Application Notes

Subject: WindMasterHS assisting with salt spraying efficiency

Reference AN0033

Introduction

A common way to clear icy roads is to apply a layer of salt, which lowers the freezing temperature of water and melts the ice. Salting roads is standard practice worldwide, and many consider it an effective method for preventing weather-related collisions. In fact, the American Highway Users Alliance found that road salt reduces collisions by up to 85%.

The Negative Effects Of Using Road Salt

Road salt can damage vehicles

Thanks to the cumulative effects of chemical reactions and time, the more road salt that comes in contact with your vehicle, the rustier it's likely to get.

Road salt can damage infrastructures

Vehicle owners aren't the only ones who need to worry about corrosion. Road salt can also damage bridges, parking garages, railroads, and other public transportation infrastructures.

Road salt can negatively impact the environment

Over time, water supplies contaminated by road salt stop supporting certain types of aquatic life. This happens when salt comes in contact with the upper layers of a water source. Due to the presence of snow salt, the water becomes denser and sinks to the bottom, preventing oxygen in the top layers from reaching the bottom layers. This separation of upper and lower layers disrupts aquatic ecosystems. Salt can also damage plant foliage, inhibit plants' nutrient intake, even kill some plants, cause salt-resistant species to proliferate, which diminishes plant diversity and further disrupts ecosystems.
Even wildlife isn't immune to the impact of added road salt in the ecosystem. It impacts birds, in particular, as they are likely to ingest the salt granules. The salt can poison the birds and reduce local populations.

Cost

Salt has to be mined (in the UK there are three main mines - Salt Union's Winsford Rock Salt Mine in Cheshire, Cleveland Potash in Teesside and Irish Salt Mining and Exploration Company in County Antrim), transported to the storage area and then spread on the roads, which all adds cost to the local authority / council / highways agency responsible for a countries roads.

The Positive Effects Of Using Road Salt

Salt's effectiveness in preventing accidents is undeniable. For every 10% improvement in road surface friction, a 20% reduction in crashes follows, according to studies. Studies also found that de-icing with road salt can reduce up to 93% of accidents – in other words, almost all of them during icing events.

In addition, salt is a budget-friendly de-icer compared to other chemicals.

The bottom line is that salt is cost-effective and prevents collisions, injuries, and highway fatalities, which is why many states still use it to melt ice on slippery roads.

Increasing Efficiency & Reducing Costs

The Engineering Center, Bygholm at Aarhus University in Denmark has carried out extensive research into spreading salt on the road in winter as this is important work for traffic safety.

More knowledge about the factors influence the salt spreading process is desired to improve the quality of the work, i.e. improved spreading precision regarding quantity and distribution on the road.

One of the important factors is turbulent airflow induced by high speed moving salt spreader truck. WindMasterHS was used to explore the airflows behind the truck and near the road surface at different distances aside from the lane as it has a robust construct and all Gill anemometers are resilient to salt.

Test 1

The first installation was with the WindMasterHS mounted on the rear of the spreader, directly in front of the salt spray.



Test 2

The second installation was with the WindMasterHS mounted on the road surface, with the spreading truck passing very close to the WindMasterHS whilst spreading salt on the road.



The data from both methods was fed into the data processing to produce a more effective spraying pattern to provide the best coverage for the least amount of salt.

Why Gill

Gill's anemometers are extensively chosen for projects requiring 3-axis wind measurement due to our reputation for high quality, easy installation and above all, for our solid-state construction, which offers huge advantages over other mechanical instruments as they require no regular maintenance. The WindMaster / WindMasterPro are accepted worldwide due to their high accuracy and high output rate at 20Hz or 32Hz. All Gill anemometers also provide an automatic quality message, giving confidence that data received is valid and can be trusted.