Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6963: Planning the Next Generation of Seal Coat Equipment

Background

Seal coats are an important preventive maintenance method used throughout Texas. For more than 40 years, there has been little change in design and construction practices. With little to no changes, Texas continues to see the same types of problems, which include rock loss, flushing, and bleeding. New technologies are being developed that could potentially reduce these problems.

What the Researchers Did

Researchers worked with the Bryan, Brownwood, and Waco Districts on six projects in each district's 2018 summer seal coat contract using both high-definition video (HDV) and mobile light detecting and ranging (LiDAR) equipment. The evaluation included documenting the common surface conditions and variability of surface conditions. Researchers recommended binder rate adjustments based on traffic levels and pavement condition. Researchers investigated innovative improvements to the binder distributor spray system to vary rates transversely along the pavement. Based on the findings, researchers recommended new approaches to documenting pavement condition, application rate adjustments, and innovative equipment improvements.

What They Found

Researchers concluded:

- The HDV system is an excellent tool for documenting the surface condition and is ready for implementation.
- The LiDAR system shows much promise to remove a significant amount of subjectivity when determining variations in surface conditions. Additional work is needed so that this technology can be automated to identify surface conditions and suggest rate changes, thus reducing labor hours and improving efficiency. With automation, the methods developed using mobile LiDAR can be deployed shortly before actual construction, making decisions more real time. More real-time decisions will ultimately lead to better performance.

Figure 1 shows examples of these systems.

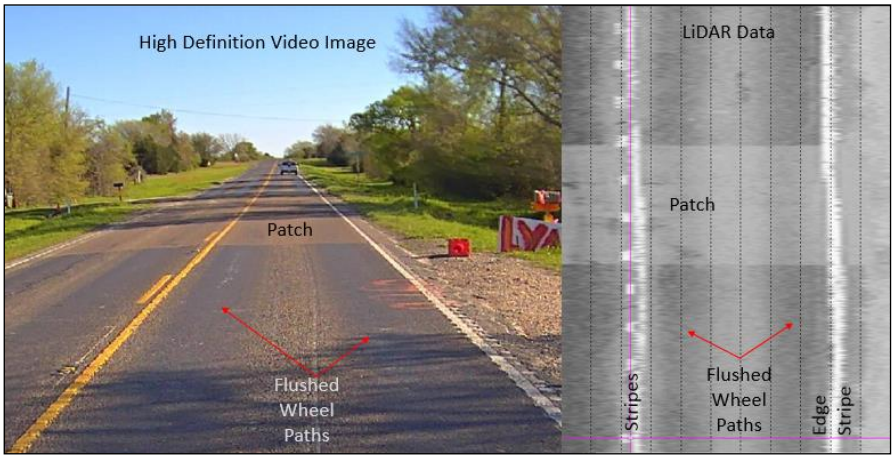

Figure 1. High-Definition Video Image and LiDAR Data.

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Researchers recommended the binder adjustments shown in Tables 1 and 2.

What This Means

New technologies are available that can improve the seal coat construction process. Risk of failure of seal coats can be reduced if the following recommendations are implemented:

- Use HDV to document the pavement condition.
- Adjust the binder application rate based on the conditions on each project and as they change.
- Continue to develop the analysis tools for the LiDAR system.
- Continue to develop equipment that can adjust the transverse application rates.

Table 1. Surface Condition Adjustment.

Surface Type	Surface Condition	Gr 3 gal/sy	Gr 4 gal/sy	Gr 5 gal/sy
Asphalt Concrete	Very dry with many cracks	0.08	0.06	0.05
	Dry with some cracks	0.05	0.04	0.03
	Good condition with few cracks	0.02	0.02	0.01
Seal Coat	Very dry with many cracks	0.06	0.06	0.04
	Dry with some cracks	0.03	0.03	0.02
	Good condition with few cracks	0	0	0
	Flushed	−0.02	−0.02	−0.01
	Bleeding	−0.04	−0.04	−0.02
Patch	Dry or fresh patch	0.03	0.03	0.02
	Fogged patch	0	0	0
	Flushed patch	−0.03	−0.03	−0.03
Prime	Dry surface, lightly primed	0.02	0.02	0.02
	Inverted prime with GR 5	0.03	0.02	0.02
	Good prime rate, well penetrated	0	0	0
	Waxy and wet, not well penetrated	−0.03	−0.03	−0.02

Table 2. Traffic Adjustment.

ADT	gal/sy
SHLD	0.05
50–100	0.05
100–250	0.04
250–400	0.03
400–500	0.02
500–650	0.01
650–900	0
900–1100	−0.01
1100–1500	−0.02
1500–2000	−0.03
>2000	−0.04

For More Information

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