

# Evaluation of Delta-S Mixture on US-431

By Jason Nelson

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## Evaluation of Delta-S Mixture on US 431 near Eufaula, Alabama

Alabama’s Department of Transportation collaborated with the National Center for Asphalt Technology to conduct an experiment to evaluate the performance of Delta S. Midsouth Paving performed the paving which contained 7.6 miles of resurfacing on US 431 near Eufaula, AL. All four traffic lanes were resurfaced, but Midsouth utilized the Delta S additive for a 0.7-mile test strip within the control mix. NCAT performed surface performance measurements pre- and post-construction to monitor the performance of the test section.

The surface mixture was designed at 60 gyrations to 4.0 percent air voids and a VMA of 15.8 percent. The design incorporated 4.1 percent new binder for a total binder content of 5.1 percent. Mixture unit weight at design conditions was 149.9 lb/cu ft. The aggregate blend (Table 1) included Martin Marietta limestone, APAC Midsouth granite, shot gravel, APAC Midsouth sand, baghouse fines, and Midsouth RAP. The project was placed in December of 2017.

Table 1. Mix Design Gradation

Sieve Size	Design Gradation
3/4" (19.0 mm)	100
1/2" (12.5 mm)	97
3/8" (9.5 mm)	89
#4 (4.75 mm)	63
#8 (2.36 mm)	47
#16 (1.18 mm)	38
#30 (0.6 mm)	32
#50 (0.3 mm)	17
#100 (0.15 mm)	9
#200 (.075 mm)	6.2

Figures 1 and 2 compare the rut depth and smoothness measurements for the test sections before and after mill and inlay as well as after the first six months in service. Figures 3 through 6 show the pre- and post-construction pavement conditions. There is no cracking observed in these sections in the first six months. The field performance will be monitored by NCAT every six months for a period of two years.

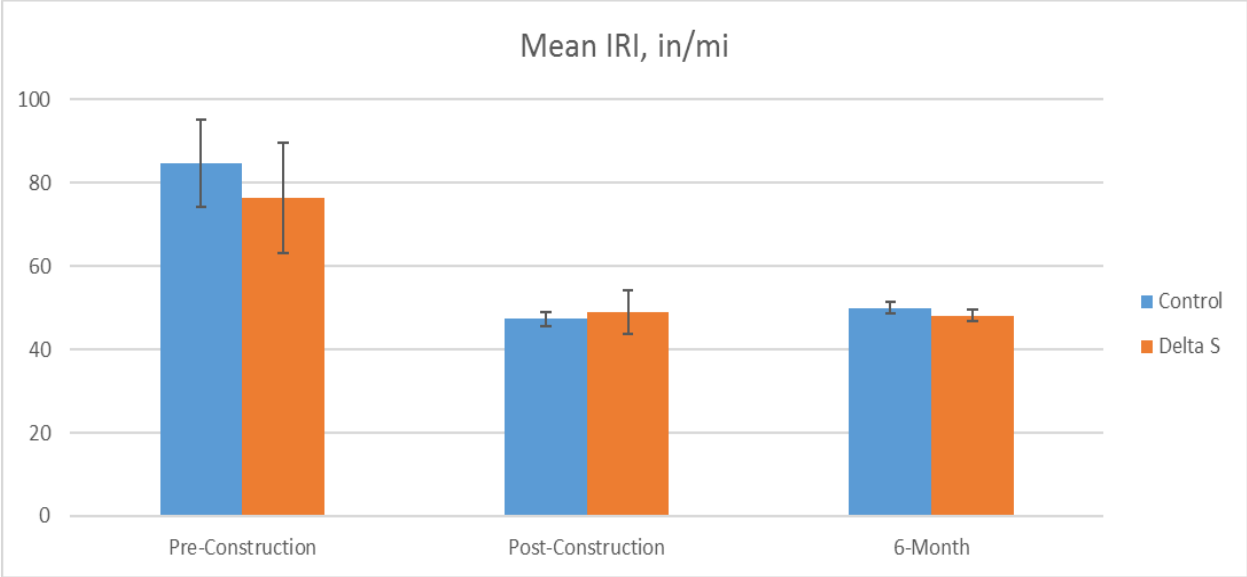


Figure 1. Smoothness data for control and Delta-S sections.

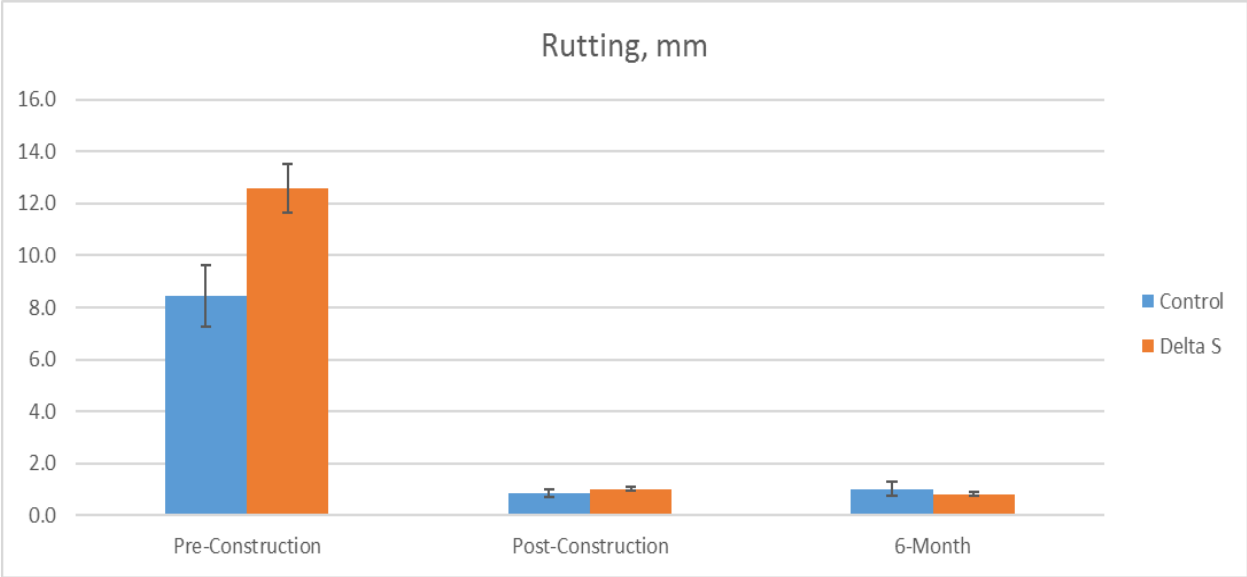


Figure 2. Rutting data for control and Delta-S sections.



Figure 3. Pre-Construction: Control section.



Figure 4. Pre-Construction: Delta-S section.



Figure 5. Post-Construction: Control section.



Figure 6. Post-Construction: Delta-S section.

Table 2. Smoothness and Rut Depth Measurements before and after Construction (same data shown in Figures 1 and 2)

<b>Control Inlay on US 431</b>		
<b>Date</b>	<b>Mean IRI in/mi</b>	<b>Rutting, mm</b>
September 2017, Pre-construction	85	8.4
January 2018, Post-construction	47	0.9
July 2018, 6-months	50	1.0

<b>Delta-S Inlay on US 431</b>		
<b>Date</b>	<b>Mean IRI in/mi</b>	<b>Rutting, mm</b>
September 2017, Pre-construction	76	12.6
January 2018, Post-construction	49	1.0
July 2018, 6-months	48	0.8