INNOVATION / TECHNOLOGY DEPLOYMENT SUMMARY

Dynamic Winter Weather Alert Messaging

CHALLENGE

Winter weather in the Texas Panhandle can be unpredictable. Travel conditions can become treacherous rapidly as winter storms blow through, particularly for vehicles descending from the Caprock Escarpment. The challenge was to improve the Amarillo District's ability to monitor roadways and automatically alert travelers of deteriorating road conditions.

SOLUTION

Figure 1. . Solar-powered mini weather station

The innovative solution was deploying a mini weather station (see Figure 1) on the side of the roadway. The mini weather station measures ambient air temperature, pavement surface temperature, humidity, and pavement surface conditions (see Figure 2). The sensor is configured to provide automated email alerts when pavement temperatures and surface conditions fall below user-defined thresholds. Amarillo District maintenance personnel use these alerts to monitor and refine their plowing activities as travel and roadway conditions deteriorate.

This innovation also includes a software application that uses the alert emails to automatically generate messages on the portable changeable message sign (PCMS) deployed at the site. The messages are intended to alert travelers of potential icy pavement conditions. The PCMS continues to display alert messages while the weather conditions persist. Once the alerts indicate that the pavement surface temperature has risen above the threshold value (near freezing), the application automatically deactivates the message displayed on the PCMS.

PROACTIVE APPROACH

The project team explored methods for using weather sensor alerts to automatically trigger the posting of weather-related messages on portable changeable message signs and notifying Amarillo District personnel.

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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BENEFITS

Expected benefits of the deployment include improved traveler awareness of potential icy conditions on pavements and faster maintenance responses during deteriorating weather conditions. The Amarillo District will pursue similar deployments in other strategic areas in the district.

KEY TASKS

- Assess available weather-monitoring technologies to identify systems that provide automated alerts to changing roadway conditions.
- Develop automated processes for generating and posting messages on dynamic message signs.
- Pilot the system in an operational setting on I-40 west of Amarillo.

DATA SOURCES

Data from the mini-weather station feeds a dashboard that shows air and surface temperatures, relative humidity, and pavement conditions. See Figure 2 for an example of the data output and other information captured during a weather event.

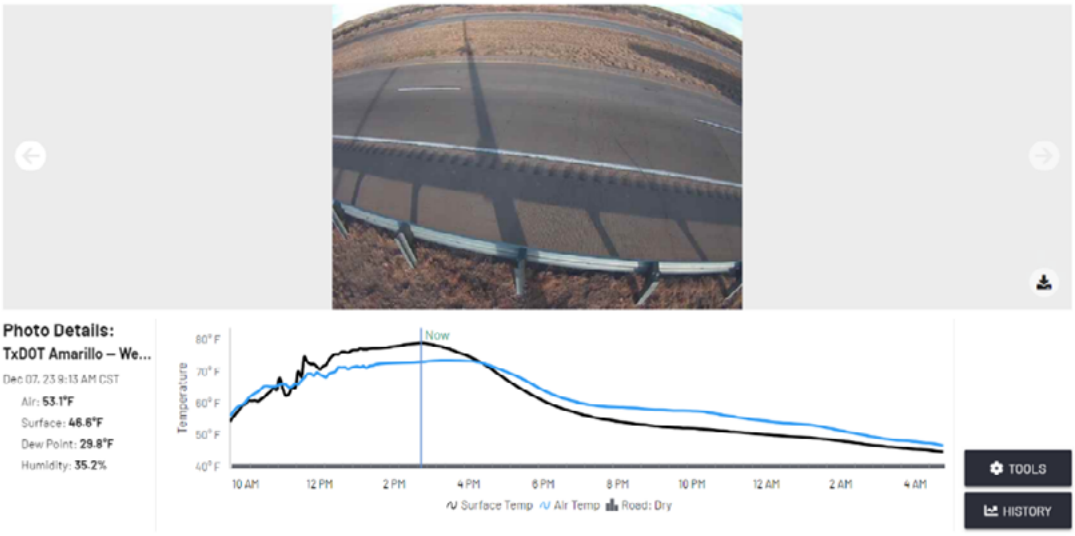

Figure 2. Sample output of weather condition information provided by mini weather station.

Resources

Amarillo District (txdot.gov)

Highway Conditions: DriveTexas.org

ITS Map: Amarillo District dynamic message signs

Contact

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