



Implementation of Transportation Asset Management in Grandview, Missouri

tech transfer summary

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MTC RESEARCH PROJECT TITLE

Implementation of Transportation Asset Management in Grandview, Missouri

SPONSORS

City of Grandview, Missouri
Midwest Transportation Center
U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology (USDOT/OST-R)

PRINCIPAL INVESTIGATOR

Henry Brown, Research Engineer
Transportation Infrastructure Center
University of Missouri - Columbia
brownhen@missouri.edu / 573-882-0832

CO-PRINCIPAL INVESTIGATOR

Carlos Sun, Associate Director
Transportation Infrastructure Center
University of Missouri - Columbia

MORE INFORMATION

www.intrans.iastate.edu/

MTC
Iowa State University
2711 S. Loop Drive, Suite 4700
Ames, IA 50010-8664
515-294-8103

The Midwest Transportation Center (MTC) is a regional University Transportation Center (UTC). Iowa State University, through its Institute for Transportation (InTrans), is the MTC lead institution.

MTC's research focus area is State of Good Repair, a key program under the 2012 federal transportation bill, the Moving Ahead for Progress in the 21st Century Act (MAP-21). MTC research focuses on data-driven performance measures of transportation infrastructure, traffic safety, and project construction.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the project sponsors.

The implementation of data-driven transportation asset management helps local governments prioritize needs, dedicate resources for infrastructure preservation, and make sound decisions.

Objective

The objective of this project was to help the City of Grandview, Missouri implement a transportation asset management (TAM) system for its roadway network. The TAM system is intended to help personnel make sustainable, data-driven decisions to maximize the performance of the city's roadway infrastructure.

Background

TAM empowers public agencies to invest their limited budgets in such a way that they provide the greatest return on investment. The successful implementation of TAM provides a data-driven methodology that helps local governments with the following in their evaluations of maintenance alternatives:

- Identification and prioritization of needs
- Dedication of resources to infrastructure preservation
- Data to support good decisions by policy decision makers

Implementing TAM requires a "mix of fixes" approach that emphasizes maintenance over rehabilitation.

TAM System Implementation Goals

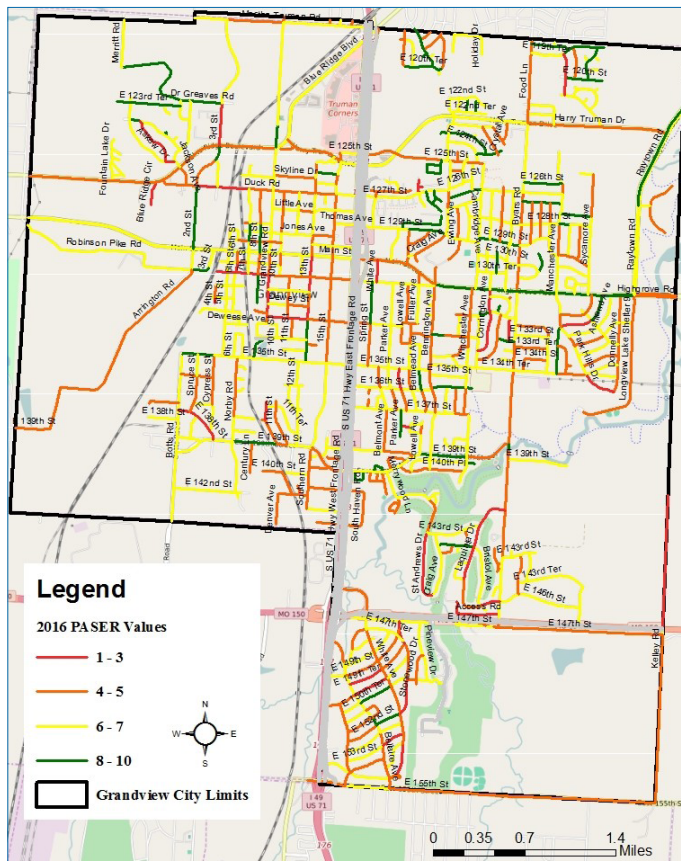
The research team and city staff established the following goals for Grandview's TAM system:

- For years 1–5: Maintain pavements in their current condition while experiencing a 2% annual decrease in buying power
- For years 1–5: Provide a list of treatments for individual segments maintained by the city
- For years 5+: Begin improving the average pavement condition by 3 to 5% annually
- Reduce pothole service requests by at least 10%

Research Description

To ensure that the TAM system would meet the implementation goals, the researchers performed the following tasks:

1. Explored current TAM best practices through a literature review and a series of discussions with 11 local communities in Missouri and other states.
2. Evaluated several TAM software packages to help the city find the package that best fit its needs. The city selected Roadsoft. This package uses the Pavement Surface Evaluation and Rating (PASER) system, which involves a visual rating of pavements on a scale of 1 to 10.
3. Evaluated historical data provided by the city, including pavement treatments, pavement ratings, and service requests.
4. Conducted a pavement inventory of all streets in Grandview's jurisdiction using a spreadsheet and the Roadsoft Laptop Data Collector (LDC). Data attributes collected included, among others, lane width and number, pavement surface type, shoulder width and type, functional class, and PASER value.



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2016 PASER ratings for each road within the City of Grandview

5. With the inventory conducted and Roadsoft configured, performed pavement preservation analyses for two time periods: 2016 through 2020 (5 years) and 2021 through 2040 (20 years). The analysis for the first period was based on current funding levels and included specific project recommendations for the next five years. To facilitate the selection of specific projects, the research team developed a decision tree-based methodology and spreadsheet tool based on this methodology. Of seven funding scenarios created for this project and investigated, the research team recommended the Targeting Infrastructure to Gain Efficiency in Roads (TIGER) Tree scenario.

The researchers based their analysis for 2021 through 2040 on the projected Grandview network in 2021, including all treatments recommended under the TIGER Tree scenario for 2016 through 2020, as well as Frontage Road improvements. The research team evaluated four scenarios based on two discount rates and two funding levels in their analysis.

Additionally, the team developed recommendations for ensuring the sustainability of the TAM system.

Key Results

Implementing TAM and the decision tree spreadsheet tool for Grandview led to the following accomplishments:

- The research team developed a TAM software evaluation spreadsheet to help the city select a system that best meets its needs and goals. They developed a TAM implementation approach using best practices from other communities, and implemented and customized Roadsoft to meet the city's needs.
- The researchers conducted a complete pavement inventory of all roadways under the city's jurisdiction.
- The researchers integrated approximately 7,000 historical and current pavement data points into the TAM software.
- The team provided approximately 1,400 maintenance, rehabilitation, and reconstruction (MR&R) treatment recommendations for the next five years (2016 through 2020) that are designed to improve pavement condition by 16% while the buying power of the city decreases 2% annually.

- The researchers estimated the number of lane-miles to be treated for different scenarios at different funding levels and discount rates for the years 2021 through 2040.
- The team developed an automated treatment selection and allocation method via a decision tree.

Sustainability Recommendations for the TAM System

The following recommendations for sustaining Grandview's TAM system can help ensure that the system yields long-term benefits:

- Grandview should update the PASER values for one-third of its jurisdiction each year to accurately track and monitor pavement deterioration over time.
- Once the decision tree tool is utilized to select treatments for the network, the selected treatments should be added to the Roadsoft database to update the network for the upcoming year.
- The pavement preservation plan should be updated annually based on the updated PASER ratings, applied treatments, and any budget changes.
- The inventory data can be imported/exported easily from Roadsoft to geographic information system (GIS) or comma-separated value (CSV) formats. Produce annual performance reports (APRs) for the entire network before and after each roadway treatment using GIS and spreadsheet database tools.

Implementation Readiness and Benefits

The implementation of TAM helps local communities develop a pavement maintenance program to better maximize their limited resources through a “mix of fixes” approach, which emphasizes keeping good roads in good condition.

The decision tree tool is an innovative solution to the challenges that local communities face due to the limited funding available for transportation infrastructure. The decision tree tool benefits communities by accounting for all pavement assets and recommending the most cost-effective solutions for pavement maintenance, rehabilitation, and replacement to help communities obtain “the biggest bang for their buck.”

The TAM implementation framework established in this project can be customized based on the needs and goals of individual communities. Grandview's TAM program is focused on pavements, but the framework could be applied to other assets as well.