Preparing for Winter Operations

Another summer has ended and it's time to consider winter operations. This article provides tips for fighting winter weather.

Prepare Equipment

Keep trucks and equipment in good condition. Perform a pre-trip inspection and routine maintenance. Report needed repairs immediately.

Calibrate spreaders for the specific material. Spreader models vary. Refer to manufacturers' recommendations. The Massachusetts LTAP Center produced a DVD demonstrating calibration. The UNH T² Center sent one to each municipality this past summer (with special FHWA funding) and has copies for loan.

Snow and Ice Control Strategies

There are three strategies for snow and ice control: anti-icing, plowing, and, deicing. Municipalities may not use all. Many use a combination.

Records from past storms and weather predictions, enable supervisors to make informed decisions when planning for a winter storm. Accurate forecasts are critical to know when a storm will arrive, how air and pavement temperatures will change, and wind direction and velocity.

Managers may use records and preditions to determine which strategies and materials to use, along with, application rates, and frequency of treatment. Use current and predicted pavement temperature to select the appropriate snow and ice control strategy. Chemical effectiveness is directly related to pavement, not air, temperature. Salt, for example, becomes less effective as the pavement temperature approaches 18°F.

Anti-Icing

Anti-icing is a proactive approach to snow and ice control. Treatments consist of applying liquid chemicals or pre-wetted salt to pavement before, or at the beginning of, a storm. Treatments create a barrier to prevent snow and ice from bonding to pavement. This allows accumulated snow to be pushed off the road, leaving the pavement relatively dry.

Anti-icing has several benefits:

1. it reduces the total chemical use,
2. it reduces materials and equipment costs and time,
3. pavement conditions are better when ice formation is prevented, and
4. it makes post-storm cleanup easier and faster.

Reapply chemicals after plowing and before pavement temperature drops. Reapply before the snow and ice bond to the pavement.

Anti-icing may be less effective during heavy, freezing rain, in blowing snow conditions, or in intense snowfall when the storm gets ahead of anti-icing

Anti-Icing Tips

- Apply using stream nozzles so materials are distributed directly on the wheel paths.
- Anti-icing is often effective for heavy frosts. Apply chemicals early in frost conditions or light freezing drizzle.
- When conditions could produce frost or black ice, apply on selected sections of the roadway (e.g., bridge decks). Consider spot applications on hills, curves, and intersections.
- When possible, apply material during low-traffic periods.
- Do not apply chemicals under excessively windy

situations.

- Reapplication may not be necessary. Residual chemicals may remain for several days.

Plowing

Remove snow as quickly as possible, to reduce compaction. Use underbody blades to remove compacted snow or slush. Adjust the blade angle to maximize cutting efficiency or snow-throwing capabilities.

Do not push or blow snow off a bridge into the water or onto traffic below.

Deicing

In deicing, chemicals are applied to snow and ice. Normally this occurs at the end of a storm, after the snow/ice has bonded to the pavement. Deicing chemicals lower the freezing point of water (causing melting). Reapply when the chemicals become diluted.

Commonly used chemicals are sodium chloride (NaCl), calcium chloride (CaCl2), magnesium chloride (MgCl2), and calcium magnesium acetate (CMA). Salt and calcium chloride are most widely used. Salt brine freezes at 18°F and a calcium chloride solution (29.8 percent concentration) freezes at -20°F.

Salt provides immediate skid protection. To work effectively as a deicier, salt must be a brine state. If salt is applied dry, the moisture to create a brine, must come from pavement surface or from the air. When the pavement temperature is below freezing, salt loses its effectiveness because pavement moisture is frozen.

When deicing on two-lane roads with low to medium traffic volumes, apply a windrow of salt along the center line. Traffic will move salt off the center line. The resulting salt brine will melt across the pavement cross slope and across the width of the road. This method provides vehicles with clear pavement under at least two wheels. On curves, spread salt on the high side of the curve.

Solid calcium chloride is more effective at lower temperatures and works quicker than salt. Store calcium chloride in moisture-proof bags. Otherwise, it may lose its ability to draw moisture and may form large chunks.

Pre-wetting

Pre-wetting salt is common. Pre-wetted salt melts faster. Wet salt is less apt to bounce or be blown off, the road by traffic. This saves 20 to 30% material costs.

Some agencies pre-wet salt by spraying it as it is loaded into the truck. For more uniform application, use a truck-mounted equipment to spray salt as it leaves the spreader.

Salt brine is gaining popularity. Some agencies produce their own brine. Brines with concentration rate greater than 23% risk failure.

Liquid calcium chloride draws moisture from the air and releases heat as it dissolves. Calcium chloride melts snow/ice at lower temperatures (than salt). Apply at six to ten gallons per cubic yard of salt. Liquid calcium magnesium acetate and magnesium chloride are also used.

After the storm

Maintain accurate records to track and manage current operations, as well as, provide information for future operations.

Snow Storage

After removing snow and completely clearing traffic lanes and parking spaces, load the snow into trucks and haul it to remote storage areas. Locate storage where it can handle the snow-melt runoff without overburdening existing drainage features and without violating Environmental Protection Agency requirements.

Source:

Smith, Duane, Local Roads Maintenance Worker's Manual, Center for Transportation Research and Education, CTRE Project -5-173 p. 111-139