

5-6963-01: Implementation of Seal Coat Binder Rate Adjustments Using LiDAR Data

Background

Seal coats are a very important preventive maintenance method used throughout Texas. Through the preventive maintenance program, seal coat contracts place about 16,000 lane miles a year, and state forces place about 3,000 lane miles per year of seal coats. A significant investment of over \$300 million annually is spent on seal coats. For more than 40 years, little change has occurred in the design and construction practices or in the equipment used to place the binder or aggregate.

Because of little to no changes in construction methods, Texas continues to see the same recurring problems, such as rock loss, flushing, and bleeding. However, new technologies are being developed that can potentially reduce these types of problems. Recently completed Texas Department of Transportation (TxDOT) Research Project 0-6963, Planning the Next Generation of Seal Coat Equipment, found that the mobile light detecting and ranging (LiDAR) system shows much promise to remove a significant amount of subjectivity when determining variations in surface conditions. Identification of surface conditions is needed in order to adjust the seal coat binder rates during construction as the conditions change.

What the Researchers Did

Researchers worked with the TxDOT Bryan District on six 2019 and five 2020 seal coat projects and with the TxDOT Brownwood and Waco Districts on five projects in each district's 2020 summer seal coat contract using mobile

LiDAR equipment. The evaluation included applying an algorithm to provide the districts with suggested shot rates. Researchers applied the algorithm to the LiDAR data and recommended binder rate adjustments. The researchers analyzed actual shot rates and compared those rates to the predicted rates.

What They Found

For the Brownwood and Waco Districts, the adjustment trends (up or down) were generally comparable for the proposed and actual rates. The key is to get the designer and the inspector to agree on the starting rate and then apply the adjustments based on the algorithm. Figure 1 and Figure 2 show the adjustment trends.

What This Means

The researchers recommend determining the starting rate from the design procedure developed in TxDOT Research Project 0-6989 and then determining the binder rate adjustments from LiDAR data analysis. This procedure can help field engineers make real-time decisions and can lead to better seal coat performance.

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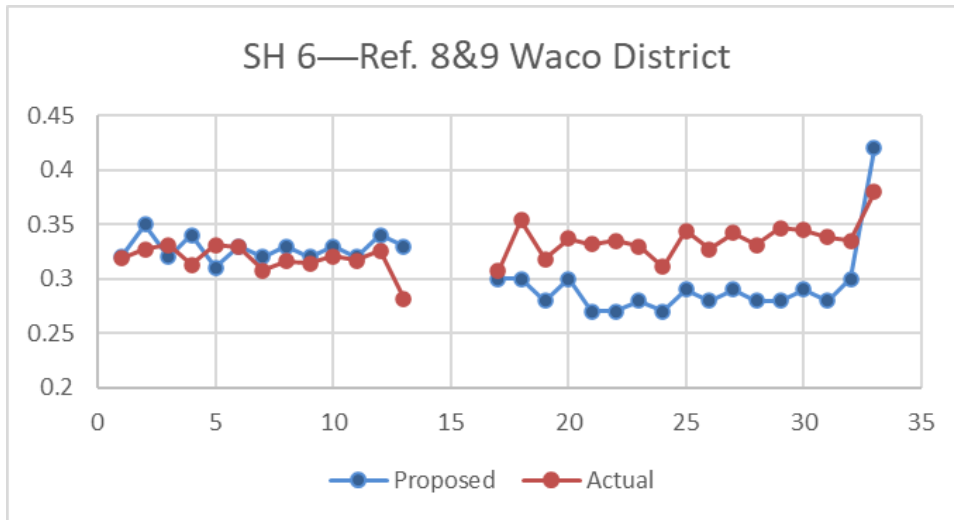


Figure 1. SH 6 Rates—Waco District.

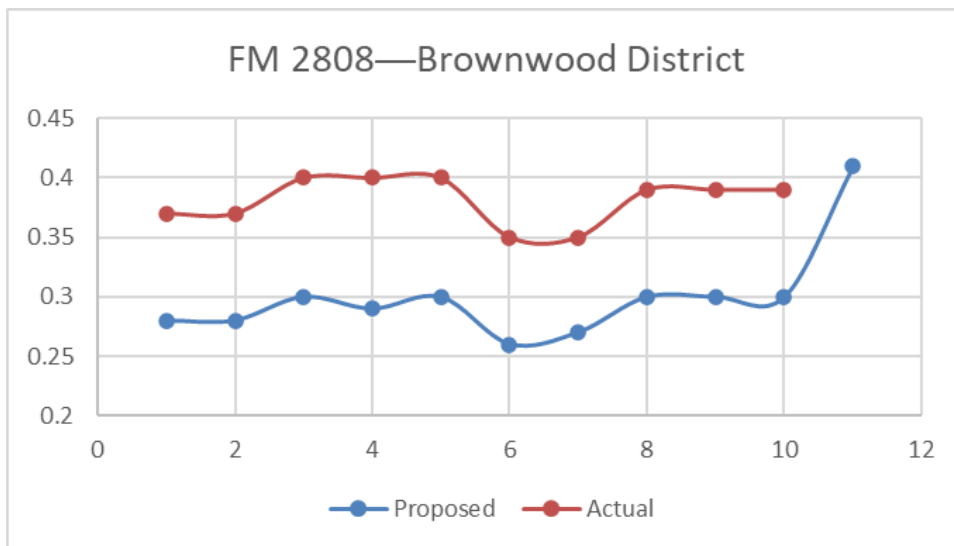


Figure 2. FM 2808 Rates—Brownwood District.

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