) 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 and additional SOV capacity is warranted, then the CMS shall identify all reasonable strategies to manage the SOV facility effectively (or to facilitate its management in the future). Other travel demand reduction and operational management strategies appropriate for the corridor, but not appropriate for incorporation into the SOV facility itself shall also be identified through the CMS. All identified reasonable travel demand reduction and operational management strategies shall be incorporated into the SOV project or committed to by the State and MPO for implementation.

(d)(1) Compliance with the requirement that the planning process in all TMAs include a CMS will be addressed during metropolitan planning process certification reviews for all TMAs specified in 23 CFR 450.334. If the metropolitan planning process in a TMA does not include a CMS that meets the requirements of this section, deficiencies will be noted and corrections will need to be made in accordance with the schedule established in the certification review.

(2) Until October 1, 1997, the interim CMS procedures in 23 CFR 450.336(b) may be used to meet the requirement in 23 U.S.C. 134(l) that Federal funds may not be programmed in a carbon

monoxide and/or ozone nonattainment TMA for any highway project that will result in a significant increase in single-occupant-vehicle capacity unless the project is based on an approved CMS. After September 30, 1997, such projects must be based on a CMS that meets the requirements of this part.

#### § 500.110 PTMS.

An effective PTMS for public transportation facilities (e.g., maintenance facilities, stations, terminals, transit related structures), equipment, and rolling stock is a systematic process that collects and analyzes information on the condition and cost of transit assets on a continual basis, identifies needs, and enables decision makers to select cost-effective strategies for providing and maintaining transit assets in serviceable condition. The PTMS should cover public transportation systems operated by the State, local jurisdictions, public transportation agencies and authorities, and private (for profit and non-profit) transit operators receiving funds under the Federal Transit Act and include, at a minimum:

- (a) Development of transit asset condition measures and standards;
- (b) An inventory of the transit assets including age, condition, remaining useful life, and replacement cost; and
- (c) Identification, evaluation, and implementation of appropriate strategies and projects.

#### § 500.111 IMS.

An effective IMS for intermodal facilities and systems provides efficient, safe, and convenient movement of people and goods through integration of transportation facilities and systems and improvement in the coordination in planning, and implementation of air, water, and the various land-based transportation facilities and systems. An IMS should include, at a minimum:

- (a) Establishment of performance measures;
- (b) Identification of key linkages between one or more modes of transportation, where the performance or use of one mode will affect another;
- (c) Definition of strategies for improving the effectiveness of these modal interactions; and

- (d) Evaluation and implementation of these strategies to enhance the overall performance of the transportation system.

### Subpart B—Traffic Monitoring System

#### § 500.201 Purpose.

The purpose of this subpart is to set forth requirements for development, establishment, implementation, and continued operation of a traffic monitoring system for highways and public transportation facilities and equipment (TMS) in each State in accordance with the provisions of 23 U.S.C. 303 and subpart A of this part.

#### § 500.202 TMS definitions.

Unless otherwise specified in this part, the definitions in 23 U.S.C. 101(a) and § 500.103 are applicable to this subpart. As used in this part:

*Highway traffic data* means data used to develop estimates of the amount of person or vehicular travel, vehicle usage, or vehicle characteristics associated with a system of highways or with a particular location on a highway. These types of data support the estimation of the number of vehicles traversing a section of highway or system of highways during a prescribed time period (traffic volume), the portion of such vehicles that may be of a particular type (vehicle classification), the weights of such vehicles including the weight of each axle and associated distances between axles on a vehicle (vehicle weight), or the average number of persons being transported in a vehicle (vehicle occupancy).

*Traffic monitoring system* means a systematic process for the collection, analysis, summary, and retention of highway and transit related person and vehicular traffic data.

*Transit traffic data* means person and vehicular data for public transportation on public highways and streets and the number of vehicles and ridership for dedicated transit rights-of-way (e.g., rail and busways), at the maximum load points for the peak period in the peak direction and for the daily time period.

**§ 500.203 TMS general requirements.**

(a) Each State shall develop, establish, and implement, on a continuing basis, a TMS to be used for obtaining highway traffic data when:

(1) The data are supplied to the U.S. Department of Transportation (U.S. DOT);

(2) The data are used in support of transportation management systems;

(3) The data are used in support of studies or systems which are the responsibility of the U.S. DOT;

(4) The collection of the data is supported by the use of Federal funds provided from programs of the U.S. DOT;

(5) The data are used in the apportionment or allocation of Federal funds by the U.S. DOT;

(6) The data are used in the design or construction of an FHWA funded project; or

(7) The data are required as part of a federally mandated program of the U.S. DOT.

(b) The TMS for highway traffic data should be based on the concepts described in the American Association of State Highway and Transportation Officials (AASHTO) "AASHTO Guidelines for Traffic Data Programs"<sup>4</sup> and the FHWA "Traffic Monitoring Guide (TMG),"<sup>5</sup> and shall be consistent with the FHWA "Highway Performance Monitoring System Field Manual."<sup>6</sup>

(c) The TMS shall cover all public roads except those functionally classified as local or rural minor collector or those that are federally owned. Coverage of federally owned public roads shall be determined cooperatively by

<sup>4</sup>AASHTO Guidelines for Traffic Data Programs, 1992, ISBN 1-56051-054-4, can be purchased from the American Association of State Highway and Transportation Officials, 444 N. Capitol Street, NW., Suite 249, Washington, D.C. 20001. Available for inspection as prescribed in 49 CFR part 7, appendix D.

<sup>5</sup>Traffic Monitoring Guide, DOT/FHWA, publication No. FHWA-PL-95-031, February 1995. Available for inspection and copying as prescribed in 49 CFR part 7, appendix D.

<sup>6</sup>Highway Performance Monitoring System (HPMS) Field Manual for the Continuing Analytical and Statistical Data Base, DOT/FHWA, August 30, 1993 (FHWA Order M5600.1B). Available for inspection and copying as prescribed in 49 CFR part 7, appendix D.

the State, the FHWA, and the agencies that own the roads.

(d) The State's TMS shall apply to the activities of local governments and other public or private non-State government entities collecting highway traffic data within the State if the collected data are to be used for any of the purposes enumerated in § 500.203(a) of this subpart.

(e) Procedures other than those referenced in this subpart may be used if the alternative procedures are documented by the State to furnish the precision levels as defined for the various purposes enumerated in § 500.203(a) of this subpart and are found acceptable by the FHWA.

(f) Nothing in this subpart shall prohibit the collection of additional highway traffic data if such data are needed in the administration or management of a highway activity or are needed in the design of a highway project.

(g) Transit traffic data shall be collected in cooperation with MPOs and transit operators.

(h) The TMS for highways and public transportation facilities and equipment shall be fully operational and in use by October 1, 1997.

**§ 500.204 TMS components for highway traffic data.**

(a) *General.* Each State's TMS, including those using alternative procedures, shall address the components in paragraphs (b) through (h) of this section.

(b) *Precision of reported data.* Traffic data supplied for the purposes identified in § 500.203(a) of this subpart shall be to the statistical precision applicable at the time of the data's collection as specified by the data users at various levels of government. A State's TMS shall meet the statistical precisions established by FHWA for the HPMS.

(c) *Continuous counter operations.* Within each State, there shall be sufficient continuous counters of traffic volumes, vehicle classification, and vehicle weight to provide estimates of changes in highway travel patterns and to provide for the development of day-of-week, seasonal, axle correction, growth factors, or other comparable factors approved by the FHWA that

support the development of traffic estimates to meet the statistical precision requirements of the data uses identified in § 500.203(a) of this subpart. As appropriate, sufficient continuous counts of vehicle classification and vehicle weight should be available to address traffic data program needs.

(d) *Short term traffic monitoring.* (1) Count data for traffic volumes collected in the field shall be adjusted to reflect annual average conditions. The estimation of annual average daily traffic will be through the appropriate application of only the following: Seasonal factors, day-of-week factors, and, when necessary, axle correction and growth factors or other comparable factors approved by the FHWA. Count data that have not been adjusted to represent annual average conditions will be noted as being unadjusted when they are reported. The duration and frequency of such monitoring shall comply to the data needs identified in § 500.203(a) of this subpart.

(2) Vehicle classification activities on the National Highway System (NHS), shall be sufficient to assure that, on a cycle of no greater than three years, every major system segment (i.e., segments between interchanges or intersections of principal arterials of the NHS with other principal arterials of the NHS) will be monitored to provide information on the numbers of single-trailer combination trucks, multiple-trailer combination trucks, two-axle four-tire vehicles, buses and the total number of vehicles operating on an average day. If it is determined that two or more continuous major system segments have both similar traffic volumes and distributions of the vehicle types identified above, a single monitoring session will be sufficient to monitor these segments.

(e) *Vehicle occupancy monitoring.* As deemed appropriate to support the data uses identified in § 500.203(a) of this subpart, data will be collected on the average number of persons per automobile, light two-axle truck, and bus. The duration, geographic extent, and level of detail shall be consistent with the intended use of the data, as cooperatively agreed to by the organizations that will use the data and the organizations that will collect the data. Such vehicle

occupancy data shall be reviewed at least every three years and updated as necessary. Acceptable data collection methods include roadside monitoring, traveler surveys, the use of administrative records (e.g., accident reports or reports developed in support of public transportation programs), or any other method mutually acceptable to the responsible organizations and the FHWA.

(f) *Field operations.* (1) Each State's TMS for highway traffic data shall include the testing of equipment used in the collection of the data. This testing shall be based on documented procedures developed by the State. This documentation will describe the test procedure as well as the frequency of testing. Standards of the American Society for Testing and Materials or guidance from the AASHTO may be used. Only equipment passing the test procedures will be used for the collection of data for the purposes identified in § 500.203(a) of this subpart.

(2) Documentation of field operations shall include the number of counts, the period of monitoring, the cycle of monitoring, and the spatial and temporal distribution of count sites. Copies of the State's documentation shall be provided to the FHWA Division Administrator when it is initially developed and after each revision.

(g) *Source data retention.* For estimates of traffic or travel, the value or values collected during a monitoring session, as well as information on the date(s) and hour(s) of monitoring, will remain available until the traffic or travel estimates based on the count session are updated. Data shall be available in formats that conform to those in the version of the TMG current at the time of data collection or as then amended by the FHWA.

(h) *Office factoring procedures.* (1) Factors to adjust data from short term monitoring sessions to estimates of average daily conditions shall be used to adjust for month, day of week, axle correction, and growth or other comparable factors approved by the FHWA. These factors will be reviewed annually and updated at least every three years.

(2) The procedures used by a State to edit and adjust highway traffic data collected from short term counts at field locations to estimates of average

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traffic volume shall be documented. The documentation shall include the factors discussed in paragraph (d)(1) of this section. The documentation shall remain available as long as the traffic or travel estimates discussed in paragraph (g) of this section remain cur-

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rent. Copies of the State's documentation shall be provided to the FHWA Division Administrator when it is initially developed and after each revision.

**PART 511 [RESERVED]**