

Quality Improvement and Application of TDOT Pavement Management Systems (PMS) Data (RES2013-48)

Research Purpose

Pavement Management System (PMS) is established and used for supporting highway pavement maintenance and rehabilitation activities. Pavement condition data are periodically collected to monitor the decay of performance of pavement infrastructure so that pavement engineers can make timely and effective decisions on maintenance and rehabilitation strategies. They are also used for predicting long-term pavement performance based on which a reasonable budget allocation at each fiscal year can be determined. Additionally, Design Division utilizes pavement condition data to calibrate and validate the design models which are used for determining the most appropriate structure for a pavement at a given traffic and environmental condition. Therefore, the preciseness and accuracy of pavement condition data are of importance for a reliable Pavement Management System. Tennessee Department of Transportation (TDOT) utilized pavement management systems since 1980's. Over thirty years of service, TDOT collected an immense amount of data on pavement surface conditions, covering over 1,100 miles of Interstates and over 14,000 miles of State Routes. Since late 1990's, TDOT started to employ high-speed automatic collection system, which consists of transverse and longitudinal Laser profiler systems and high-speed imaging system, to collect, process and analyze pavement surface information. Compared to traditional collection method, the primary advantageous of employing high-speed automatic collection system is that it is easy to collect a huge amount of pavement surface information at highway travel speed without any effect on traffic. However, the preciseness and accuracy of pavement condition data may be subjected to many factors, including measurement environment, surface features, sensor resolutions, data collection staff, etc. There is still a lack of guideline on quality control procedure for collection of pavement condition data. Therefore, it is necessary to establish a guideline to improve the data collection activities and ensure quality data are collected for supporting maintenance decision activities.

Objective and Significance

The main objective of this project is to identify the current quality issues of PMS data and develop a ready-to-use data quality control framework to assist TDOT to conduct quality control activities throughout the process of data production. This research team aims to improve data quality for pavement management system in Tennessee so that the health of highway pavement infrastructure can be monitored, estimated, and reported both accurately and precisely.

Outcomes

The outcomes of this research consist of a comprehensive nation-wide survey on the current data quality control practice, a systematic evaluation of the data quality for PMS data to identify the current quality issues, a procedure to identify the data quality issues throughout data production process, and a guideline on data quality management. Figure 1 shows the data collection equipment and Figure 2 shows the quality control loop.



Figure 1. Data collection Equipment

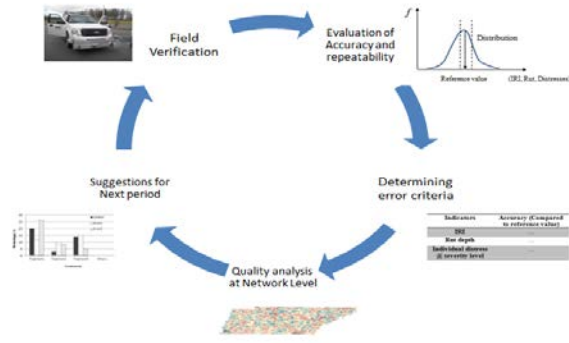


Figure 2. Quality control loop

Time periods and status of the project

The duration of the project is from January 1, 2013 to December 31, 2015. The research team has submitted the final report to TDOT. The results and findings from the study has also been disseminated on international conferences and in journal papers.

Contact information

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