



Shallow Rutting in Flexible Pavements

CHALLENGE

In the Brownwood District, shallow rutting occurs at a rate 50 percent higher than other areas in Texas. Traditional repair methods, such as milling, hydro-blasting, and multiple seal coats, have yielded mixed success (Figure 1), complicating efforts to address this challenge. Current pavement rutting data in TxDOT's Pavement Analyst system does not provide district decision-makers with sufficient tools for:



Figure 1. Typical seal coat application.

- **Granular Delineation:** To precisely identify areas requiring repair.
- **Consistent Measurement:** To ensure consistent and replicable rut depth measurements.
- **Comparative Analysis:** To effectively compare candidate repair zones.
- **Predictive Analysis:** To forecast pavement rehabilitation needs.

Skid data is similarly difficult to use for project development. Limited project funding critically necessitates a strategic approach to prioritizing repair zones and selecting the right method to repair shallow rutting.

SOLUTION

This project provided an opportunity for the Brownwood District to devise a comprehensive approach to addressing shallow rutting. Key elements of the innovation include:

- **Standardized Identification and Cataloging:** Developing a consistent methodology to identify and catalog shallow rutting locations.
- **Predictive Maintenance:** Implementing tools to predict pavement rehabilitation needs based on rutting severity.
- **Treatment Identification:** Evaluating the most effective treatments for shallow rutting within the district.
- **Prioritization Framework:** Establishing a data-driven framework to prioritize roadways for shallow rutting repairs, optimizing the use of limited funds.

TxDOT GOALS



Deliver the right projects



Focus on the customer



Foster stewardship



Optimize system performance



Preserve our assets



Promote safety



Value our employees



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- **PMIS Reporting Enhancements:** Revising Pavement Management Information System (PMIS) reporting to better align with the need for informed decision-making.
- **Best Practices Synthesis:** Synthesizing best practices and historical data on shallow rutting repair techniques.

This comprehensive approach provides Brownwood District staff with the tools to accurately identify, prioritize, and select the right shallow rutting treatment.

PROACTIVE APPROACH

To enhance data analysis, reporting, staff training, and implementation of best practices, the Brownwood District is developing guidelines, predictive tools, and a prioritization framework to ensure effective identification, treatment, and continuous improvement of pavement conditions.

BENEFITS

This innovation addresses shallow rutting with a consistent, one-stop shop approach to predicting, identifying, prioritizing, and treating shallow rutting repair needs. Using data to pinpoint and prioritize repairs reduces costs by targeting available resources efficiently. Access to better assessment tools and a knowledge base of best practices also ensures smarter decision-making.

KEY TASKS

- **Research:** Review best practices and historical approaches to rutting repair to identify suitable methods that can be used by both TxDOT and contracted crews.
- **Data Analysis:** Compile PMIS data (2017–2023) and develop a reporting process to analyze rutting-related factors.
- **Automation and Prioritization:** Evaluate automated calculations to identify correlations between data fields (e.g., rutting vs. distress) and develop a system for comparing roadway sections for repair prioritization.
- **Training:** Share knowledge and best practices via interactive training sessions.

DATA SOURCES

Data for this innovation was sourced from the Project Management Information System (PMIS), a pavement condition data resource that facilitates annual reporting and analysis. The project also incorporated published research and operational information on pavements.

Resources

[Brownwood District \(txdot.gov\)](https://www.txdot.gov/brownwood-district)

[Conditions of Texas Pavements, 2020-2023 \(txdot.gov\)](https://www.txdot.gov/conditions-of-texas-pavements-2020-2023)

[PMIS: Pavement Rater's Manual, 2024 \(txdot.gov\)](https://www.txdot.gov/pm-is-pavement-rater-s-manual-2024)

[Measures for improving resilience of pavements \(piarc.org\)](https://www.piarc.org/measures-for-improving-resilience-of-pavements)

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