



NTEMP S3 Information on New Weather Sensors and Training Materials

Fort Worth, TX

HWY21FH005

(27 pages)

I. Weather Sensors

Eighteen weather sensors from Frost Technologies were installed in 14 locations along the three North Texas projects. These weather sensors capture air and pavement temperatures, as well as relative humidity. The weather sensors also transmit photographs of the road. The weather sensors have been placed in areas where freezing is more likely to occur. These sensors also trigger real-time alerts via email to designated employees when certain conditions are detected on the road. The location of the eighteen weather sensors is as follows:

LBJ

Location Details	Devices Installed	Coordinates
SBML IH35E South of IH635	Two	(32.9066, -96.8988) (32.9066, -96.8988)
IH635 EBML & WBML over Park Central	Two	(32.9239, -96.7809) (32.9241, -96.7810)
IH635 WBGPL/Welch Intersection	One	(32.9261, -96.8264)
IH35E NBML at Manana Dr	One	(32.8721, -96.8976)
US75 Reversible HOV Lanes	One	(32.9323, -96.7553)

NTE

Location Details	Devices Installed	Coordinates
SH183/IH820 NE Mall Interchange - Approaching EBML	One	(32.8327, -97.2090)
SH183/IH820 NE Mall Interchange - Approaching WBML	One	(32.8345, -97.1985)
SH183 EBML entrance before Bedford Rd	One	(32.8397, -97.1529)
SH183 WBML at US377	One	(32.8400, -97.2603)

NTE3

Location Details	Devices Installed	Coordinates
IH35W NBGPL & SBML over Trinity River	Two	(32.7783, -97.3197) (32.7770, -97.3198)
IH35W/FW Downtown Connector	One	(32.7468, -97.3197)
IH35W/FW SBML Exit at I30	One	(32.7633, -97.3181)
IH35W SBFR over Fossil Creek	One	(32.8629, -97.3157)
IH820/IH35W interchange	Two	(32.8405, -97.3125) (32.8407, -97.3123)

The weather sensors are placed on signage gantries, toll gantries, and poles located on bridges and overpasses. All the sensors are placed on bridges and overpasses. Two of the weather sensors were installed on the overpass at Trinity River:

- 35W - NBGPL at Trinity River (32.778333, -97.319714)
- 35W - SBML over Trinity River (32.777082, -97.319881)

II. Training Materials

Training materials have been updated to include the new technologies and processes that have been implemented and an online AASHTO training has also been adopted. Our employees were provided with specific training for the following technologies:

- DTN Forecasting service
- Frost Technologies weather sensors
- PRECISE GPS and Tracking devices
- Force America controllers

Training was provided through Microsoft Teams meetings with vendor representatives. Please see below the agenda for some of the meetings held with the companies listed above:

1. DTN ClearPath Weather Overview: 11/2/2021 3:00 PM – 4:00 PM.

Organizer: DTN

Training Scope

- Brief overview of DTN Clearpath
- Explain Division of Roadway into 5 Sections (Marking Favorites)
- Map View and List View of the sections

- Per Section (Type of Weather Data Available – Summary, Graph View, Table View, 10 Day Report)
- Explanation of how to read and interpret the data
- Weather, Road, Snow, NWS Alerts
- Weather Overlay, Routes, RWIS, FAA Sections on Left Pane
- Data view for previous 24 Hours and next 72 Hours
- Frost Sensor Data and Usage
- How to Read the Daily Forecast Email
- MET Alerts
- Q&A Session

2. DTN and Frost Technologies: 10/18/2021 3:00 PM – 3:30 PM.

Organizer: NTEMP S3 O&M Department

DTN Agenda:

- DTN ClearPath Login with NTE Account: [DTN ClearPath Weather®](#)
- NTE divided into 3 sections (NTE12, NTE3A and NTE 3B)
- Reviewed viewing the following Data per each section:
 - Summary of weather and pavement Conditions
 - 10 Day forecast on each segment
 - Hourly Forecast Table data for 48 Hours
- Summary of ALL Sections on Dashboard View
- Frost Sensor visible in DTN Dashboard (Yet to be configured)

Frost Technologies Agenda:

- Frost Technologies logins: [Frost Technologies](#)
- Installed Sensor collects the following data: Air & Pavement temperatures; Dew Point, Humidity and pictures every 10 min
- New Devices to be installed on 10/26 and 11/25
- Alerts can be setup for Temperature data

3. DTN and Frost Technologies: 11/09/2021 3:30 PM – 4:00 PM.

Organizer: NTEMP S3 O&M Department

Agenda:

- Personnel from RM to navigate through DTN and show us how to get the desired data
- Review Frost Sensors and Dashboard
- Create Alerts based on RM Requirements
- Q&A

4. Precise dashboard: 10/26/2021 2:00 PM – 3:00 PM.

Organizer: NTEMP S3 O&M Department

Agenda:

1. Reporting
 - a. Route completion
 - b. Brine/Salt usage

2. Dashboard Features
3. How to set up custom legends
4. How to track live completion
5. How to manage two different fleets and roadways in the same environment

5. Precise dashboard: 12/6/2021 2:00 PM – 3:00 PM.

Organizer: NTEMP S3 O&M Department

Agenda:

1. Reporting
 - a. Route completion
 - b. Brine/Salt usage
2. Map
 - a. Route replay
 - b. Asset Historical
 - c. Route Completion
3. How to set up custom legends (Asset Type, Switch Type, Static,...)

Finally, a Snow & Ice Rodeo was held on December 7th, 2021. A copy of the presentation used as guidance for the event can be found as **Exhibit 1**.

The below a table contains the titles and links to the different AASHTO on-line courses that have been adopted.

ID	TRAINING
1.	AASHTO SICOP Introduction to anti-icing and winter maintenance
2.	AASHTO SICOP Winter road maintenance management
3.	AASHTO SICOP Winter roadway hazards and principles of overcoming them
4.	AASHTO SICOP Weather basics
5.	AASHTO SICOP Weather and roadway monitoring for anti-icing decisions (2 ½ hours)
6.	AASHTO SICOP Anti-icing practice in winter maintenance operations

On-line access can be granted through the following link (only for registered attendees):

<https://store.transportation.org/Account/Login?ReturnUrl=%2FMyStore%2FTraining%3FaspxAutoDetectCookieSupport%3D1>

EXHIBIT 1 – SNOW & ICE RODEO PRESENTATION



LBJ/NTE Snow & Ice Training

During the LBJ/NTE Snow and Ice Training the following training will be done:

- Training will consist of, but will not be limited to the following topics:
- Safely operating and driving all equipment
- Road Safety for the public and the maintenance personnel
- Importance of keeping roadway clear
- Making and storage of brine and salt
- Application of brine and de-icing salts: speed and settings
- Routes
- Tracking usage
- Equipment calibration
- Radio communication
- Monitoring and reporting roadway conditions.
- Cleaning Salt Spreaders
- Cleaning Brine Sprayers
- Cleaning Brine Machine

SAFETY!

- First and foremost, safety will be the underlying theme throughout all training. Proper driving and operating techniques will be stressed at all stations. Any chance to provide coaching and correction will be identified and implemented.
- Public Safety will also be discussed regarding application processes. Keeping the roadway clear of any snow and ice is essential to providing safe travel to the public.
- Technicians will be taught about maintaining open Radio Communications for pertinent information including ever changing roadway conditions.

Dump Truck Brine Sprayers Station 1

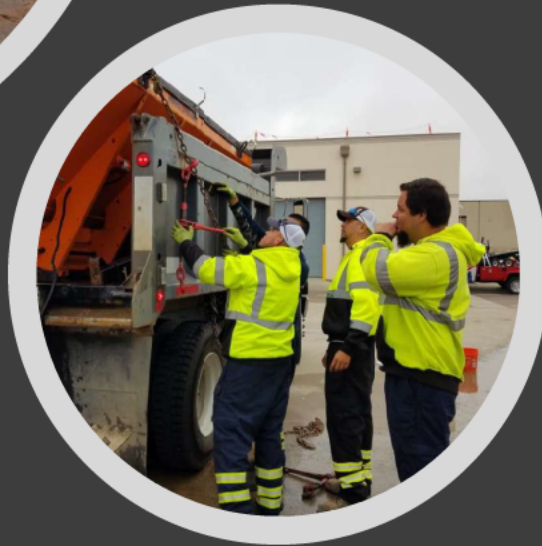


Dump Truck Brine Sprayers

- Each tech will be shown how to properly load and unload the brine sprayers on the dump trucks. Supervisors/Leads will coach on the importance of safety while operating the dump trucks.
- Techs will be shown the proper way to secure the sprayers to the bed using straps and binders.
- While the spraying unit is loaded the techs will be shown how to properly operate the control device for the spraying unit.
- During this time emphasis will be placed on maintaining proper speed throughout operation to ensure the optimal application of product.
- Refer to Loading and Unloading Procedure



Dump Truck Spreaders Station 1



Dump Truck Spreaders

- Techs will be trained on the correct technique to load and unload the spreader units into the back of the dump
 - They will be shown the proper way to secure the spreaders to the trucks using chains and binders.
 - While the spreader is loaded, we will go over the use of the Control device.
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- The importance of truck speed, auger speed, and spinner speed will be stressed to ensure adequate product is being laid out.
 - Refer to Loading and Unloading Procedures



Pick Up Brine
Sprayers

• Station 2

Pickup Brine Sprayers

- In this section the Supervisor/Crew Leader will go over and train on the Proper and safe use of the forklift to load and unload the sprayer units.
- Techs will be shown the correct way to secure the unit using the 4-point attachment method.
- While sprayer unit is loaded the techs will be instructed how to operate the units using the switch board in the truck cab.
- Special attention will be paid to teaching the proper speed to ensure that the optimal amount of product is applied.
- Refer to Loading and Unloading Procedures

Equipment Calibration

- Techs will be shown the calibration process. However, all calibrations will be done by the Mechanic and Supervisor/Crew Leaders.
- Refer to Calibration Procedure
- Station 2



Pick Up Spreaders
Station 2

Pickup Spreaders

- Techs will be taught the correct and safe way to use the forklift to load and unload the spreading units into the pickup beds.
- They will be shown the correct 4-point- tie down to secure the spreaders into the beds.
- While the spreader is loaded, we will go over all controls, and again stress the importance speed has on the amount of material dispersed.
- Refer to Loading and Unloading Procedures



Dump Truck
Sprayer/Spreader
Controller & Arc
Sensors

Station 3




Plow Operation Station 4



Brine Making and Storage Station 5

Brine Making and Storage

- During this training technicians will be shown how to make brine.
- The training will start with Applying salt to the brine maker, Connecting the proper hoses to the brine making system, adjusting water levels for dilution of salt and how to check or read the correct salinity level for the final brine solution.
- Techs will be shown how to properly pump Brine solution into the storage tank.
- Proper covering of the Salt pile is critical to protecting the material from the elements, and will be coached to each tech.
- The technician will also be shown how to document the salinity reading into the electronic form on the tablet.
- Refer to the Brine Making Procedure



During the Snow and Ice Rodeo we will discuss the brine spraying/salt spreading routes, Work orders, documentation and radio communication . Each Vehicle will have an assigned route book. The Supervisors/Crew Leaders will go over the route books with the techs and answer any questions. The final steps on the day will be driving the routes in their assigned vehicles. We will continue driving the routes in the days after the Snow and Ice rodeo to get the techs comfortable with the routes and use this time to verify the data coming in from the Precise units that are installed in the trucks.

Tracking usage

- Each Technician will be responsible for completing a work order each day. In this work order they will be responsible for inputting all materials used. The Supervisor and Crew Lead will go over this work order with the technicians.
- Station 6



Cleaning Equipment

- Cleaning all equipment is essential to maintaining an effective and ready response for snow and ice events. Techs will learn the correct way to clean and store all snow and ice equipment including all sprayers, tanks, and spreaders as well as the brine making system. This will be discussed throughout each station.
- Refer to Cleaning Procedure for step by step