



RESEARCH PROJECT CAPSULE [11-1P]

June 2011

TECHNOLOGY TRANSFER PROGRAM

LADOTD Pavement Management System (PMS) for Project Level Applications

JUST THE FACTS:

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24 months

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State

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POINTS OF INTEREST:

*Problem Addressed / Objective of
Research / Methodology Used
Implementation Potential*

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PROBLEM

The Pavement Management System (PMS) of the Louisiana Department of Transportation and Development (LADOTD) contains an immense amount of data on pavement conditions at the network level. Implemented in 1990, the system covers the interstate highway system, arterial/collector systems, non-state maintained national highway system, and the off-system sample components of the Highway Performance Monitoring System. This is a total of over 19,000 miles.

LADOTD has 20 years of pavement inventory and performance data available in their PMS database. This valuable information has seen an increase in use from numerous sections within the agency for a variety of purposes. Originally intended as a network level tool, the PMS database is now being used for other purposes including:

- Project level assessments
- Pavement protection
- Department policy, guideline, and procedure development
- Research

Along with this expansion in use comes the need to quantify the accuracy, reliability, and limitations of the current PMS database. These attributes need to be evaluated to develop guidelines that explain the appropriate uses of the database for purposes outside the original intent. The guidelines are also needed to include an assessment of the risk involved with using current PMS data for each of the purposes listed above.

Integral to this evaluation is an assessment of the quality control/quality assurance measures currently in place. While the current quality controls are adequate for network level analysis, improvements in the process may be necessary to achieve the quality required for other types of assessments.

OBJECTIVE

To fully address the research needs described in the problem statement, the primary objective of this project is to develop guidelines that provide information on how network level PMS data can be used at a project level in activities of pavement engineering and what those limitations may be. These guidelines will include information on the accuracy and reliability of the current PMS data for these purposes. A discussion of the limitations of the data for a variety of purposes will also be included as will quality improvement recommendations. Accomplishing this objective will require a comprehensive assessment of the network level data provided by the current PMS.

These guidelines will provide users of the PMS database valuable information on the proper use of PMS data. This will aid in the long-term goal of maximizing the utility of the PMS database and improving efficiency in LADOTD operations.

METHODOLOGY

A series of tasks have been defined as follows:

Task 1: Literature Review and User Survey

This study begins with a thorough review of existing published and unpublished relevant literature. Of particular interest are LADOTD reports that document changes in the PMS in the past 20 years, such as quality control/quality assurance (QC/QA) protocols and policy documents on the uses of the database. In addition, LADOTD personnel involved with the PMS will be surveyed to determine how PMS data are currently being used and what users want from the PMS.

Task 2: Establish Criteria and Benchmark for Quality Checks

The data required for project level applications will be reviewed and categorized as follows:

- Available in the PMS database with adequate accuracy/reliability
- Available in the PMS database with inadequate accuracy/reliability
- Unavailable in the PMS database but can be substituted with assumptions
- Unavailable but needed with adequate accuracy/reliability

Criteria for quality management will be developed as part of this task. Based on the results of the literature search and user survey, the research team will determine the basic requirements for PMS data to be used at a project level and criteria and benchmarks to be used in the assessment of PMS data so that the outcome of this study can be realistically implemented.

Task 3: Develop Assessment Plan

Based on the results of Tasks 1 and 2, a plan to assess the PMS in terms of reliability, accuracy, and repeatability will be developed. This includes a review of LADOTD's QC/QA plan and data collection protocols. Statistical analysis of the variability of the data collected may also be required. An interim report will be prepared summarizing the findings of the preceding tasks.

Task 4: Quantitative Assessment of Accuracy, Reliability and Limitations

In order to verify the data in the PMS, comparisons with sample sites may be necessary and any statistical differences quantified. Based on the requirement of statistical analysis on data samples, the minimum numbers samples sections will be selected with the data associated with them being analyzed and assessed according to the criteria and benchmarks established in Task 2 so that a statistical assessment of LADOTD PMS can be established. Louisiana currently has two Long Term Pavement Performance Program (LTPP) sites that may be used for verification as well as other roadway sections to be selected from the LADOTD PMS.

Tasks 5, 6, and 7 will focus on developing recommendations for improving the quality of data collection, guidelines for project level applications, and the final report, respectively.

IMPLEMENTATION POTENTIAL

The results of this study intend to help LADOTD to improve the quality of PMS data collected based on current technologies available for data collection and processing and for the quality control and assurance process. The implementation will also include the improvement of communication between LADOTD PMS and its users within and outside LADOTD. Depending on the needs of PMS users, new project-level applications may include the collection of data to support the implementation of pavement designs, preservation, research of selection of new pavement treatment strategies, etc.