

PAVEMENT MANAGEMENT REQUIREMENTS FOR THE LOCAL GOVERNMENTS in INDIANA

The 1992 Intermodal Surface Transportation Efficiency Act (ISTEA) requires Pavement Management Systems (PMS) on all public roads that are eligible for federal assistance. This includes all routes classified as rural major collectors and urban collectors.

Local agencies must have a PMS on these routes to receive federal assistance for road projects. INDOT is asking all public agencies to start planning now to develop a PMS for their use, if they don't already have one. To aid in this, a set of requirements and guidelines has been developed to clarify what is needed.

ISTEA gives the flexibility for the local PMS to be tailored to the needs of the various levels of government. To provide this flexibility INDOT has been meeting monthly with cities, metropolitan planning organizations (MPOs), HERPICC and counties in a committee called the Indiana Pavement Management Advisory Committee (IPMAC) to define these requirements. The PMS requirements were adapted by the committee in January 1995.

The Pavement Management Requirements for Local Governments in Indiana list the minimum acceptable limits of what a PMS must contain and be capable of. Examples of data and features are given in the requirements for guidance. The requirements provide a framework for estimating the work needed to develop or implement a PMS. Each agency is free to add to the minimum requirements to make the PMS fit their needs.

Each local government is expected to meet the requirements. INDOT will develop a certification and compliance process with the IPMAC committee to see that the requirements and intent of ISTEA are met.

The various components of the Indiana requirements must be implemented at the local level by October 1, 1997. This means that by the summer of 1997 INDOT will be asking local governments for status and certification of all pavement management systems in the state. Pavement management data takes some time to collect, so an organization should initiate work on their PMS by the summer of 1996 to meet the October 1997 deadline.

HERPICC, INDOT and local government associations will continue to provide assistance and guidance for PMS in the upcoming months. Funding issues and the certification process are some of the items yet to be decided.

**PAVEMENT MANAGEMENT
REQUIREMENTS
for LOCAL GOVERNMENTS in INDIANA**

I. GENERAL REQUIREMENTS

- A. All roads functionally classified as rural major collectors or urban collectors and above, must be covered by a Pavement Management System (PMS). The roads requiring PMS will be called pavement management system routes. The National Highway System (NHS) under State and local jurisdiction shall meet the requirements of the 1991 ISTEA⁽¹⁾ for PMS. All other PMS routes must meet the minimum requirements as specified here. The PMS requirements are intended to be flexible to meet the varied needs of both INDOT and local government.
- B. Representatives from local governments, HERPICC and INDOT, formed a committee called the Indiana Pavement Management Advisory Committee (IPMAC), which created and approved these guidelines. Additions, corrections or revisions to these guidelines will be considered by the Committee.
- C. The results from a PMS must be considered in planning highway transportation work programs for which Federal-aid funding is anticipated and should be used in other related planning processes.
- D. INDOT will perform the data collection and the required analysis on State roads and local jurisdictions with NHS routes. Local agencies must have a PMS that meets these minimum standards on all other PMS routes under their jurisdiction. Local agencies shall provide for the data collection and analysis. INDOT will provide guidance and support for local agencies PMS where possible. IPMAC strongly encourages that a PMS cover all roads in a agency's system.
- E. A local agency is required to have a PMS on the PMS routes to be eligible for Federal-Aid Highway funds.

⁽¹⁾ ISTEA- Intermodal Surface Transportation Efficiency Act as described in 23 CFR Part 500, Subpart B- Pavement Management Systems.

IPMAC
 Local PMS Guidelines
 January 31, 1995

- F. Local agencies must provide certification annually to INDOT showing the status of their PMS. INDOT will randomly review the local PMS to assure compliance with these requirements. INDOT is responsible for certifying to the FHWA the status and the coverage of PMS each year.
- G. The objective of PMS is to provide information to local agencies to develop priorities and to help produce lists of transportation projects. The goal of PMS is to preserve or improve the appropriate service levels of a road network.

II. RESULTS FROM A PAVEMENT MANAGEMENT SYSTEM

- A. The PMS must gather the following information.
 - Inventory of roads
 - Pavement condition survey
 - Work history
 - Traffic volume information
 - Information storage
- B. When implemented the PMS will help produce the following summaries.
 - An inventory of a jurisdiction's pavement network
 - Reports for mileage certification
 - Reports for functional class determinations
 - The projected needs for the appropriate levels of service
 - Network and project investment analysis
- C. When implemented the PMS must help produce, through the analysis of pavement condition and operation data.
 - The segments of road that may need work over a multiple year (2-5) planning period
 - The type of maintenance or rehabilitation needed
 - The estimated cost of the work
 - A priority for the projects that considers traffic and potential benefits of the work
- D. When implemented the PMS will help provide information for use in other agency operations. Consistent road names and a reliable location reference method should be used as a starting point toward sharing information.

IPMAC
Local PMS Guidelines
January 31, 1995

III. DATA COLLECTION and MANAGEMENT

A. INVENTORY OF ROADS

An inventory shall be kept up to date on the roads within the jurisdiction. Any documented changes to the local agency mileage must be submitted to INDOT. The existing road inventory as maintained by INDOT can be used for establishing an inventory. As a minimum an inventory of roads shall contain:

1. ROAD NUMBER

Road Number is the number (Example- IR 123) INDOT has assigned to the road segments. These are needed to verify mileage with INDOT.

2. ROAD NAME

Road Name is useful at the local level and should provide meaning to the Road Number. Several alternate names may be used if local usage varies. The naming of roads is an important issues in sharing data with other management systems.

3. SEGMENT ID NUMBER

Segment ID is used to name each piece of a road. The segment ID can be made to follow whatever conventions makes sense to the local agency. Segments of roads are definable by the local agency. IPMAC recommends to make a new segment for major changes in surface type or changes in number of through lanes.

4. SEGMENT LOG MILE BEGIN & END

Segment Log Mile Begin & End is used for finding the segment length and for keeping segments in order. More importantly it can be used to build data bases to relate bridges, culverts, or signs to the segments of roads. For example, if a bridge is at log mile 2.53 on CR 200W it belongs to segment number "A1" that starts at 0.00 at the county line and ends at 3.00 at SR 78. By knowing the location items can be mapped and located in the field.

IPMAC
Local PMS Guidelines
January 31, 1995

5. PHYSICAL DETAILS OF SEGMENT

- Functional class
- Number of lanes
- Width of lanes
- Surface type
- Shoulder width & type (optional)

Physical Details of Segment are the items that describe the road. These are used to aid in making the decisions required of the agency. The items shown are the minimum items required by any PMS. Many more items can be added to fit the agency needs.

B. PAVEMENT CONDITION

The pavement condition of the segments must be determined at least once every two years. Each of the options listed below gives progressively more detail and allows for more sophisticated PMS analysis. A condition survey is a basic requirement of any PMS. The condition can help decide what is physically wrong with a pavement and aid in setting priorities. Roughness, rutting, or other detailed data collection is optional.

1. MINIMUM REQUIREMENT for a CONDITION SURVEY

The condition of each segment is rated using the HIGHWAY PERFORMANCE MONITORING SYSTEM (HPMS) manual for collection of Pavement Serviceability Rating (PSR) data. This method is a windshield survey that rates the pavement on a (0 - 5) scale, where "0" is worst. An engineering judgement of the maintenance or rehabilitation needs are determined from the survey to develop priorities and project lists. See Appendix-A for the HPMS rating procedure.

An alternative is to rate the condition of each segment as described in the University of Wisconsin Transportation Information Center PASER Manuals. This method is a (0 - 10) scale PAVEMENT CONDITION RATING (PCR) survey, where "0" is worst. Each rating has pictures as standards to compare road conditions. Asphalt, concrete and gravel roads have their own standards for rating. The manuals are available through HERPICC.

IPMAC
Local PMS Guidelines
January 31, 1995

Another acceptable option is rating the condition by examining individual distress types. The extent (how many) and severity (how bad) of several types of distress, like cracks, potholes or ruts, are determined. From this a Pavement Condition Rating (PCR) is developed from the amount and kind of distress observed. INDOT has a PCR method that is available for this level of data collection. This method can be adjusted for various distresses and weighing factors to tailor the rating to suit the needs of the local agency.

2. RECOMMENDED OPTIONS

In addition to pavement distress, the roughness of the pavement can be used. The ride of the pavement is a primary concern to the public. The Present Serviceability Index (PSI) determination of ride quality, is optional. The roughness of the segments is rated on the (0 - 5) scale, where "0" is worst. The index is determined by a person rating only how the pavement rides.

Another way to find the roughness is to measure the pavement with a roughness response measuring device or profiler. The device may be a CLASS I, II or III device as classified in the HPMS manual. This method is most useful on higher speed or volume routes.

IPMAC strongly suggests that local agencies collect information about culverts, drainage ditches, or other drainage related items. A drainage condition rating may be developed similar to the pavement procedures. In urban areas, curbs types, inlets, or utility cut information may be useful. Locations of curves or roadside hazards, may prove useful for determination of safety problems.

C. WORK HISTORY

Records of the work performed on pavements must be maintained. The location and amount of maintenance and construction must be started now to build a history for the future. Collection of past work history is not required. Costs must be recorded for the major items that preserve or improve the life of the pavement. The following is an example of the type of information a construction history should record:

IPMAC
Local PMS Guidelines
January 31, 1995

Road Number (ref. inventory of roads)
Road Name (ref. inventory)
Location of work performed (ref. inventory)
Work ID Number (Contract #, P.O., Local Work Order)
Type of Work (resurface, chip & seal, ditches, culverts)
Surface Material (Hot mix, crushed stone, RS90)
Completion time
Cost

D. TRAFFIC VOLUME INFORMATION

The average daily traffic (ADT) of the segment should be determined periodically. An estimate of traffic usage must be made based on adjacent counts or from local knowledge if actual counts are not available. Best practice guides should be used to aid in this data collection area. A traffic count is not required for each segment.

Traffic volume information can be used several ways within a PMS, for example; to help determine possible treatments, to measure the benefits of treatments, and to assist in setting priorities for projects.

E. INFORMATION STORAGE

The PMS information must be recorded either on paper or on a computer. A PMS is not required to be on a computer data base. The PMS must be easy to review and useful to the local agency. A Pavement Management System is not a computer system. It is good management practices for roads.

IV. ANALYSIS

The Minimum Requirements for a local government network are:

A. PAVEMENT CONDITION ANALYSIS

1. The PMS must be able to sum the mileage of the jurisdiction by the data items collected such as:

Functional Class-	Number of Miles in collectors
Condition-	Number of Miles below 2.5 PSR
Physical Features-	Number of Asphalt Miles or
	Number of Lane Miles

IPMAC
Local PMS Guidelines
January 31, 1995

2. A local agency PMS must be able to show the number of miles that are in five (5) levels. These levels are:

- | | |
|--------------|--------------|
| 1. Very Poor | 4. Good |
| 2. Poor | 5. Excellent |
| 3. Fair | |

Any condition rating procedure must be able to be converted into these categories. The condition ratings of each category must be determined by the local agency and may vary according to the road function. An arterial route and a collector each may have a condition rating of "5" using the PASER method. (Many tight cracks, or raveled or noticeable bumps). This rating is probably Fair for the arterial, but Good for a collector. INDOT would consider it Poor for the Interstate. The rating of "5" indicates the same condition, but the levels are dependent on the roads usage or the jurisdiction's demands.

These levels of condition allow roads with different rating methods, roads with different usage, or roads with different surfaces to be compared. These levels of condition must be defined by the user and can help set the levels of service the agency can afford or expects.

B. PAVEMENT PERFORMANCE ANALYSIS

The PMS must be able to record and examine conditions over time for the same pavement sections. These locations may be selected sample locations or continuous over the entire network. The historical conditions and the construction history will allow comparisons of how various pavements perform over time.

C. NETWORK and PROJECT INVESTMENT ANALYSIS

As a minimum the PMS shall document the planned maintenance or rehabilitation needed on the network of PMS routes. The needs must show the costs to maintain the network over a multiple year (2-5) planning period.

An acceptable method for determining pavement needs is to make a judgement at the time of rating pavements of what actions are needed to preserve or extend the pavement life. The costs and timing of the actions must be determined and documented. The resulting

IPMAC
Local PMS Guidelines
January 31, 1995

pavement actions must be compared with the available funds to aid in producing a documented and ranked work program for the roadway network. A comparison of what work is needed and what can be produced will show the unfunded needs of the network.

V. SUMMARY OF PMS REQUIREMENTS

For Local Agencies the following general categories of data are required.

A. Data Collection and Management

1. Inventory of Roads
2. Pavement Condition
3. Work History
4. Traffic Volume Information
5. Information Storage

B. Analysis

1. Pavement Condition Summaries
2. Pavement Performance Analysis
3. Network and Project Investment Analysis

IPMAC Adopted: 1/31/95

Table IV-2

HPMS

PAVEMENT SERVICEABILITY RATING

(Use full range of values)

PSR & Verbal Rating	Description
5.0	<p>Only new, superior (or nearly new) pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated very good.</p>
4.0	<p>Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.</p>
3.0	<p>The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high speed traffic. Surface defects of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and cracking, and some pumping.</p>
2.0	<p>Pavements in this category have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes ravelling, cracking, rutting, and occurs over 50 percent, or more, of the surface. Rigid pavement distress includes joint spalling, faulting, patching, cracking, scaling, and may include pumping and faulting.</p>
1.0	<p>Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.</p>
0.0	