



Performance Evaluation of Highly Modified Asphalt Binder to Mitigate Reflective Cracking of Concrete Pavement

Special Project Progress Report EXP-SR-45

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FDOT Office	State Materials
District	7
County	Hillsborough
Financial Project	431495-1-52-01
Roadway ID	10040000
State Road No.	45
US Road No.	41
Report Date	7/14/2020

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Objective

The objective of this study is to monitor and evaluate the relative performance of a High Polymer Asphalt (HP) binder used as an overlay to mitigate the reflection of concrete pavement joints. The performance of a standard Polymer Modified Asphalt (PMA) is also being monitored as a control section.

Background

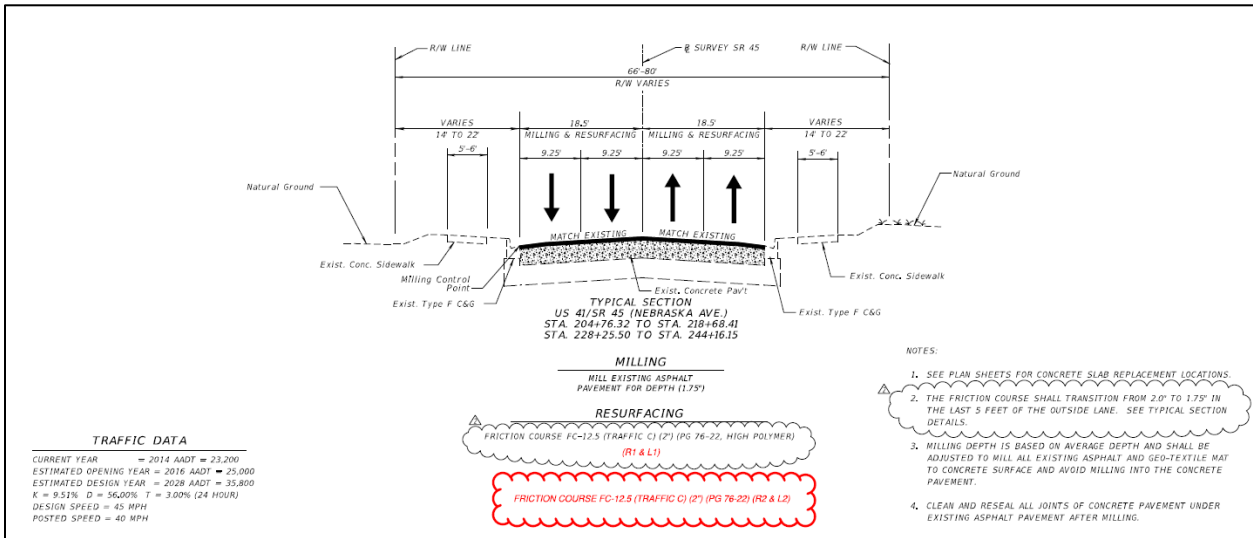
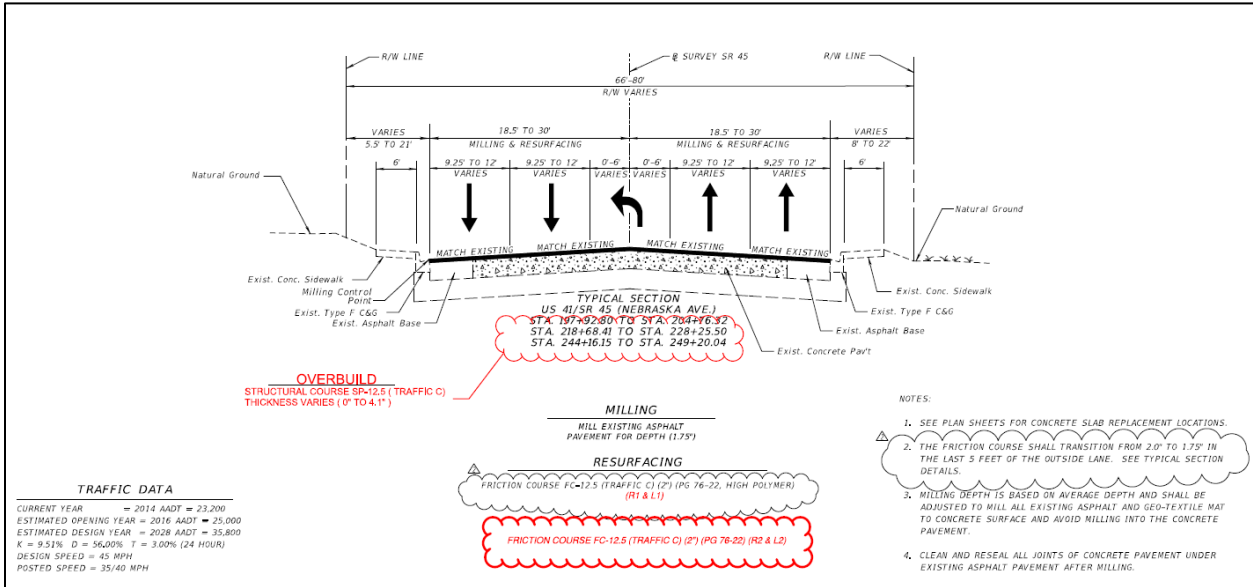
The special experimental project was part of a milling and resurfacing (M&R) project (431495-1-52-01) on SR-45, North Nebraska Avenue, in Hillsborough County, extending from north of US92/SR600 to south of East Sligh Avenue. Nebraska Avenue is an urban arterial and consists of four undivided 9.25-foot wide lanes, 0 to 12 ft left turn lane, with curb and gutter between the signalized intersections. The existing pavement structure consisted of 1.0-inch FC- 9.5, 1.0 inch of SP 9.5 structural course, and 6 to 9 inches Portland Cement Concrete composed of 12 ft wide doweled slabs with 20 ft joint spacing. The Pavement Survey and Evaluation Report (PSER) indicated a fair overall pavement condition with high severity reflective cracking of concrete construction joints. The previous resurfacing project had placed a crack reduction geotextile membrane along the concrete construction joints located at every 7 to 10 joints. The PSER reported that the failing membrane caused the existing asphalt to spall, which was most likely due to improper placement.

Project Description

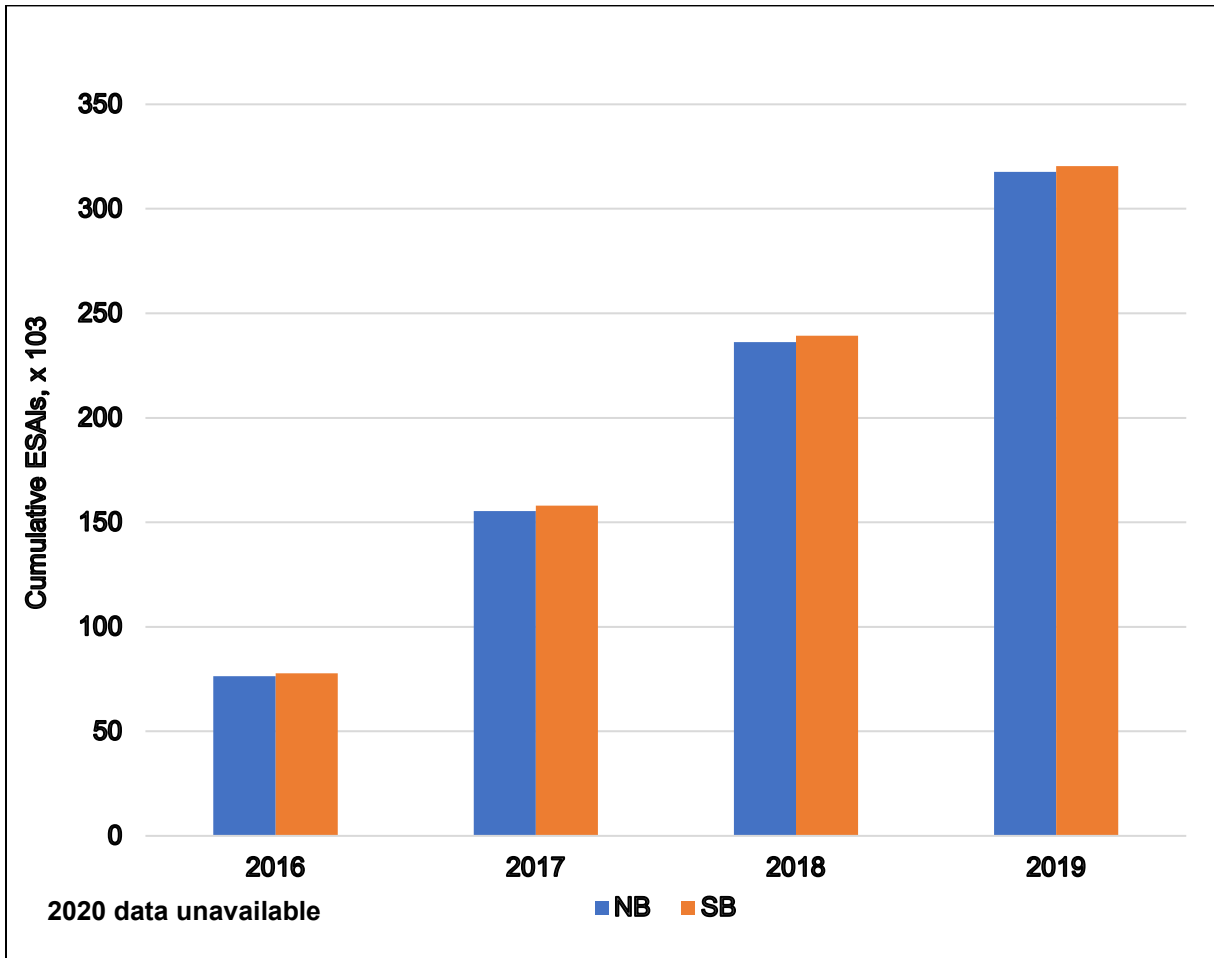
The existing asphalt including the geotextile mat were milled down 1.75 inches, and received a 2-inch single lift of 76-22 FC-12.5 HP in the inside lanes (L1 and R1), and 76-22 FC-12.5 PMA in the outside lanes (L2 and R2), representing Test and Control sections, respectively. Depth of milling was based on average milling depth to the concrete surface while avoiding milling into the concrete surface. The scope of work required cleaning and resealing all concrete joints under existing asphalt after milling. The project had a design period of 12 years with design year AADT of 35,800 and a truck traffic of 3% making it a Low Volume Facility. The M&R was completed in May 2016. Pavement performance began in June 2017, and was based on cracking, rutting, and smoothness.

Several roadway features were reported during the data collection, which may have a significant effect on the measured roughness. These include but are not limited to signalized intersections, stop and go traffic, intersecting roadways geometry, reflective pavement markers, etc.... These features when present in a high-speed profiler wheelpath(s) will result in a higher roughness and thus a higher International Roughness Index (IRI) for a section. Furthermore, the reported traffic data represent the total aggregated directional traffic as per lane traffic data is not available. Therefore, the effect of traffic loading on the performance of HP sections (R1 and L1) may be different than that in PMA sections (R2 and L2).

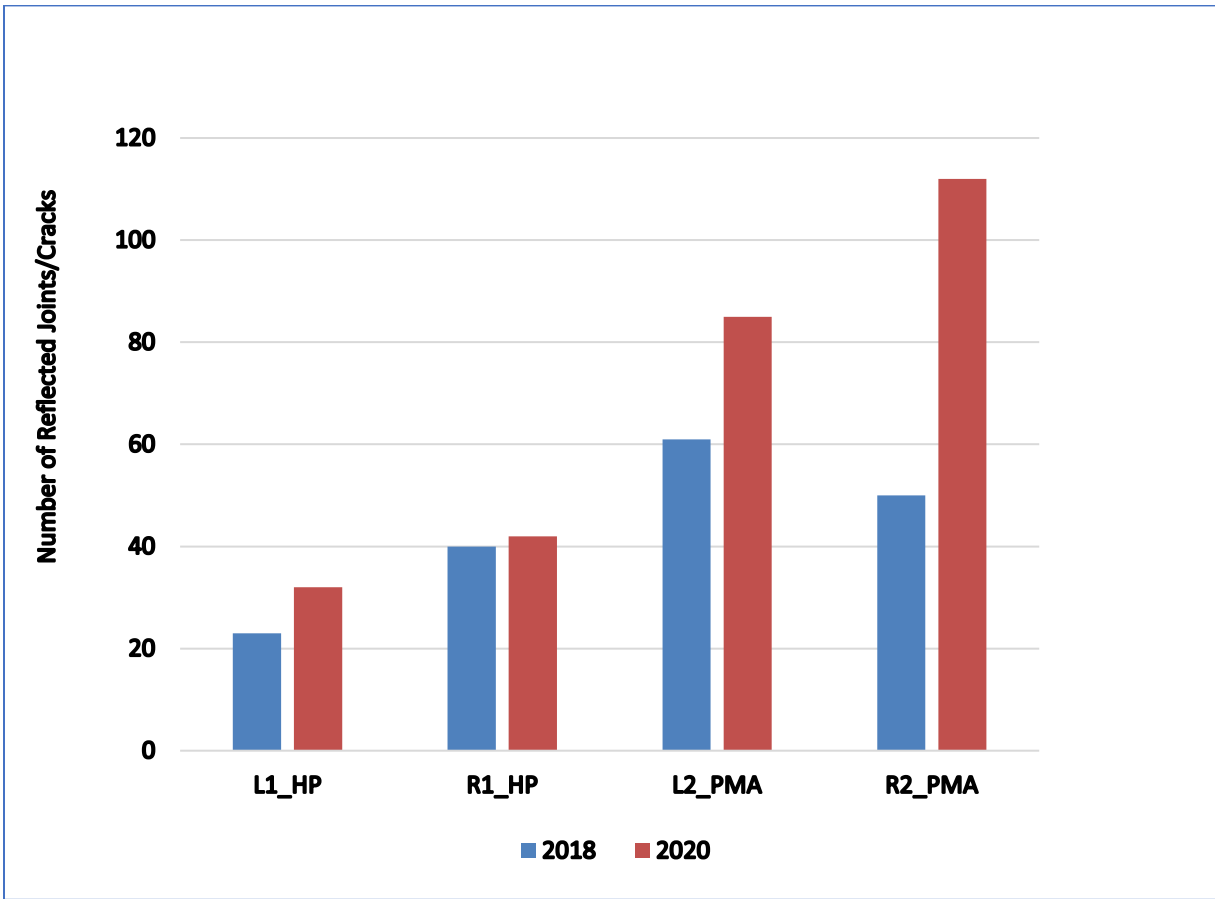
Typical Section



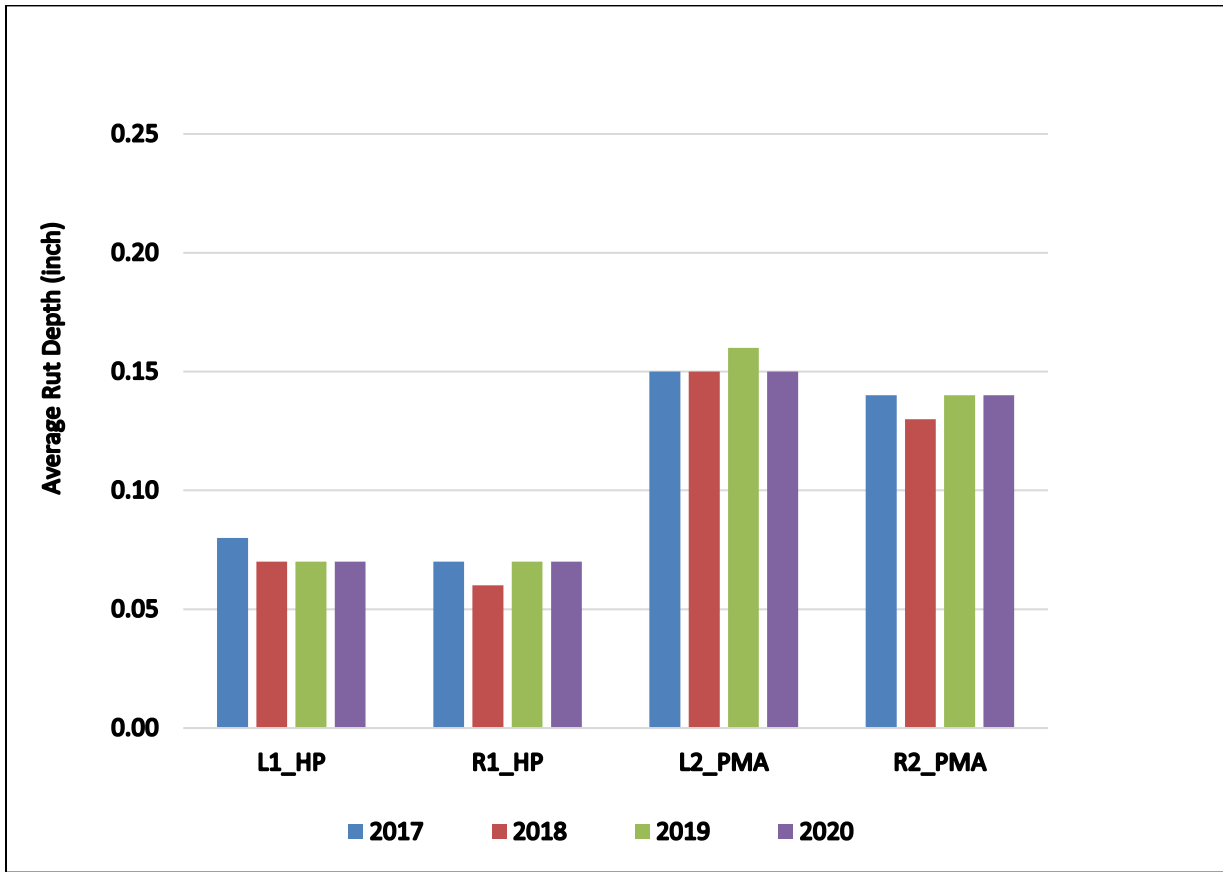
Traffic Count



Cracking



Rutting



Smoothness

