

Freezing Rain Adds to the Headache!

By Dale Keep, Ice and Snow Technologies

In the snow and ice management business, freezing rain is normally the most difficult form of precipitation to deal with because of the large amount of moisture and the extremely high rates of dilution for deicing chemicals applied. While the resulting ice layer resembles a black ice condition, it is different in that there is a continuous addition of ice to the surface.

During severe storms, continuous deicer applications are often applied (often without success) in an attempt to stay ahead of the ice. Given this tactic, contractors must consider the level of service requirements of the contract and the amount of ice expected while developing a plan. Due to the high rate of dilution to the deicer(s) applied during the freezing rainstorm, typically large amounts of deicers are required to maintain or often regain bare, wet conditions.

Freezing rain scenarios
Freezing rain falls on clear, dry pavement. Under this scenario, a liquid pretreatment is a good start. It will slow the development of ice on the surface and may give you time to mobilize and reapply before ice formations start. Retreat as necessary with dry or pre-wetted solid deicers to maintain or achieve the desired level of service.

Freezing rain falls on snow- or ice-covered pavement. Under these conditions, if quick removal is desired, a heavy application of dry or pre-



wetted solid chemical is needed ahead of the freezing rain. This would be followed by further treatment as necessary with dry or pre-wetted solid deicers. In extreme freezing rainstorms, a combination of deicers and plows may be needed to remove the ice when the storm is over.

A difficult task

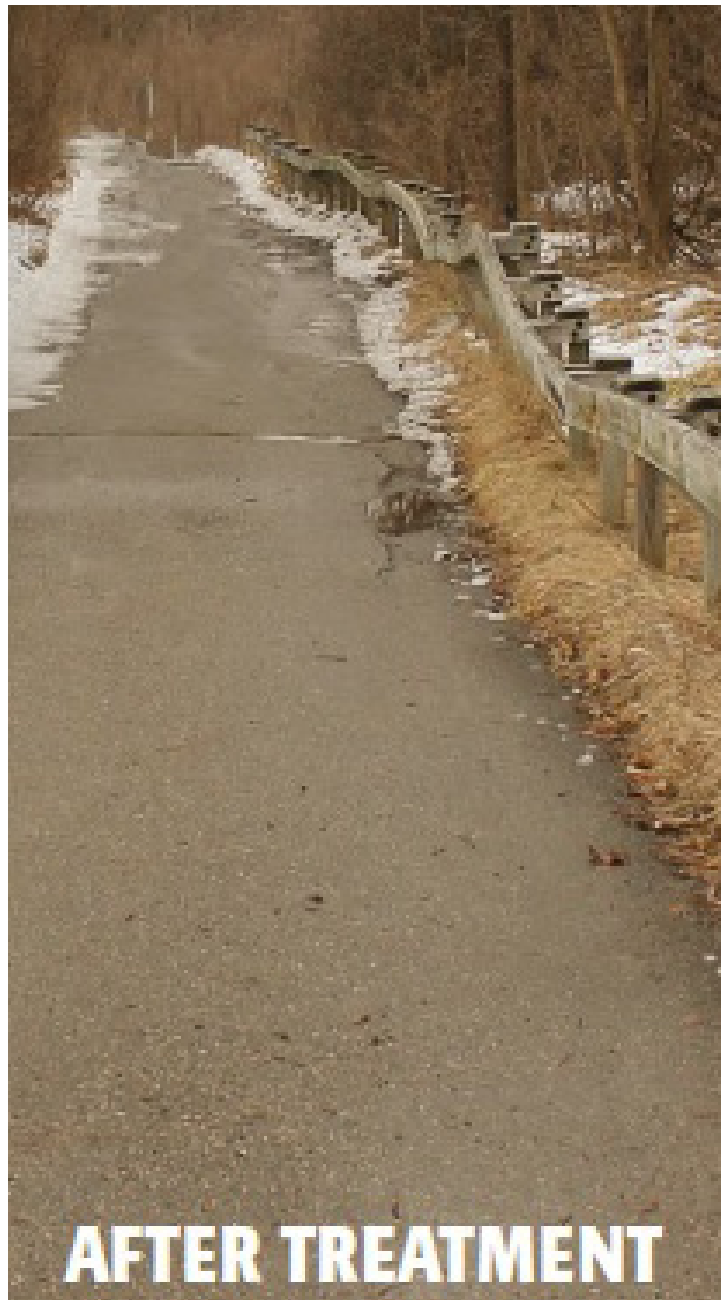
In addition to the high dilution rate and large quantities of deicers typically required to battle freezing rain, there is a high risk of melt and refreeze, unless the storm ends with the surface temperatures rising.

Predicted storm severity, time of day, deicer availability, inventory, cost of multiple applications, customer expectations, and the reality of the situation should all be considered when developing a storm-fighting strategy.

In severe storms, when ice forms and the storm continues, there is a high probability that it may not be possible to manage it with chemicals. I have experienced ice storms during which we started out using chemicals only to be forced to park equipment until the storm was over. Regardless of the approach to control it, freezing rain is the ultimate challenge; and there may be times—regardless of contract or intentions—when reality will dictate the ultimate plan and the results.

What's the difference?

Recently while sitting in an airport,



people were talking about freezing rain and what to do as a homeowner and a driver. It quickly became clear that they were not talking about freezing rain, but rather were talking about ice pellets or sleet. This common misconception, and the difficulty in managing different precipitation, makes the subject worthy of some definitions:

Snow. Solid precipitation in the form of minute ice flakes that occur below freezing.

Snow pellets (graupel). White, opaque, approximately round ice particles between 2 and 5 mm in diameter that form in a cloud either from ice crystals sticking together or from accretion (the growth or enlargement by gradual buildup).

Ice pellets (sleet). Transparent pellets of ice that measure 5 mm or less in diameter.

Freezing rain/drizzle. Rain or drizzle that falls in liquid form and then freezes upon striking a cold object or ground. Both can produce a glaze coating of ice. Freezing rain is the result of warm air sandwiched between layers of cold air.

The thickness of the warm air layer will dictate which form of precipitation formed:

If the warm air layer is thin or nonexistent, precipitation will start as and remain snow.

A warm air layer that is somewhat thicker will allow snow to partially melt and refreeze as snow pellets.

As the warm air layer thickens, snowflakes will almost completely melt and then fall into a thick layer of cold air resulting in sleet. When the warm air layer is thick enough to fully melt the snow and the lower cold air layer causes the water droplets to become super-cooled, the rain freezes when it strikes the ground. It can also be the case that the ground is still frozen, which will give the same effect—a layer of clear ice.

The record depth for freezing rain is at 8 inches, set in Idaho in January 1961.

Dale Keep owns Ice & Snow Technologies, a training and consulting company based in Walla Walla, WA.