



Florida Department of  
**TRANSPORTATION**

# **FDOT Experimental Projects Performance**

**2020 FTBA Construction Conference  
Orlando, Florida**

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State Materials Office**

# Topics of Discussion

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- **Overview**
- **Projects Performance**
  - Pavement Preservation (PP)
  - Crack Relief (CR)
  - High Polymer (HP)
  - Quiet Pavement (FC-Q)
  - Fog Seal (FS)

# Overview

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- Customers - Districts, Central Office Design and Construction
- Selection of suitable site within FDOT project for the construction of:
  - one or more test sections utilizing the experimental design(s) and/or material(s), and
  - one or more control sections utilizing the standard design and/or material

# Overview

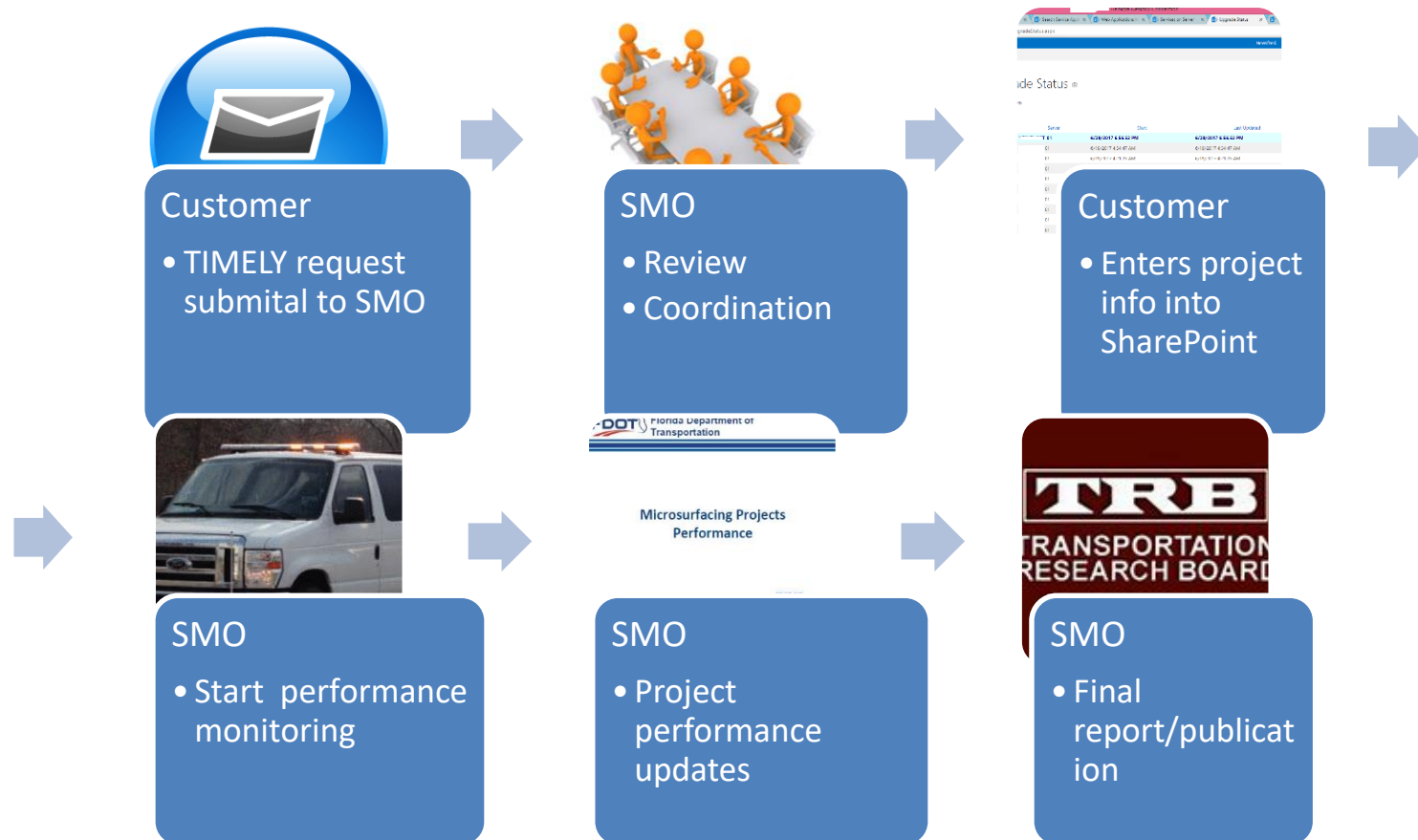
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Main factors considered in test site selection:

- Adequate truck traffic and pavement design to yield significant results within a reasonable time-frame
- Adequate test/control section length (minimum 1,500 ft per section) with suitable horizontal and vertical alignment
- Uniform subsurface and suitable surface conditions

# Overview

## Process



# Overview

ID	Project	Type	District	County	SR	Age
1	79060_PPPCP_SR600	E	5	Volusia	600	6
2	51010_SR30_PP	S	3	Gulf	30	7
3	79002_ULTFUSE_SR9	S	5	Volusia	9	2
4	79110009_ULTFUSE_SR472	S	5	Volusia	472	1
5	79110010_ULTFUSE_SR472	S	5	Volusia	472	1
6	55080_SR20_OGCR	S	3	Leon	20	7
7	50010_SR10_CR	E	3	Gadsden	10	10
8	53020_SR10_HP	S	3	Jackson	10	3
9	50030_SR10_HP	S	3	Gadsden	10	3
10	26005_SR222_MICRO	S	2	Alachua	222	6
11	14120_SR52_OGCR	S	7	Pasco	52	4
12	70022_SR508_FDR	E	5	Brevard	508	4
13	10040_SR45_HP	S	7	Hillsborough	45	3
14	13020_SR43_RCA	E	1	Manatee	43	8
15	75471_SR528_RCA	E	5	Orange	528	0
16	27090_SR8_BFC	S	2	Baker	8	12
17	93130_SR15_GEOSYN	E	4	Palm Beach	15	2
18	34050_SR55_FC_Q	S	2	Levy	55	9
19	34070_SR24_SAM	S	2	Levy	24	4
20	08010_SR45_OGCR	S	7	Hernando	45	5
21	58030_SR30_ULTFUSE	S	3	Santa Rosa	30	5
22	16030_SR35_FOGS	S	1	Polk	35	11
23	16170_SR25_FOGS	S	1	Polk	25	11
Total Active Projects		23	D1/D7	6		
Active Experimental (E)		6	D2	3		
Active Special (S)		17	D3	6		
			D4	1		
			D5	6		

# Projects Performance

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## Pavement Preservation (PP)

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Evaluate the effectiveness of different pavement preservation techniques to extend pavement life and serviceability



# Pavement Preservation (PP)

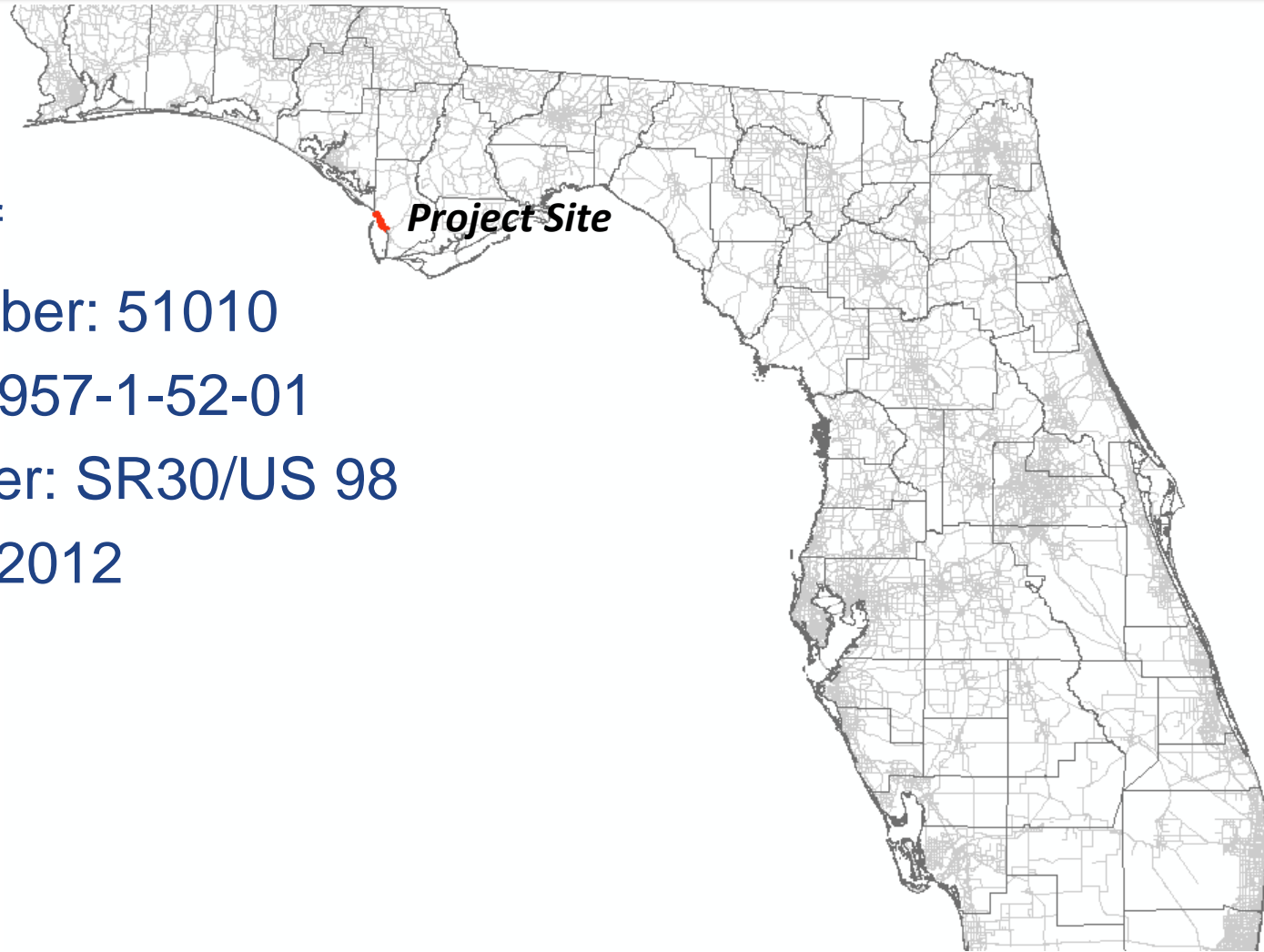
County: Gulf

Project Number: 51010

Fin No.: 426957-1-52-01

Road Number: SR30/US 98

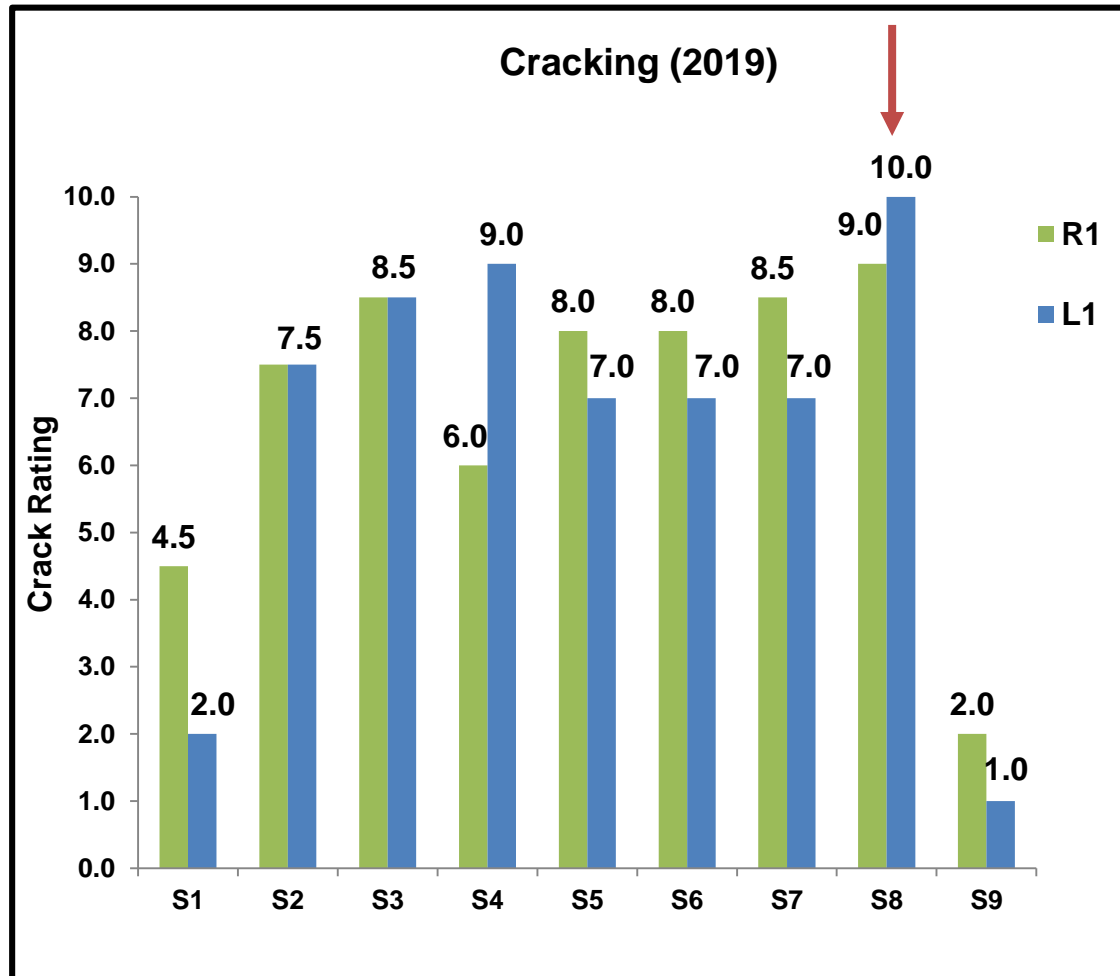
Completed: 2012



# Pavement Preservation (PP)

LANE(S)		R1, L1		
Test Section No.	Beginning Milepost	Ending Milepost	Description	length (mile)
S1	8.744	9.033	FC3, CONTROL (NO RESURFACING)	0.289
S2	9.033	9.318	MICRO-SURFACING	0.285
S3	9.318	9.611	FC 4.5, 1/2" OVERLAY	0.293
S4	9.611	9.900	FC 4.5, 3/4" OVERLAY	0.289
S5	9.900	10.189	FC 9.5, 1" OVERLAY	0.289
S6	10.189	10.478	FC 9.5, 1" OVERLAY, W/1" MILLING	0.289
S7	10.478	10.767	FC 12.5, 1.5" OVERLAY, W/1.5" MILLING	0.289
S8	10.767	11.056	BONDED FRICTION COURSE	0.289
S9	11.056	11.345	FC3, CONTROL (NO RESURFACING)	0.289

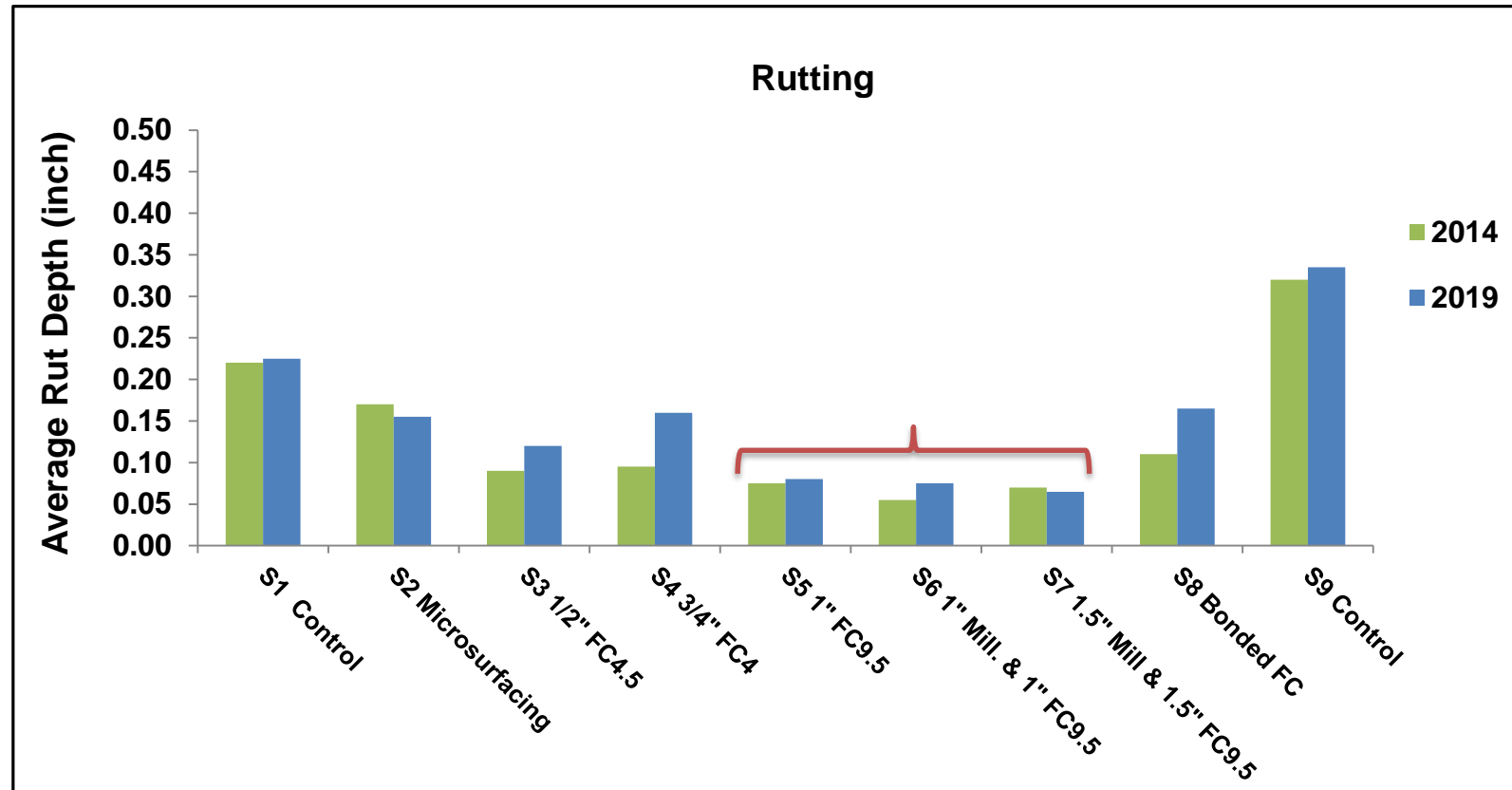
# Pavement Preservation (PP)



S1	FC3 CONTROL (NO RESURFACING)
S2	MICRO-SURFACING
S3	FC 4.5, 1/2" OVERLAY
S4	FC 4.5, 3/4" OVERLAY
S5	FC 9.5, 1" OVERLAY
S6	FC 9.5, 1" OVERLAY, W/1" MILLING
S7	FC 12.5, 1.5" OVERLAY, W/1.5"
S8	BONDED FRICTION COURSE
S9	FC3 CONTROL (NO RESURFACING)

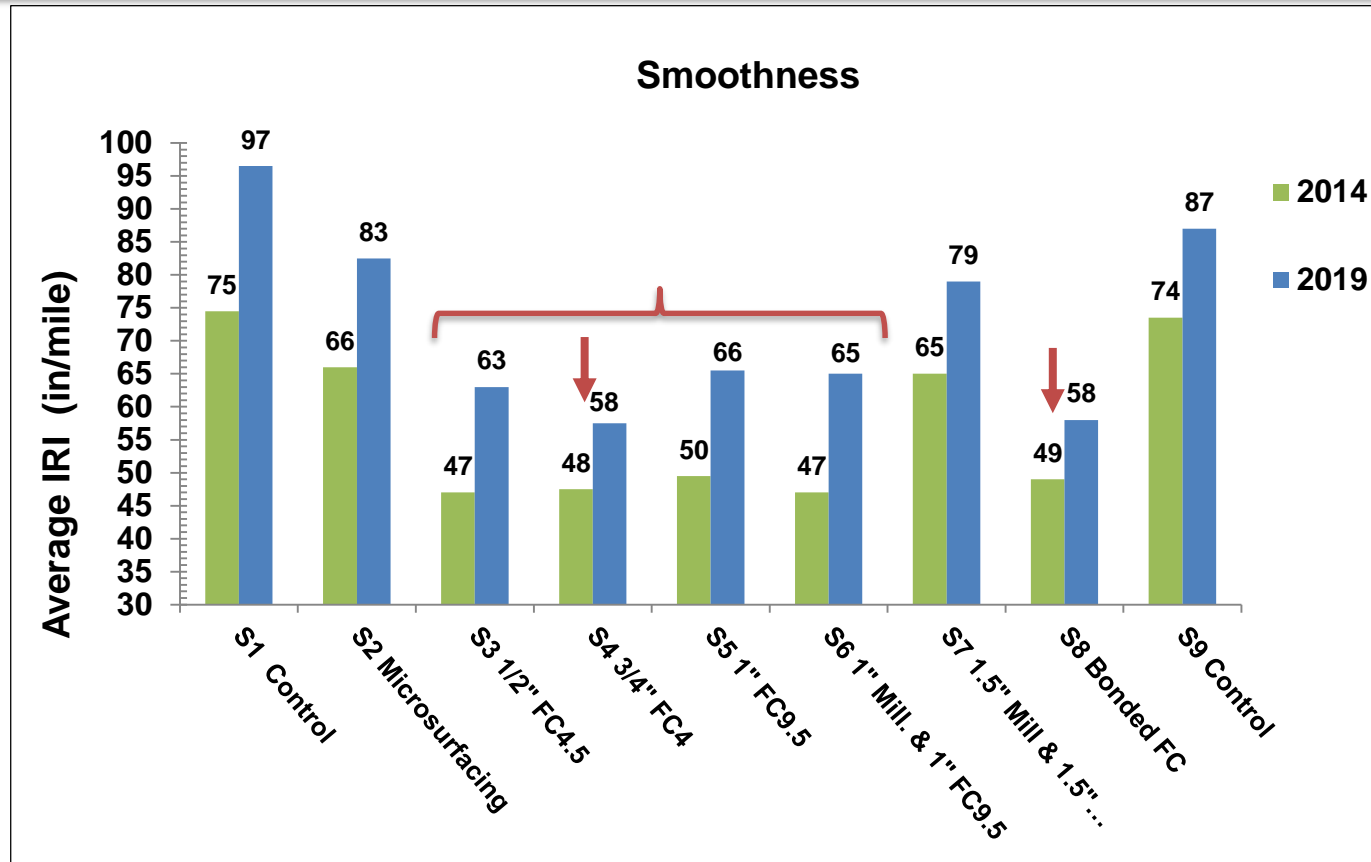
Bonded Friction Course was most effective treatment in controlling cracking

# Pavement Preservation (PP)



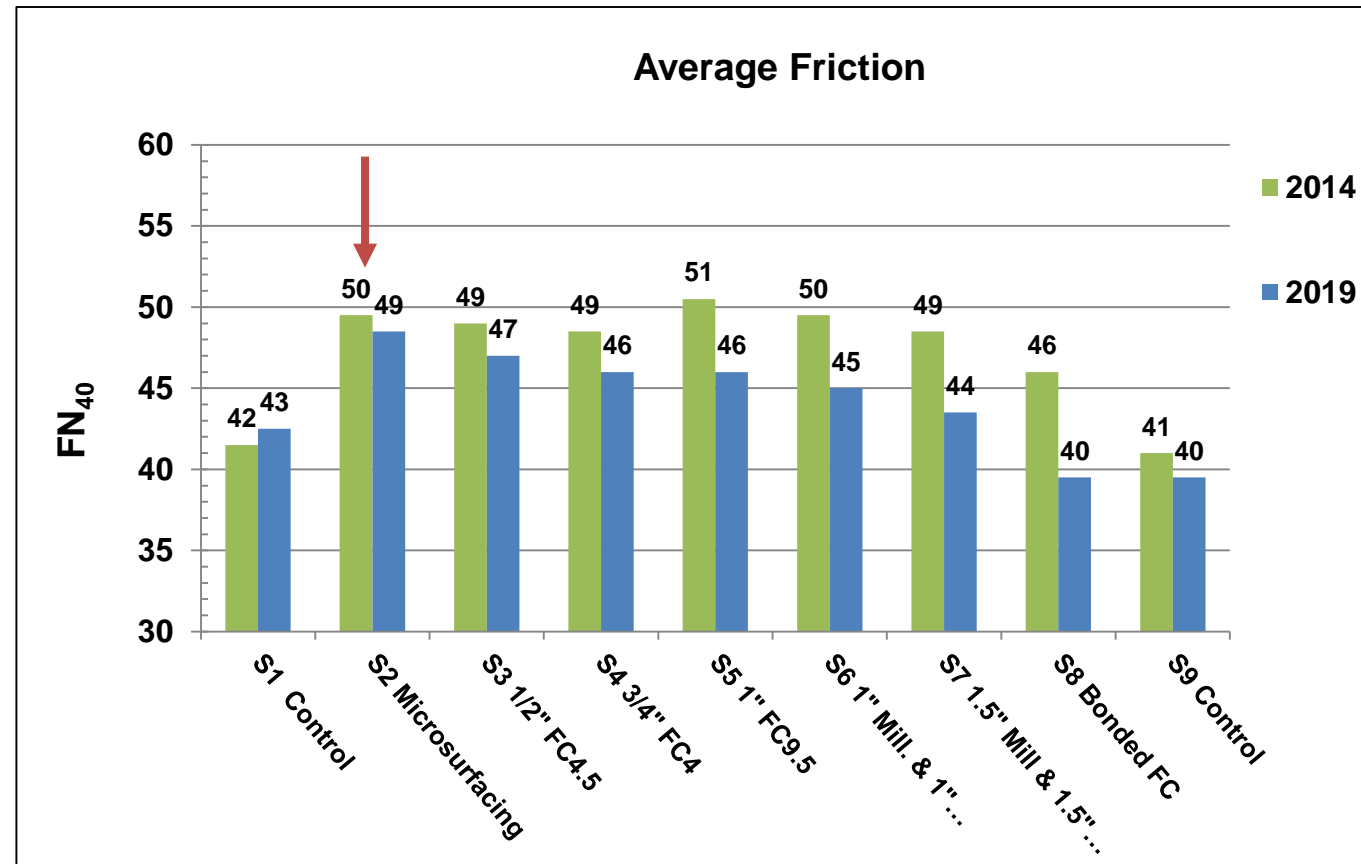
FC 9.5 overlays were more effective in controlling rutting

# Pavement Preservation (PP)



FC 4 and BFC were most effective in preserving smoothness

# Pavement Preservation (PP)



Micro-surfacing treatment had the smallest drop in Friction

# Projects Performance

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## Crack Relief (CR)

# Crack Relief (CR)

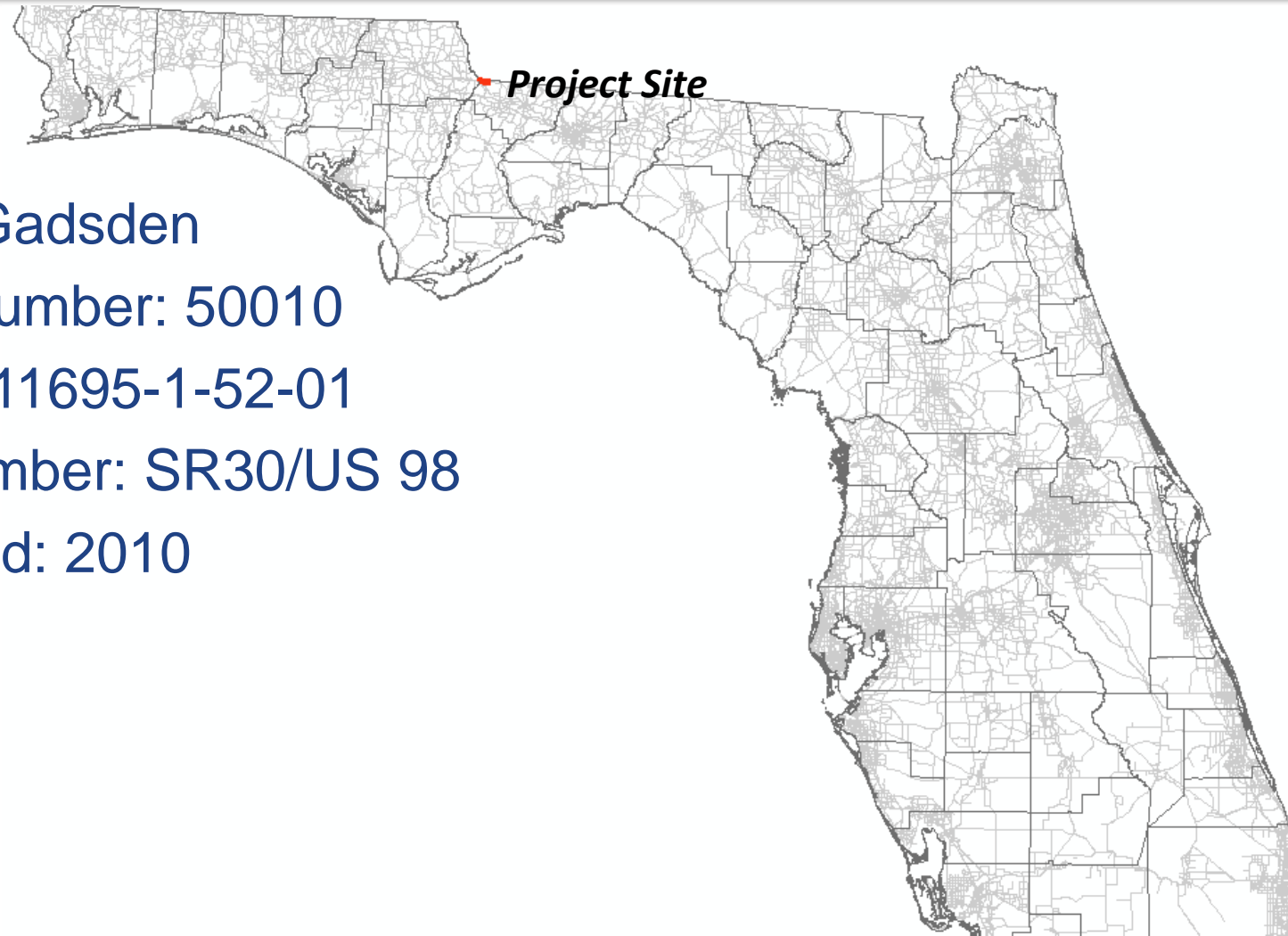
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Evaluate the effectiveness of different crack relief techniques to mitigate reflective cracking of asphalt

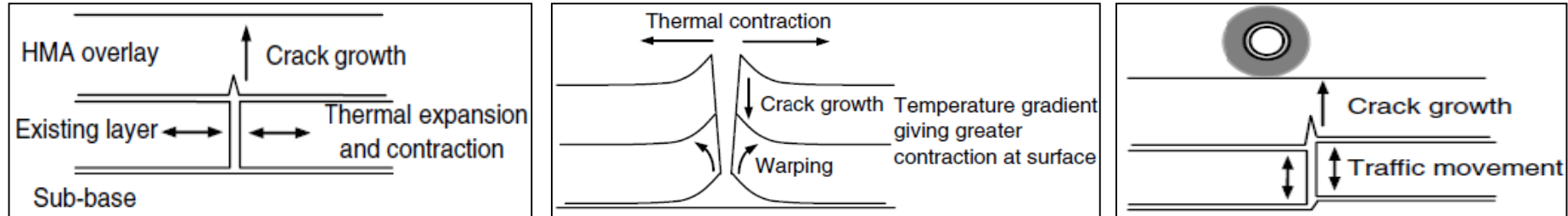


# Crack Relief (CR)

County: Gadsden  
Project Number: 50010  
Fin No: 411695-1-52-01  
Road Number: SR30/US 98  
Completed: 2010



# Crack Relief (CR)



- Thermal
  - Horizontal movement of PCC slabs initiates bottom-up reflective cracking
  - Curling of PCC slabs initiates top-down reflective cracking
- Load
  - Differential vertical movement of adjacent joints propagates reflective cracking

# Crack Relief (CR)

- R1 and L1 originally constructed with PCC in the 1920's
- Several rehabilitations and widening
- Experienced significant reflective cracking



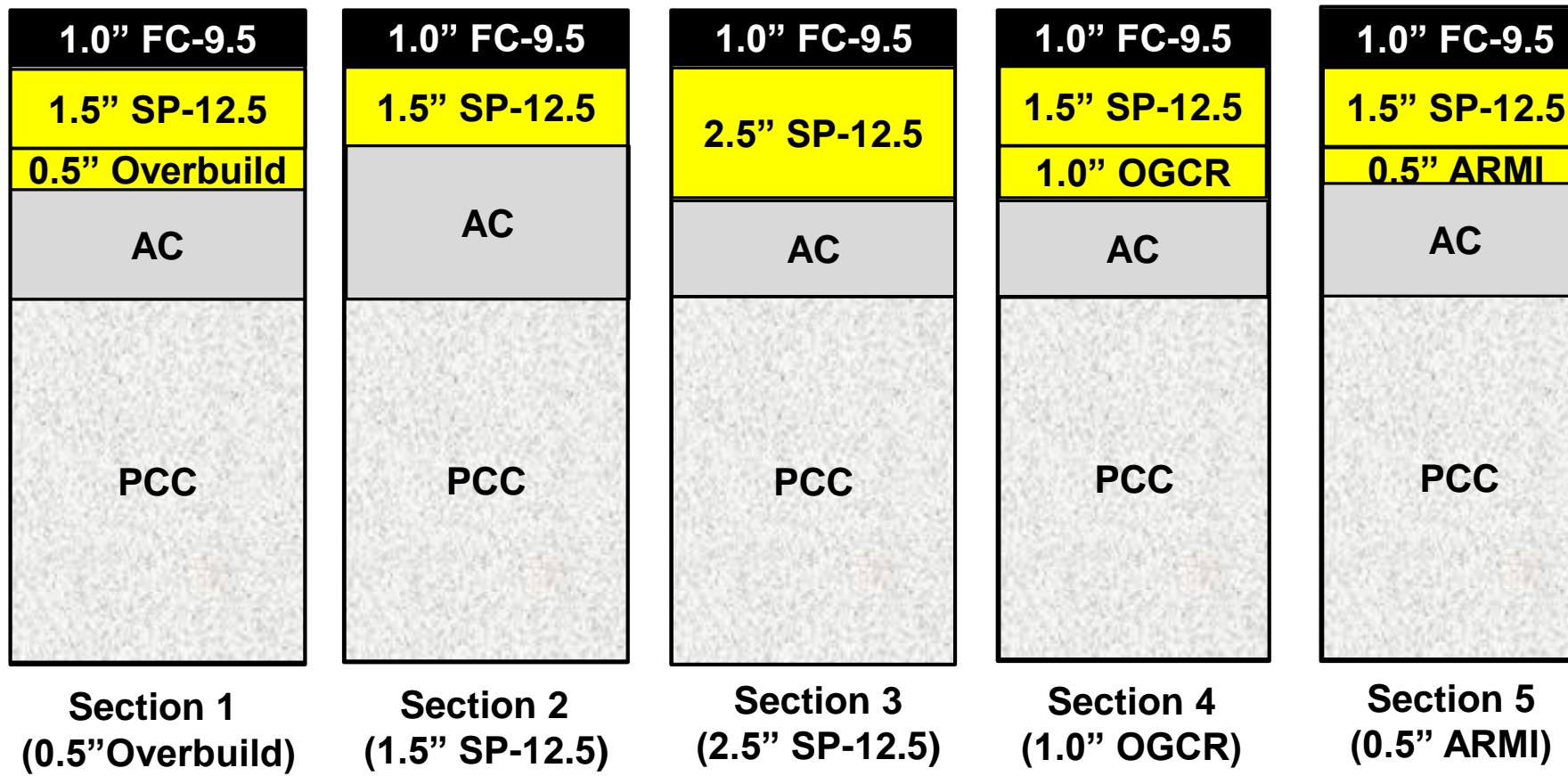
# Crack Relief (CR)

- Five test sections were built in R1 and L1
- Each section was ~ 1500 feet
- Each section received a different AC overlay type and thickness on top of existing AC and PCC base

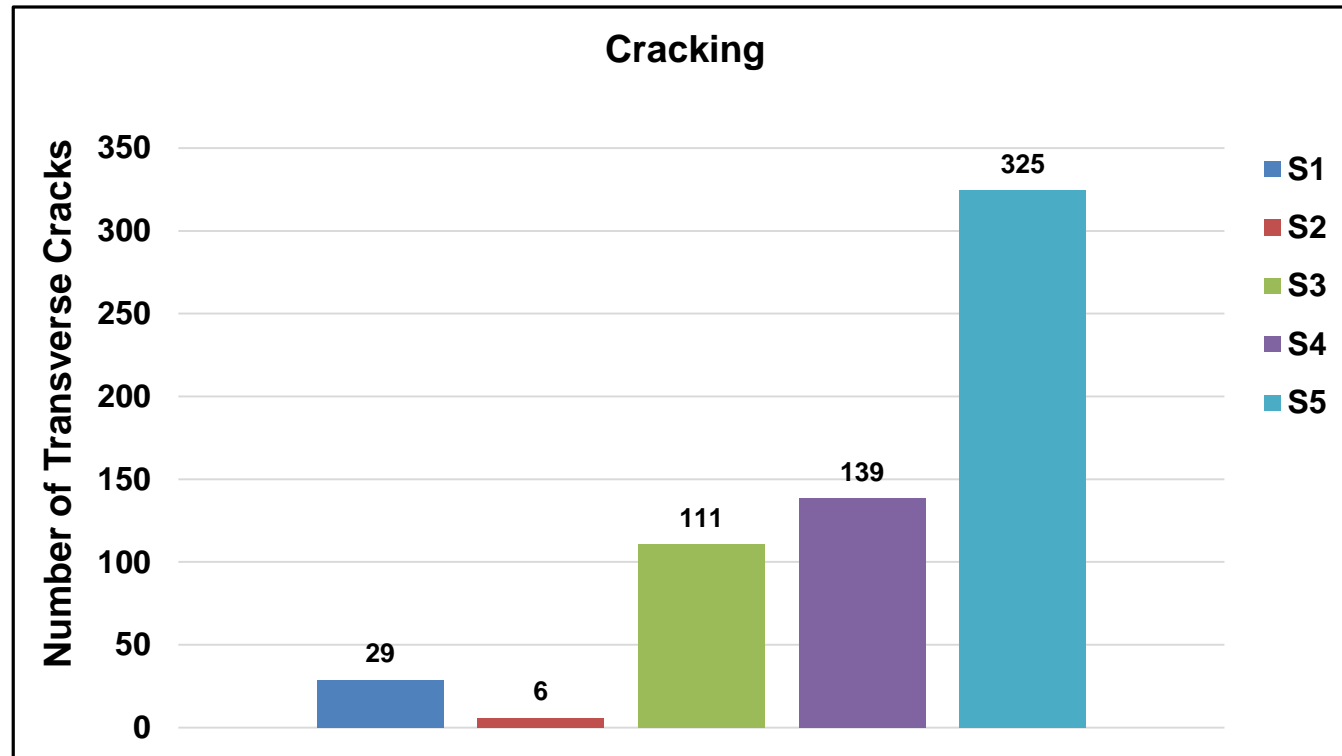
Section 1	Section 2	Section 3	Section 4	Section 5
1.0" FC-9.5	1.0" FC-9.5	1.0" FC-9.5	1.0" FC-9.5	1.0" FC-9.5
1.5" SP-12.5	1.5" SP-12.5		1.5" SP-12.5	1.5" SP-12.5
0.5" Overbuild		2.5" SP-12.5	1.0" OGCR	0.5" ARMI

# Crack Relief (CR)

Not to scale

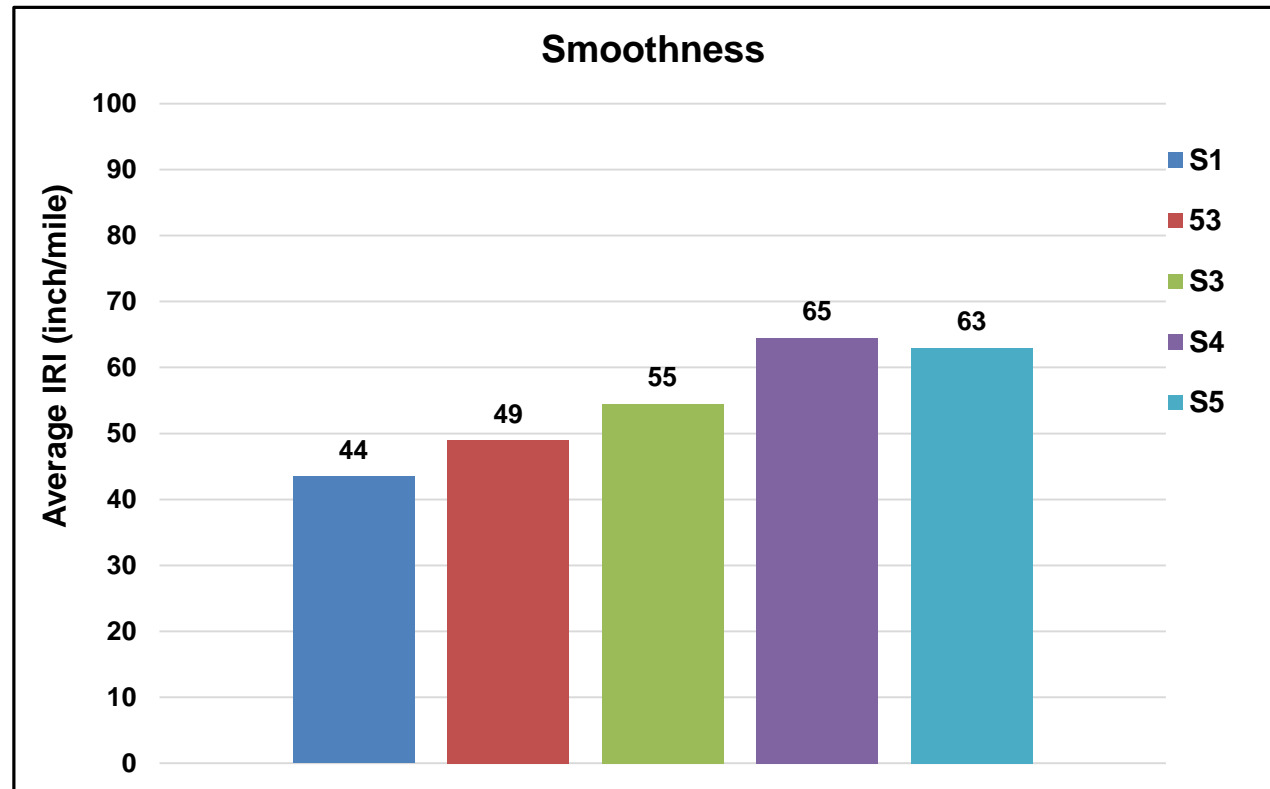


# Crack Relief (CR)



S2 (1.5" SP 12.5) had the least transverse cracks; S5 (1.5" SP 12.5 + 0.5" ARMI) had the most cracks

# Crack Relief (CR)



S1 (1.5" SP12.5) had the highest smoothness

# Projects Performance

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## High Polymer (HP)



# High Polymer (HP)

County: Gadsden

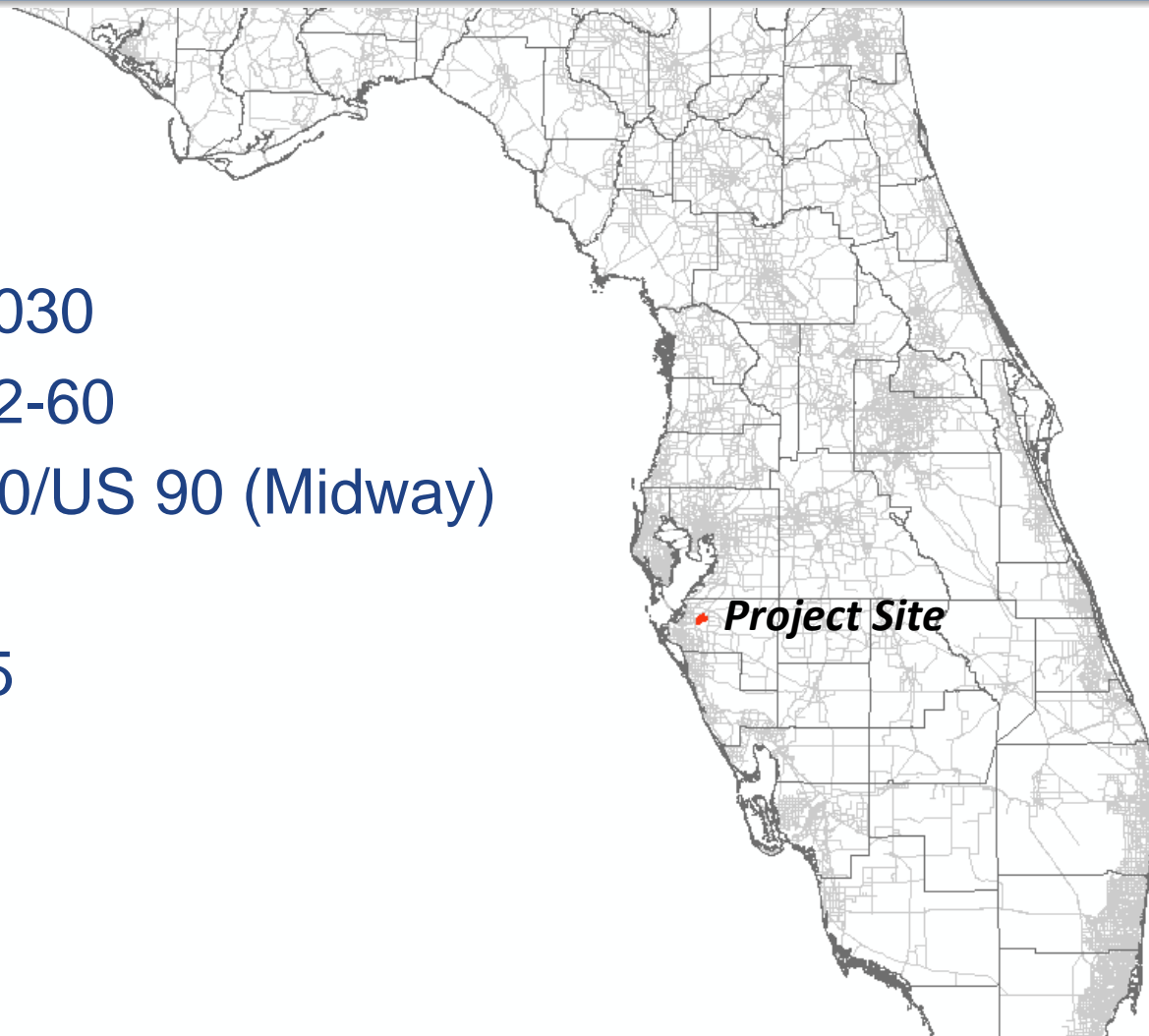
Project Number: 50030

Fin No: 422151-1-72-60

Road Number: SR10/US 90 (Midway)

Trucks: 9.2%

Completed: 08/2015

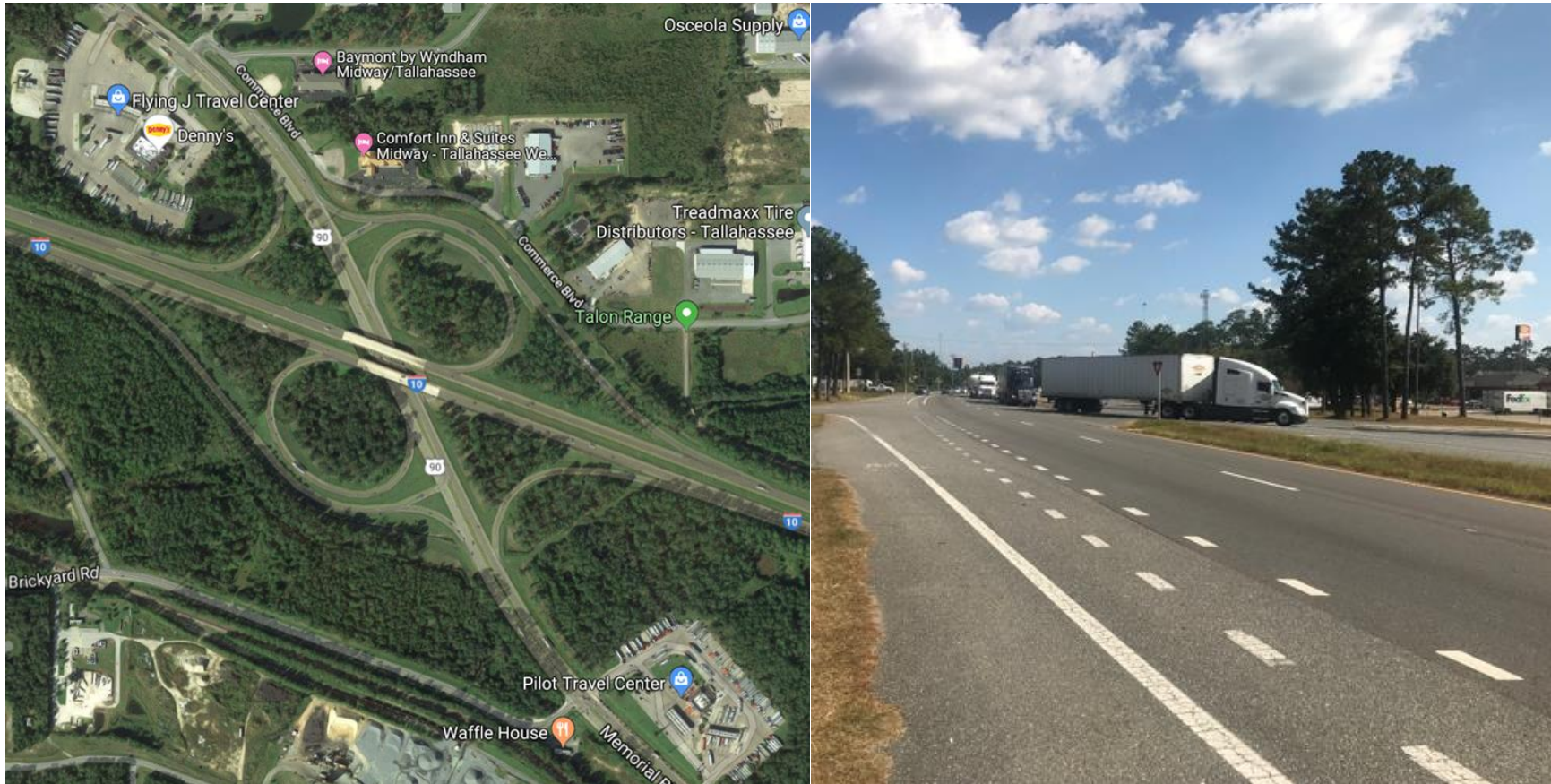


# High Polymer (HP)

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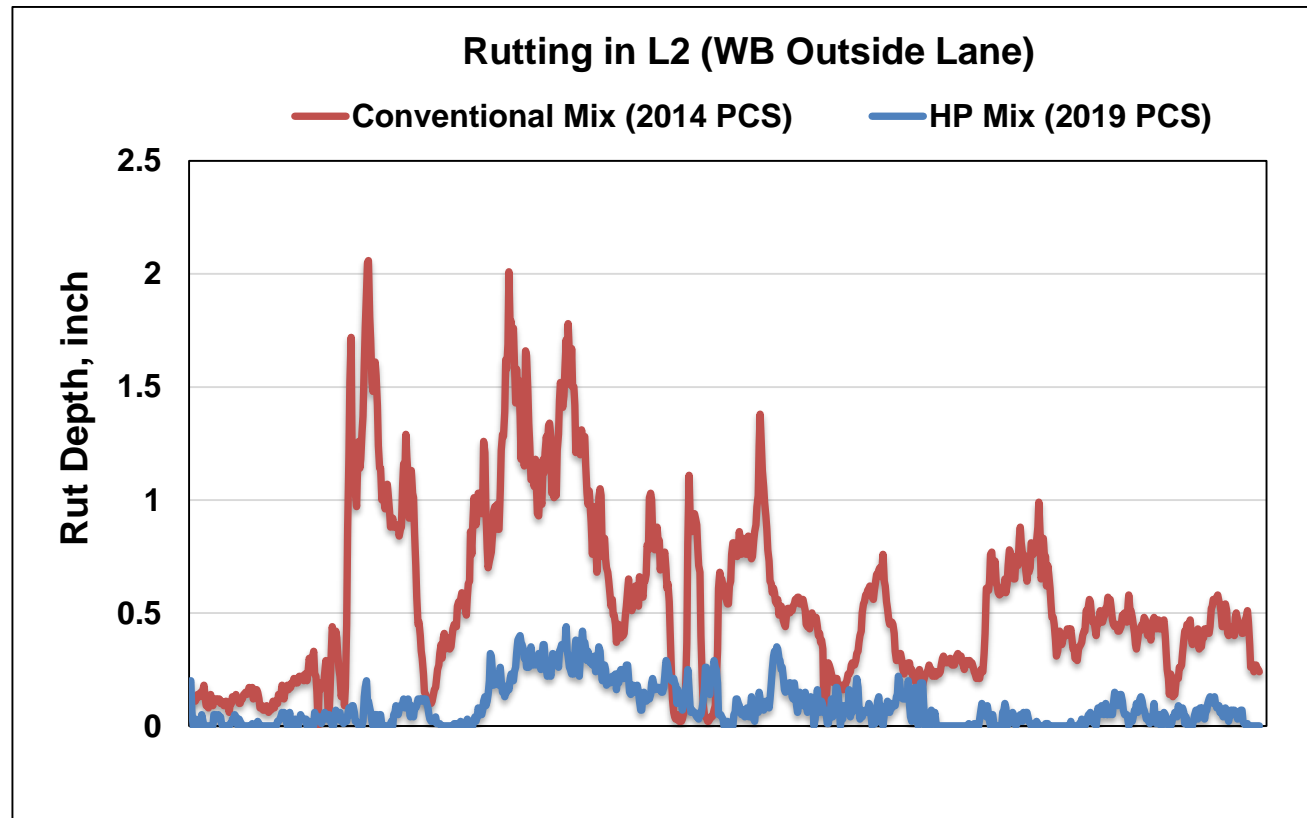
- Westbound outside travel lane (L2) at I-10 interchange
  - Located between two truck stops
  - Rutting over 2 inches in some areas
- Programmed to be reconstructed with PCC
- Resurfaced top 2.5" with single lift of FC12.5 containing HP
- PCC reconstruction was postponed

# High Polymer (HP)



Source: H. Moseley - US 90 HP Pilot Project

# High Polymer (HP)



HP binder was effective in controlling rutting

# Projects Performance

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## Quiet Pavement (FCQ)

# Quiet Pavement (FCQ)

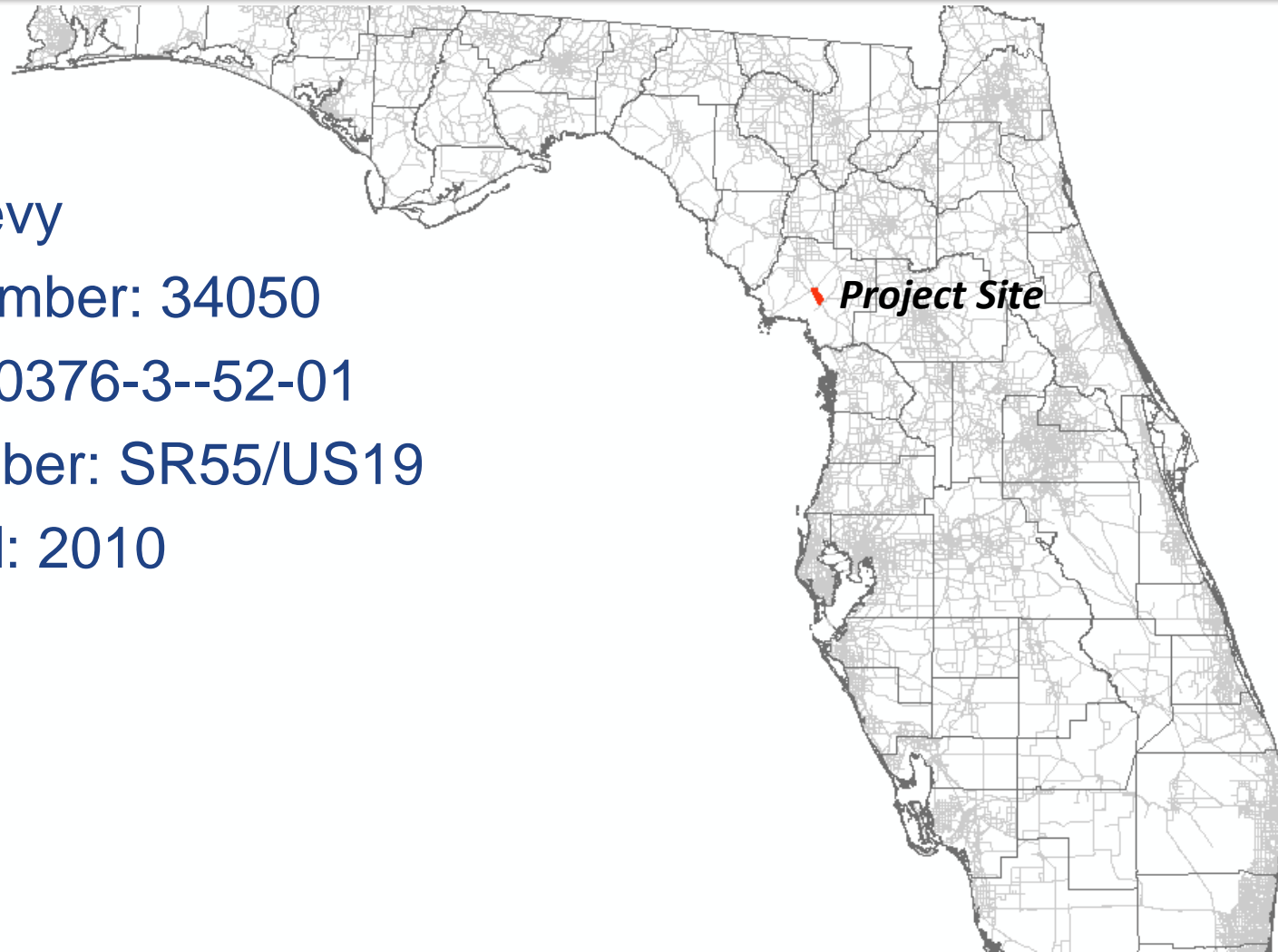
County: Levy

Project Number: 34050

Fin No: 210376-3--52-01

Road Number: SR55/US19

Completed: 2010



# Quiet Pavement (FCQ)

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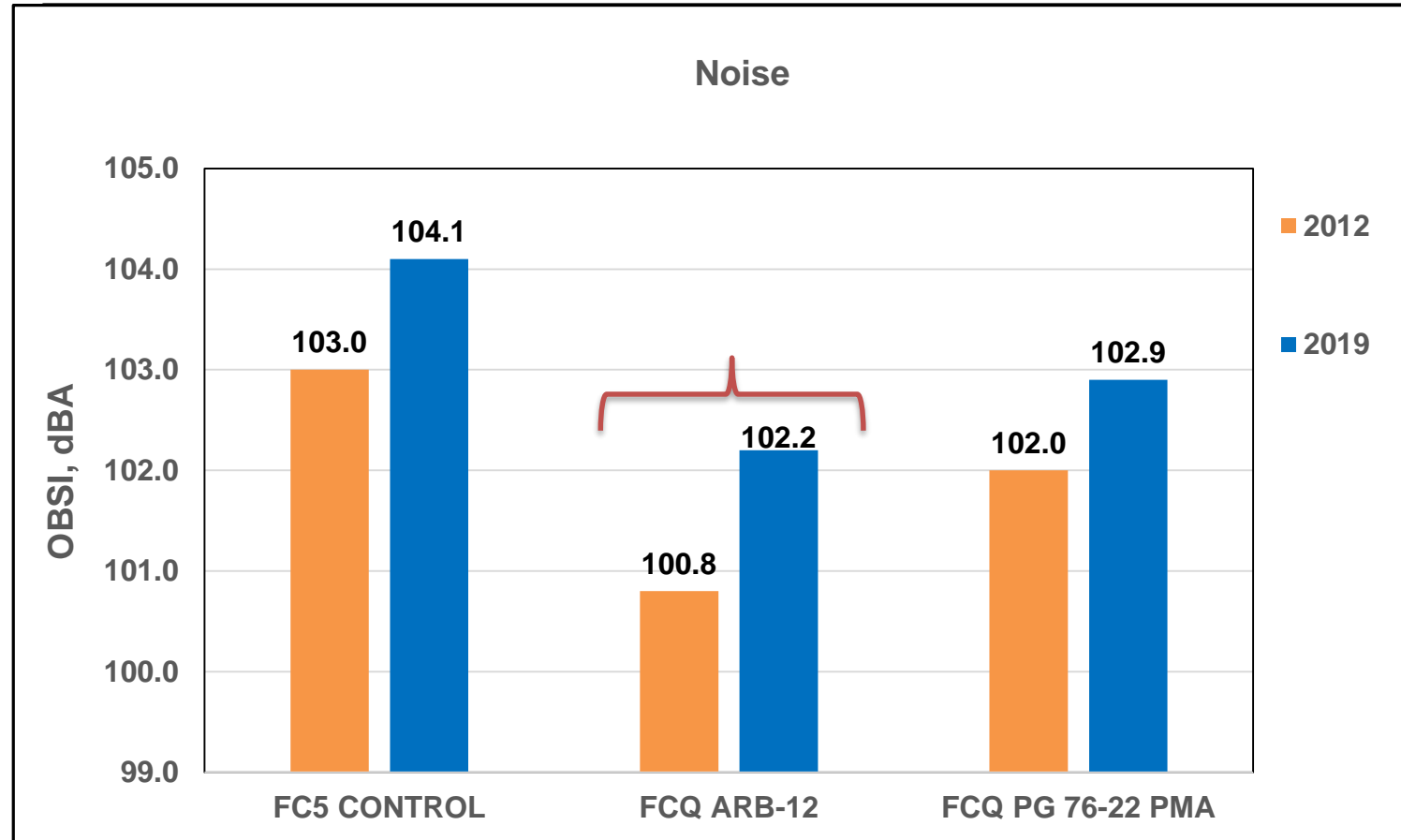
- FDOT has been actively involved in the FHWA Quiet Pavements Pilot Program
- Two FCQ sections were designed to produce less tire/pavement noise than the traditional FC5
- FCQ is essentially a FC5 surface with different aggregate characteristics

# Quiet Pavement (FCQ)

<b>Beginning Milepost</b>	<b>Ending Milepost</b>	<b>Test Section</b>
26.798	27.598	FC5 CONTROL
27.598	28.393	FCQ ARB-12
28.393	29.229	FCQ PMA



# Quiet Pavement (FCQ)



FCQ with ARB-12 is more effective in reducing tire-pavement noise

# Projects Performance

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## Fog Seal (FS)

# Fog Seal (FS)

County: Polk

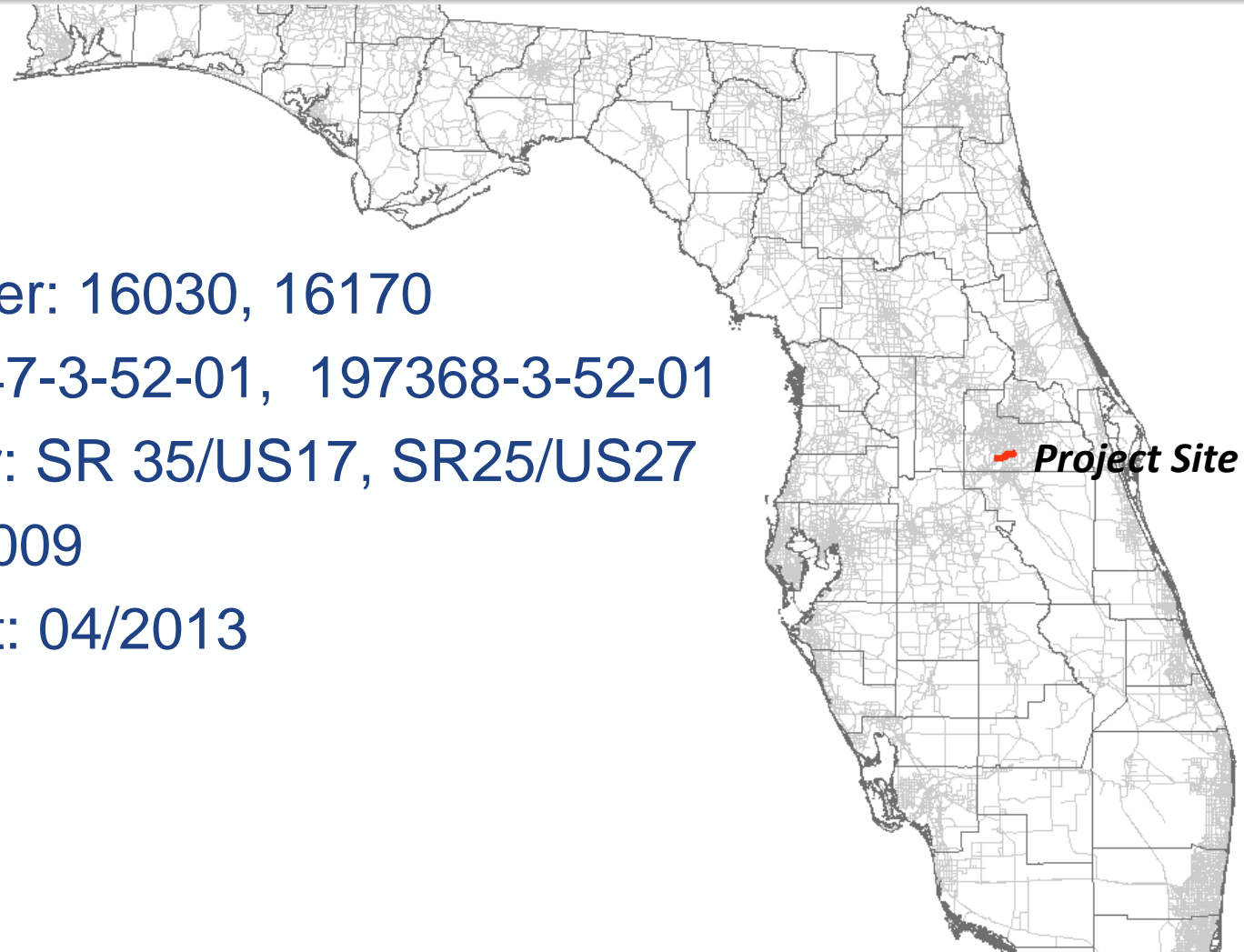
Project Number: 16030, 16170

Fin No: 197647-3-52-01, 197368-3-52-01

Road Number: SR 35/US17, SR25/US27

Completed: 2009

FS Placement: 04/2013



# Fog Seal (FS)

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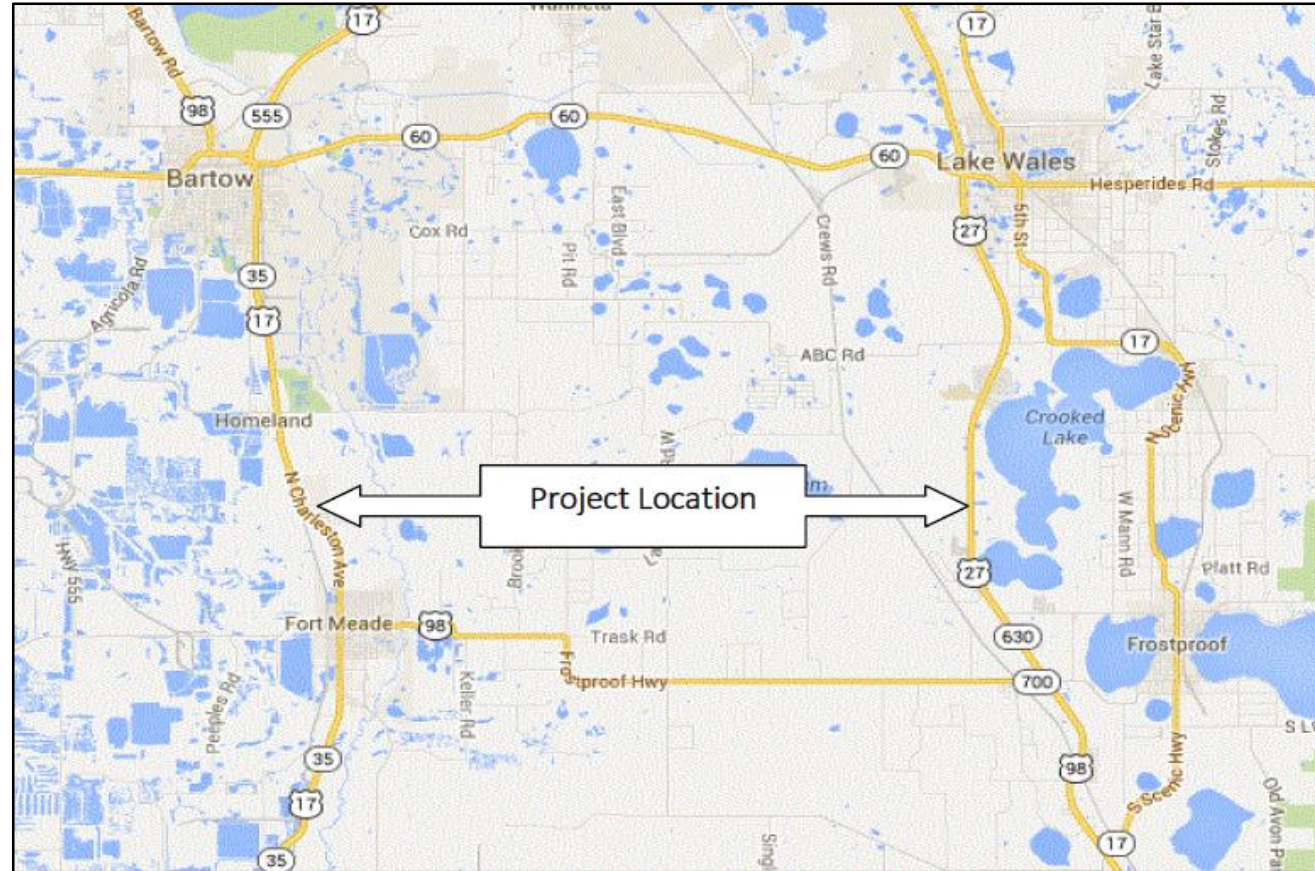
- The functional purpose of an OGFC is to reduce hydroplaning by increasing pavement texture and porosity
- The porous texture of an OGFC exposes the thin film of asphalt on the aggregate to heat, air, UV radiation and moisture, causing the binder to oxidize and harden
- This oxidative hardening makes the binder more brittle, and less fatigue resistant, which ultimately results in cracking and raveling.

# Fog Seal (FS)

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- Application of a fog seal (FS) can prevent an OGFC from raveling by increasing the binder film on the aggregate particles and subsequently reduce the oxidative hardening
- FDOT placed three (3) different FS test sections on two projects in Polk County to evaluate the potential of this preventive maintenance technique

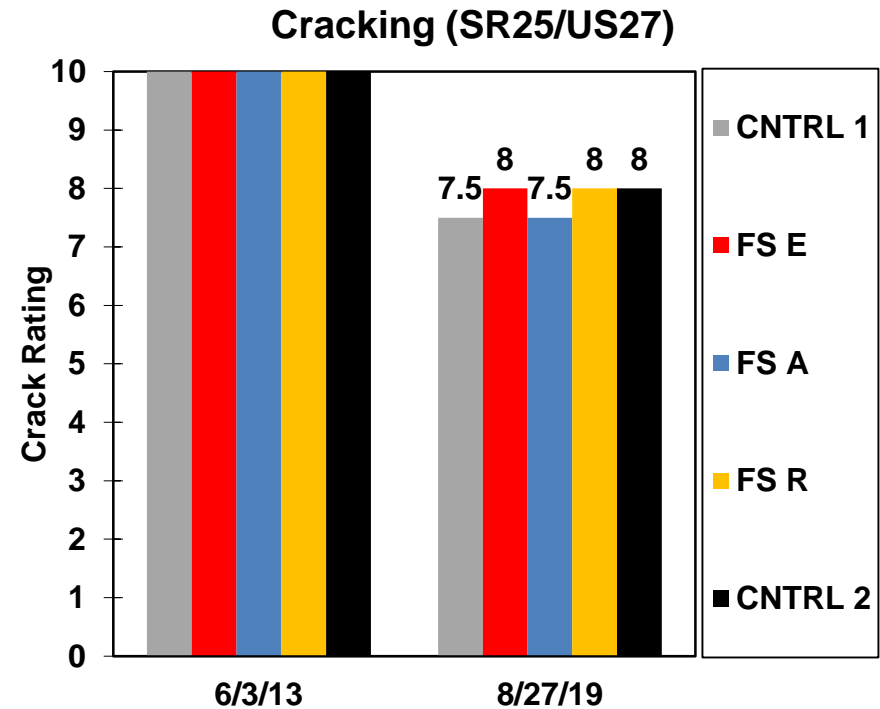
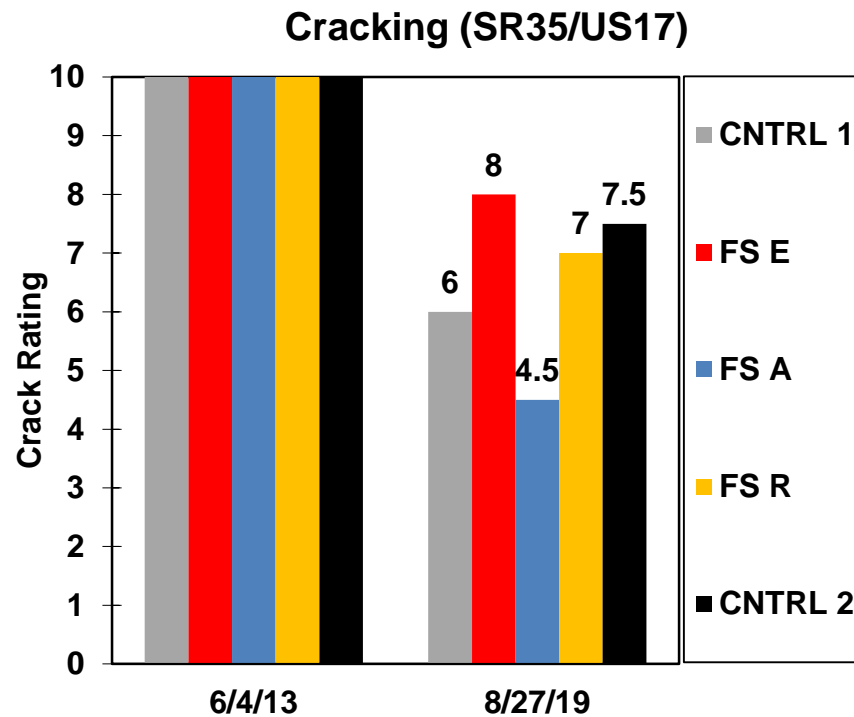
# Fog Seal (FS)



# Fog Seal (FS)

Test Section	Description	Spread Rate (gal/yd <sup>2</sup> )	
		SR35/US17	SR25/US27
CNTRL 1	FC5 (no FS treatment)	-	-
FS E	emulsion with polymer, rejuvenator and emulsifier	0.10	0.10
FS A	clay stabilized, mineral filled emulsion	0.07	0.13
FS R	maltene based emulsion of petroleum oils and resins	0.04	0.07
CNTRL 2	FC5 (no FS treatment)	-	-

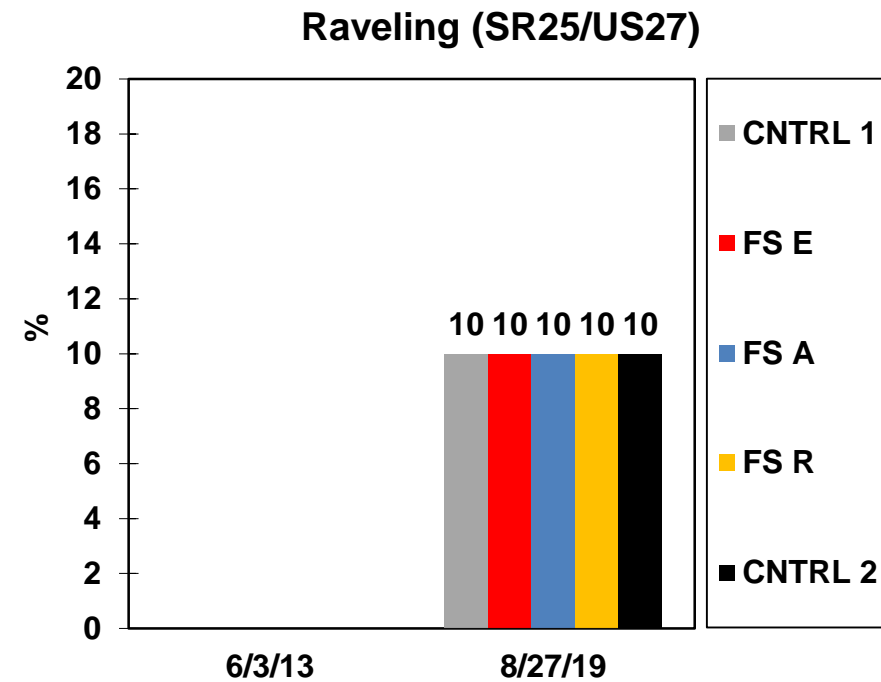
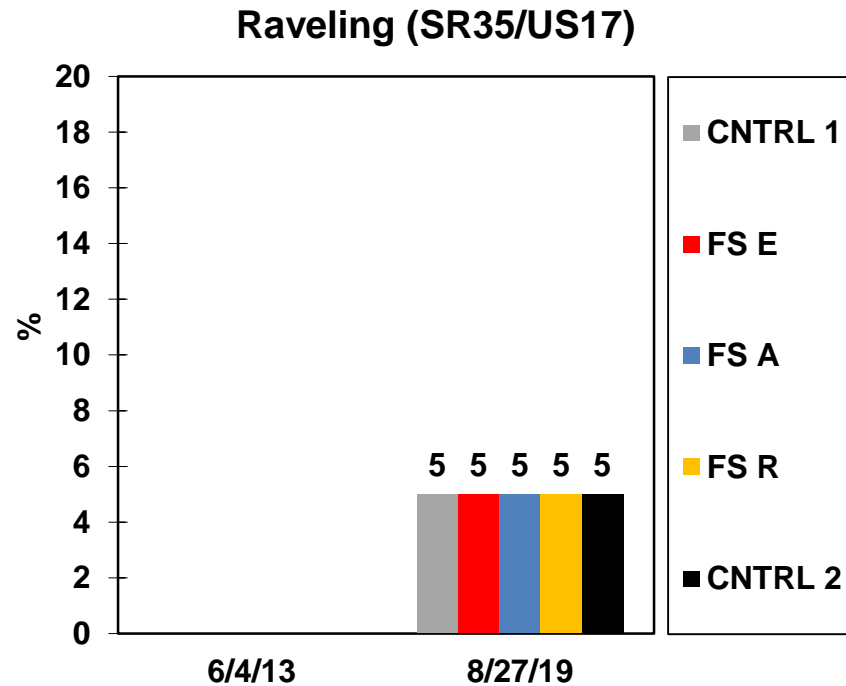
# Fog Seal (FS)



FS E treatment has the best overall cracking performance

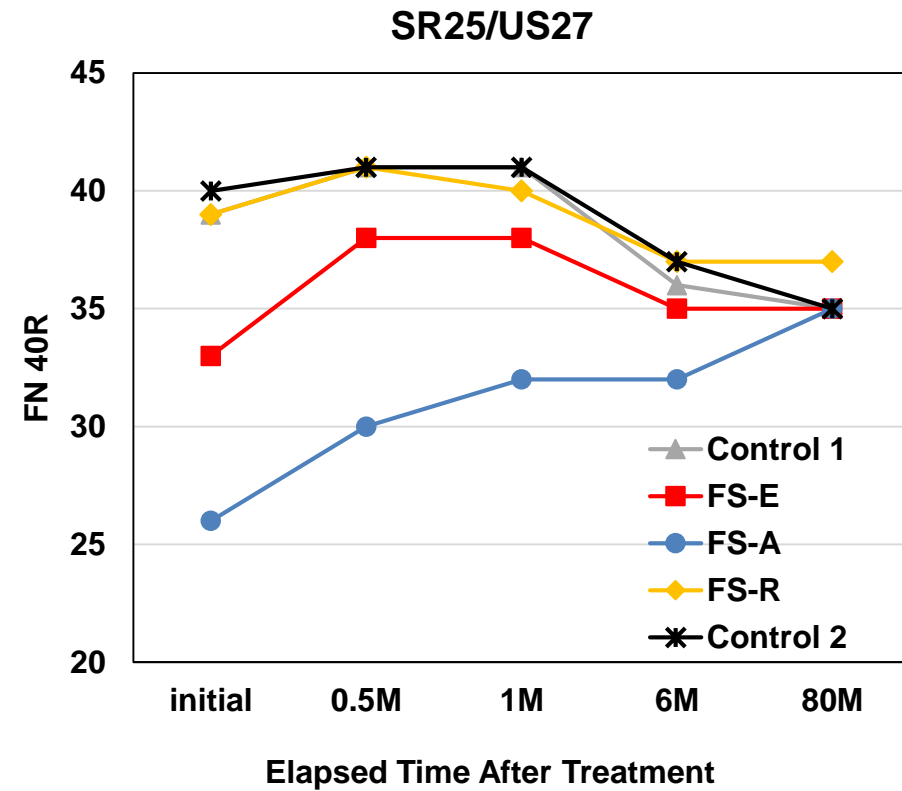
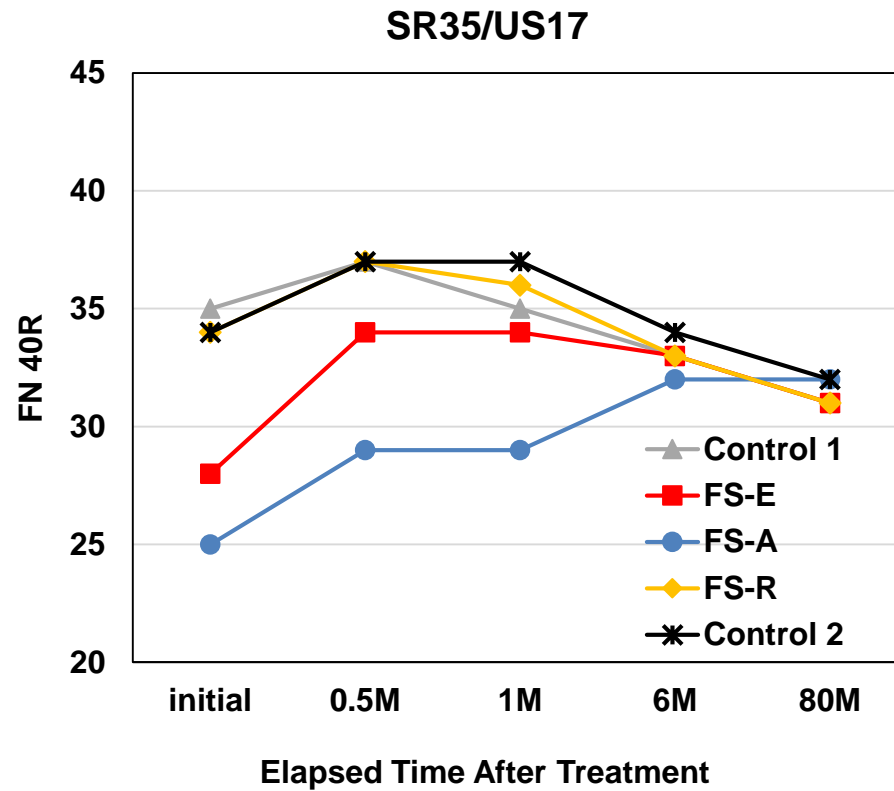


# Fog Seal (FS)



No difference in raveling among FS and control sections

# Fog Seal (FS)



FS E treatment had the least impact on friction



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**Thank You !**



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**For additional information contact:**

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