

PAVEMENT MANAGEMENT SYSTEM

TRANSPORTATION ASSET MANAGEMENT

Pavement Management System

The Pavement Management System (PMS) was one of the first systems to employ an asset management approach. It was under development before the concept of an integrated Transportation Management System (TMS) evolved at the Michigan Department of Transportation (MDOT). However, this system is not yet fully integrated into TMS.

What is PMS?

PMS is used to perform a variety of engineering and planning functions. These include forecasting future network pavement condition and costs associated with implementing various pavement repair strategies. The system provides users with necessary analytical tools to define realistic long-term goals, based on projected investment levels. The system also allows users to define what long-term investment levels are required to achieve a given network condition level in the future.



Data used to perform this analysis include historical cost and Remaining Service Life (RSL) data. RSL is the result of a process that includes data collection and processing, uniform section analysis and pavement performance modeling.

How Pavement is Managed

Pavement deterioration is caused by a variety of factors. These include environment, materials, traffic, workmanship and design. Pavements typically deteriorate at a variable rate throughout their life, and tend to degenerate faster as they age. In order to effectively manage this variable deterioration, the MDOT Pavement Preservation Program (PPM) uses a three-pronged approach that includes reconstruction and rehabilitation (R&R), capital preventive maintenance (CPM) and reactive maintenance. PPM reflects a “mix of fixes” approach, allowing MDOT to maximize network condition for a given program level.

R&R fixes are applied to pavements with an RSL of up to two years. Pavements having RSL values greater than two years are managed using CPM. CPM work costs much less than R&R fixes, allowing MDOT to address more miles of pavement per taxpayer dollar. CPM makes relatively inexpensive repairs, yielding a great benefit by preserving existing pavements.

What Defines Good Pavement?

By conducting periodic pavement condition surveys, MDOT tracks the condition of approximately 13,000 centerline miles of the state highway and National Highway systems. Data from these surveys are used for bridge, congestion, intermodal, pavement and safety analyses in TMS.

PAVEMENT



MDOT uses two different, but complementary, evaluation systems for identifying pavement condition on assets for which it is responsible:

- Sufficiency Rating: An annual subjective “windshield survey” of the entire state system
- PMS Rating: A biennial collection of detailed pavement condition data.

“Sufficiency” rates pavement distress condition and pavement ride on a scale of one to five with one being the best. Ratings are based on the observed amount/severity of pavement cracking, faulting, wheel tracking and patching. MDOT has been collecting these ratings on an annual basis since 1961. Sufficiency provides an excellent sense of what customers experience on the highways.

PMS rating data are collected over a two-year period and include distress and ride-quality ratings, and measurements of rutting and surface friction. Distress Index (DI) data are computed from the detailed distress data and used by PMS to compute RSL. Types of distress data collected include cracking, raveling, flushing, spalling, faulting, roadway curvature, pavement grade, cross slopes and rutting. Ride quality is classified using the Michigan Ride Quality Index (RQI). An index of 50 or greater corresponds to an RSL of zero. RSL refers to years left before reconstruction or major rehabilitation should be considered for a pavement fix.

Pavement Strategic Plans

Pavement management works in support of all goals and objectives put forth in the *State Long-Range Plan*. A part of this support is stipulated in the *Five-Year Road & Bridge Program*. This document identifies MDOT’s current investment strategies and a specific list of road and bridge projects to be undertaken on a rolling five-year basis.

Performance Standards & Needs

MDOT’s pavement condition goal is to have 95% of the freeway, and 85% of the non-freeway system in “good” condition by the end of 2007. PMS is used to evaluate effectiveness of different network pavement strategies in order to achieve these goals.

PMS is used to evaluate which pavement strategies will result in both suitable short- and long-term network condition levels. The main PMS tool used to perform network strategy analysis is the Road Quality Forecasting System (RQFS).

Who is Responsible for PMS?

Major responsibility for PMS resides with the Bureau of Highway, Construction & Technology Division. Strategic planning support is also provided by planners in Statewide Transportation Planning.

Who are the Customers?

MDOT pavement engineers and transportation planners are the main customers of PMS. They use the data and analytical tools to develop cost-effective short- and long-term pavement strategies. These strategies result in a pavement network that is safe and rides well. In addition, effective strategies result in minimizing long-term user impacts caused by major reconstruction or frequent maintenance.

Further, the users and makers of strategic transportation and financial plans use the process to assure the best return on our investment. As the results of pavement management are applied to the development of maintenance projects, those who work to assure the roads are in good shape, as well as residents and business interests who use them, are also customers of pavement management.



Undertaking basic maintenance activities helps prolong the useful life of a road.

For Further Information - please contact MDOT at 517-373-2240 or send e-mail to assetmgt@mdot.state.mi.us