Florida Department of Transportation

SR-222 Micro Surfacing Project Performance

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Introduction

Microsurfacing is a widely used pavement preservation and preventative maintenance technique. This advanced form of slurry seal which uses the same basic ingredients, including emulsified asphalt, water, fine aggregate, mineral filler, and combines them with advanced polymer additives. It is generally considered a highly specialized process, and public highway agencies often depend on the experience of a microsurfacing contractor and emulsion supplier for design and construction. Though micro surfacing has been used frequently by city and county agencies, the Department has little experience with this pavement rehabilitation technique. The goal of this project is to evaluate micro-surfacing as a strategy to extend the life of a pavement from three to five years prior to a more extensive rehabilitation strategy such as milling and resurfacing

Background

The purpose of the study is to determine whether micro surfacing can potentially delay pavement deterioration in end-of-load segregated areas, which had experienced extensive raveling.

The project is on SR-222, a four-lane urban divided highway in Gainesville, Alachua County (Figure 1). The rehabilitation was part of a maintenance contract and consisted of crack filling followed by a double application of micro surfacing slurry placed in all four travel lanes, between NW 89 Street and NW 69 Street, including the left turn lane off SR 222 onto NW 83 Street. However, only the travel lanes have been monitored for performance. The project was completed in early March of 2014. The last time this roadway was milled and resurfaced prior to this project was in 2006.

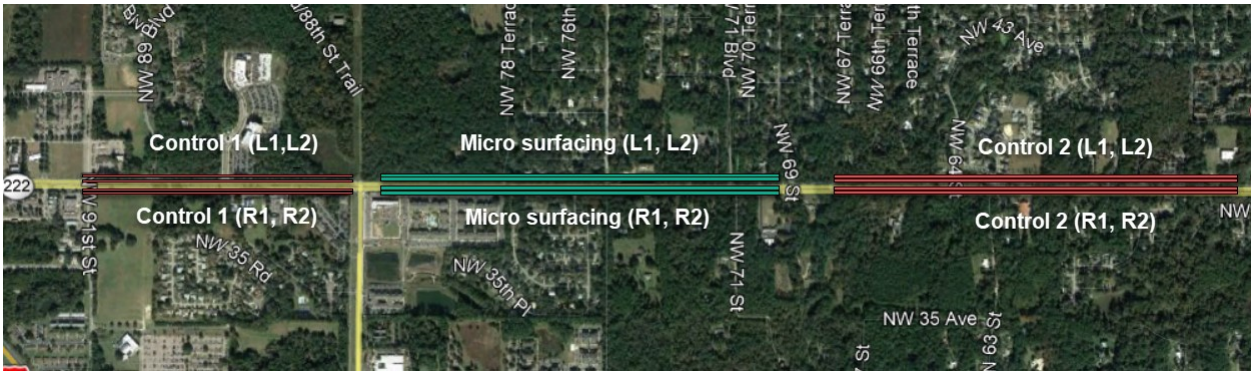

FIGURE 1 Project Location

Each travel lane included a 0.490- mile untreated section in the West (Control 1), a 0.865-mile micro surfacing section (Test Section), and a 0.895-mile untreated control section in the West (Control 1), and a 0.895-mile untreated control section in the East (Control 2) (Figure 2). Therefore, the experimental project was comprised of four micro surfacing treated sections (i.e., one in each lane), and eight untreated control sections (i.e., two in each lane). According to annual Pavement Condition Survey (PCS) data, all sections had experienced similar level of distress prior to the micro surfacing treatment in 2014.

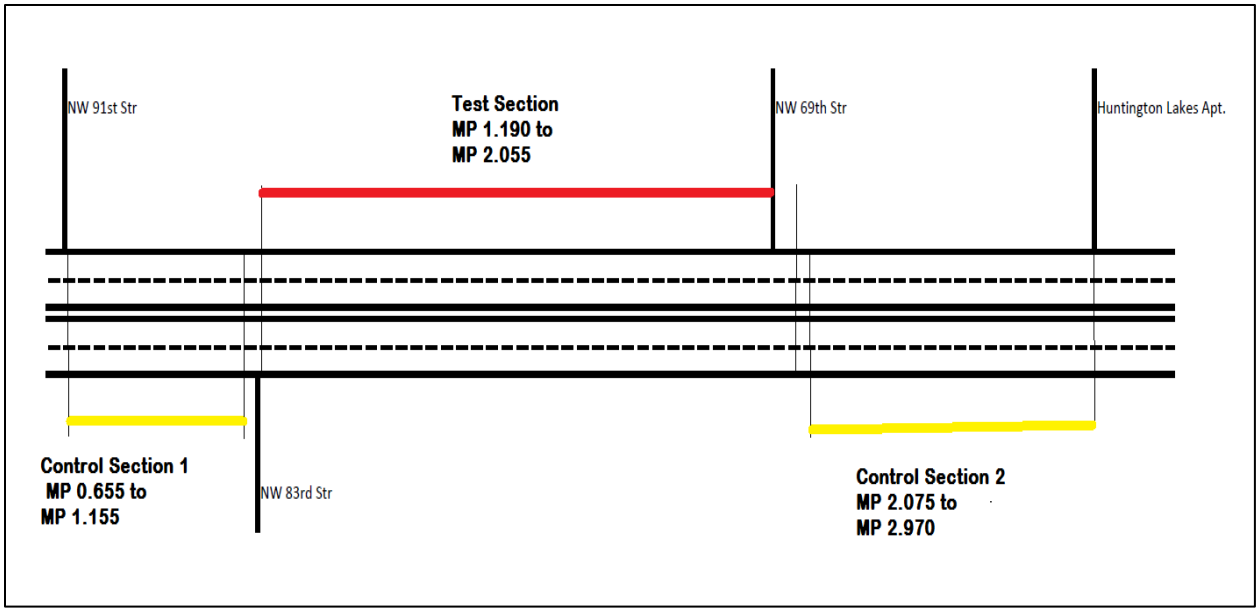

FIGURE 2 Project Layout

Performance

Performance evaluation was based on Smoothness, Rutting, Crack Rating, and Friction. Smoothness is represented by the International Roughness Index (IRI), representing the average roughness measured in both wheel paths. Rutting performance is based on the average rut depth measured in both wheel paths. IRI and rut depth are both measured automatically using an inertial high-speed laser profiler, while crack rating is evaluated on a scale of 0 (worst) to 10 (best) by the profiler operator using a windshield survey. Friction resistance is based on Friction Number (FN_{40R}) measured by the dynamic locked wheel friction tester in accordance with ASTM E274 “Standard Test Method for Skid Resistance of Paved Surface Using A Full-scale Tire”. This report reflects the performance period from pre-construction through the last test cycle in 2020.

- ***Traffic*** Average Annual Daily Traffic (AADT) between 2014 and 2019 averaged 15,000 with 2.5% truck traffic in each travel direction. Traffic data for 2020 was not available as of the writing of this report. In 2019, the cumulative traffic loading was nearly 0.6 million Equivalent Single Axle Load (ESAL) in the design lane (Figure 3).

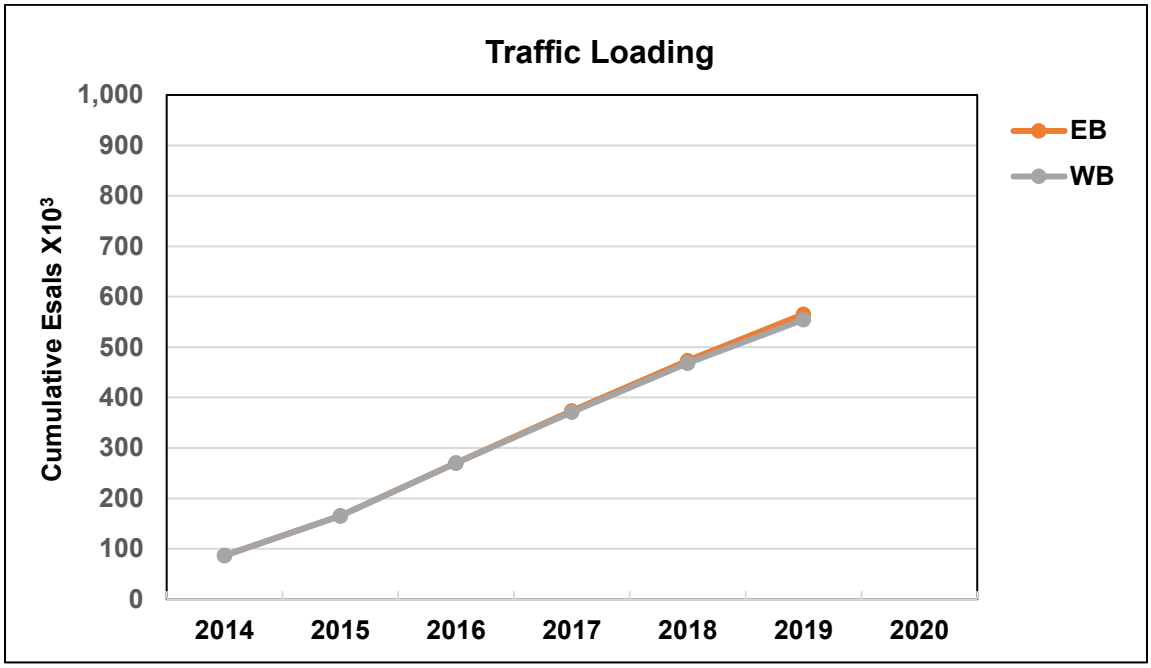

FIGURE 3 Traffic

- ***Smoothness*** Performance data shows both control and microsurfacing exhibit a relatively smooth ride (Figure 4).

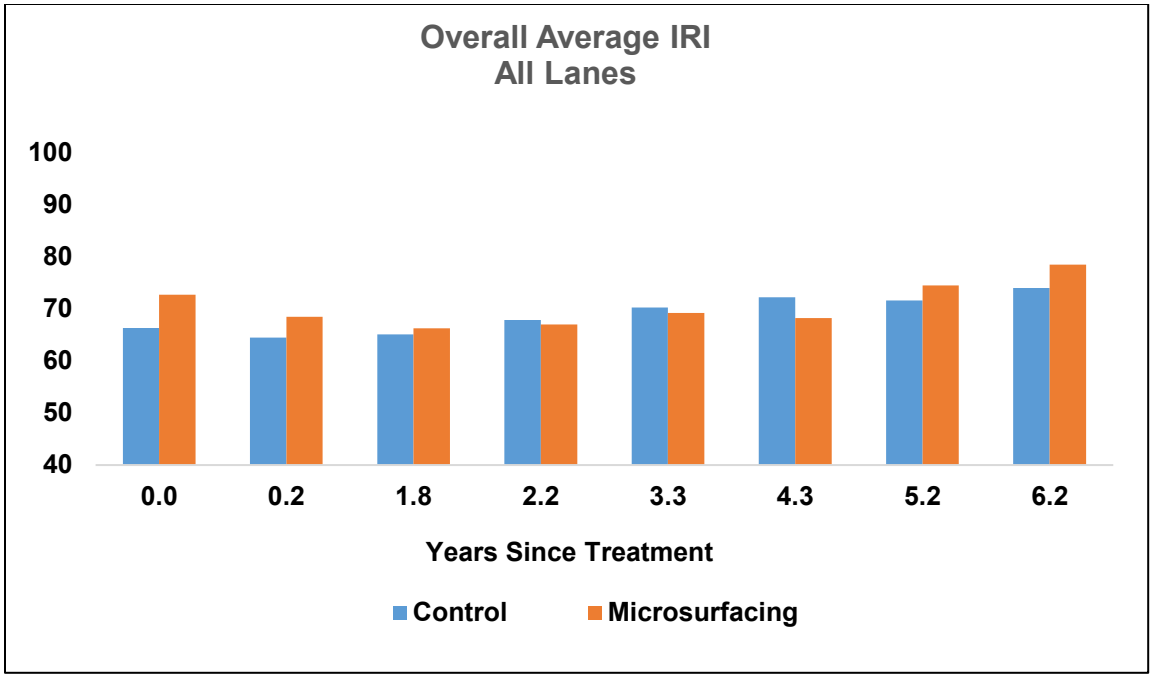

FIGURE 4 Smoothness

- ***Rutting*** Rut depth data show no significant difference between micro surfacing and control sections (Figure 5).

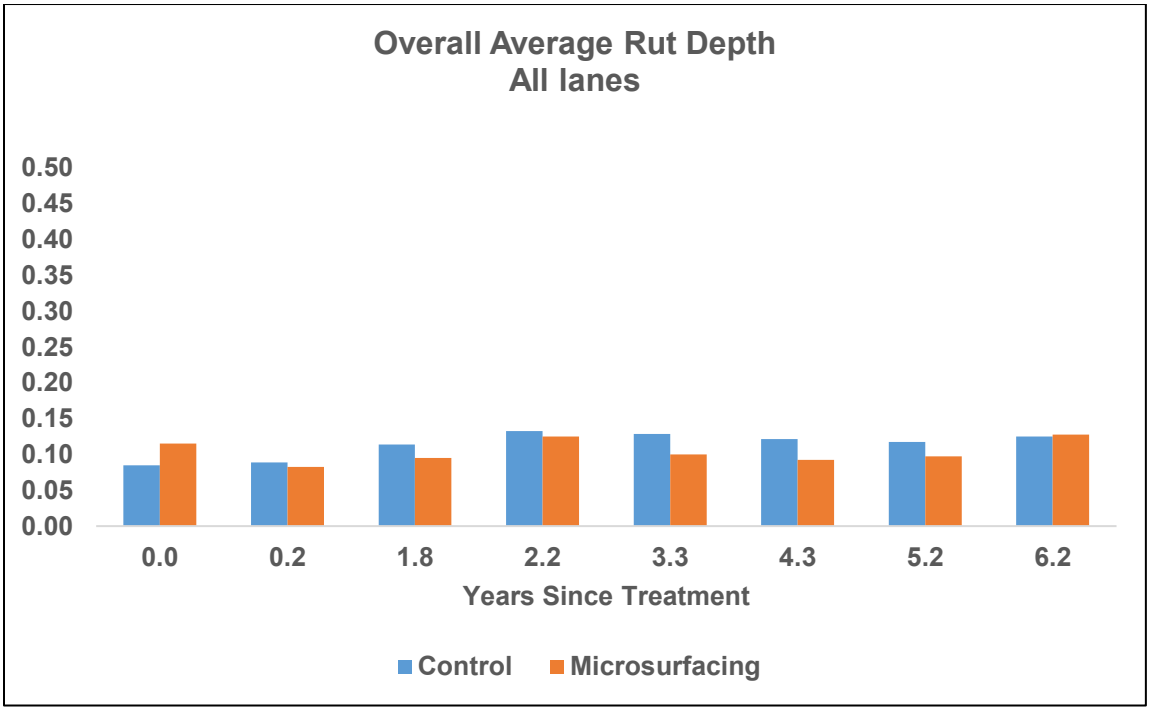

FIGURE 5 Rutting

- ***Cracking*** 2019 cracking data shows little visible cracking distress and light patching in the micro surfacing sections. The control sections exhibited Class 2 and Class 3 cracking with light raveling, potholes, and patching, which initiated 1.5 years following construction. Some control sections were in worse condition than the rest particularly in the eastern end of the project (MP 2.075 to 2.970), with a crack rating of 5.5 in R1 and L2; also, the control section in the western end of the project in L2 (MP 0.665 to 1.155) had a crack rating of 4.5. The overall average crack rating in 2019 across sections was 9.3 for micro surfacing and 6.3 for control sections (Figure 6).

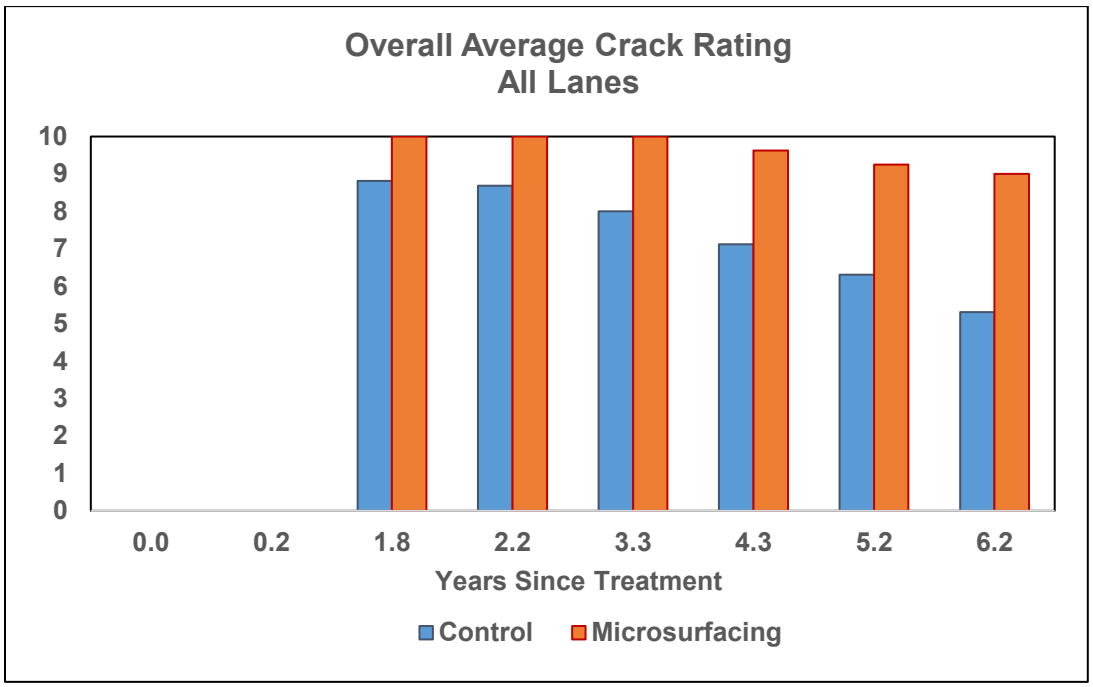

FIGURE 6 Cracking

- ***Friction*** Performance data was not collected in 2014 (pre and post construction), 2015, 2017, and 2020. Friction data show relatively higher overall FN for micro surfacing sections compared to control sections (Figure 7). In 2019,

after 5 years of service, FN value per test section ranged from 43 to 45 for micro surfacing, and 37 to 42 for control sections, with overall average FN of 44 and 41, respectively. The FN for all sections was above the minimum required threshold of 35.

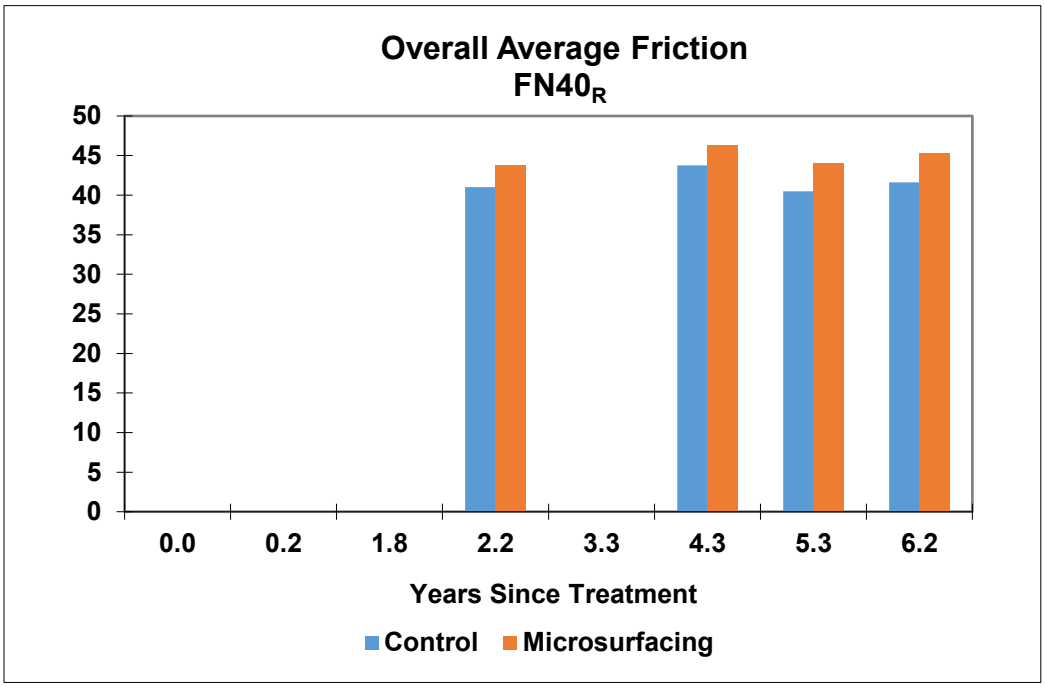

FIGURE 7 Friction