



INNOVATION / TECHNOLOGY DEPLOYMENT SUMMARY

Ice Mitigation Procedures for Permeable Friction Course Pavements

CHALLENGE

The Paris District experiences frequent winter storms, requiring proactive measures to prevent ice formation on roadways. One challenge lies in treating Permeable Friction Course (PFC) pavements, which have air voids designed for water drainage. Unfortunately, these voids also allow ice-prevention materials to seep into the pavement, reducing their effectiveness. New PFC pavements seem to require significantly more pretreatment solution compared to older PFC or traditional non-permeable surfaces.

SOLUTION

This innovation uses data from road weather information stations (RWISs) to help the district establish treatment guidelines for PFC pavements before, during, and after winter ice events. Mini weather stations monitor precipitation and pavement conditions and provide alerts on deteriorating conditions.

This project explores the use of RWIS data to establish improved treatment guidelines for PFC pavements before, during, and after winter weather events.

PROACTIVE APPROACH

The Paris District proactively installed four mini RWISs along I-30 and US 75. During the 2023–2024 winter, the district collected and analyzed sensor data to correlate it with pavement treatment applications (Figure 2). This analysis will inform adjustments to pretreatment strategies for future winter weather events.

BENEFITS

Miniature weather stations (RWIS) provide real-time data on:

- Precipitation and pavement conditions
- Air temperature and relative humidity
- Pavement temperature and friction coefficient

TxDOT GOALS



Deliver the right projects



Focus on the customer



Foster stewardship



Optimize system performance



Preserve our assets



Promote safety



Value our employees

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By analyzing this data, the Paris District aims to:

- **Improve Pretreatment Effectiveness:** Optimize the application rates of ice-prevention materials for PFC pavements to ensure proper surface protection.
- **Optimize Material Use:** Apply the right amount of pretreatment on different roadway sections, reducing waste and cost.
- **Reduce Weather-Related Collisions:** Enhance overall winter storm preparedness and improve roadway safety during icy conditions

KEY TASKS

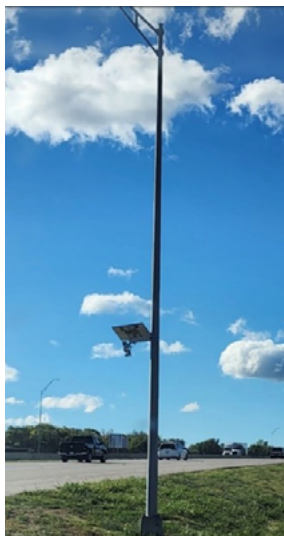


Figure 1. Data collection weather sensor.

- **RWIS Location Identification:** Identify strategic locations to install mini RWIS stations, focusing on areas with PFC pavements of varying ages (Figure 1).
- **Benchmarking De-icing Applications:** Review de-icing application rates used by other districts for pavement types.
- **Data Collection and Analysis:**
 - Install mini RWIS stations at selected locations.
 - Analyze RWIS data during winter events to validate the accuracy of pavement sensor readings.
 - Correlate RWIS data with different PFC pavement segments to establish data collection processes for ongoing monitoring.
- **Refined Pretreatment Strategies:** Based on the collected data, the district will refine its pretreatment application rates for different scenarios (before, during, and after freezing/icing events) as depicted in Figure 2.

DATA SOURCES

The RWIS stations (Figure 1) also provide valuable data on weather conditions (temperature, humidity, precipitation, wind) and pavement surface conditions (temperature, friction coefficient, overall status).



Figure 2. Mini weather station install on I-30 in the Paris District.

Resources

[Paris District \(txdot.gov\)](https://www.txdot.gov)

[Proven Safety Countermeasures: Pavement Friction Management \(dot.gov\)](#)

[Highway Conditions: DriveTexas.org](https://www.drive-texas.org)

[Weather-Savvy Roads: Sensors and Data for Enhancing Road Weather Management \(utexas.edu\)](https://www.utexas.edu)

[Data Collection and ITS \(dot.gov\)](https://www.dot.gov)

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