Lancashire County Council-Safecote

Who?

Lancashire County Council is responsible for delivering winter service for its Priority Road Network which comprises of over 2,500km of carriageway representing 36% of the 7,000km network for which the county council is the highway authority. It is possible to determine maximum and minimum levels of resilience using assumptions with regard to spread rate and average carriageway width, for a given availability of salt, according to the council's Winter Service Plan.

The plan sets out the council's requirements and advice for the winter service on all highways for which the county council is responsible for. It complements the wider economic, environmental and social objectives of the council's Corporate Strategy and the priorities set out in the Local Transport Plan 2011-2021. The seven priorities of the Local Transport Plan are: improve access into areas of economic growth and regeneration, provide better access to education and employment, improve people's quality of life and wellbeing, improve the safety of its streets for its most vulnerable residents, provide safe, reliable, convenient and affordable transport alternatives to the car, maintain its assets and reduce carbon emissions and its effects.

Like most highway authorities, the councils Overall Winter Period will extend from Mid-October to Mid-April however, the actual end of the season is determined by forecast information and will be extended when it is indicated that winter conditions are likely to persist beyond Mid-April. The Core Winter Period covers December, January and February, but recognising that severe winter weather can occur earlier or later, particularly in Pennine Lancashire. The weather forecasting contract extends from 1st October to 31st April with conditions monitored throughout this period.

For each winter season, the county council stockpiles over 30,000 tonnes of salt, including strategic reserves, to cover all potential eventualities, including disruptions to the supply chain.

The county council exceeds the proposed pre-season resilience standard by a considerable margin, with the '12 days / 48 runs' benchmark using an equivalent 20g/m2 spread rate requiring a pre-season stockholding of 18,000 tonnes (ie 45 runs at 400 tonnes per run).

The challenge:

Lancashire CC has always tried to be forward thinking when it comes to its approach to highways and winter service delivery. The council wanted to find ways of reducing its salt usage as well as driving other efficiencies as part of its winter service plan. On average the county uses around 17,000-18,000 tonnes of salt a year, even in seasons when there is little snow fall because of the amount of marginal nights the winter team is responding to.

The solution:

Lancashire was an early adopter of the Safecote treatment and has been a customer ever since. Harvey Danson, now Area Highways Manager at Lancashire CC , has been involved with the process of incorporating Safecote treated salt into the council's plans since the start. "At the time we were very focused on ensuring that our winter service delivery was up to standard and beyond. Lancashire has been, and still is, known as a leading light in terms of winter service innovation and we wanted that to continue," he said. "We invested in salt storage quite early on because we recognised the benefits of retaining salt moisture content etc, and simply looking after the salt because after all, it is a very expensive commodity," says Mr Danson.

Lancashire first trialled Safecote treated salt from its Curerden depot where investment in salt storage had already been made. "We had immediate success with Safecote here and soon it was being used on all routes out of this depot and then, over two-years, rolled out through every one of our depots. We found we were using less salt and use of Safecote treated salt very quickly becoming a cost-neutral exercise for us. It cost more per tonne to buy but we were putting down less salt so it balances out," says Mr Danson.

Lancashire CC also found that Safecote treated salt was effective at dealing with hoar frost situations. "Before Safecote we were finding that during the peak winter periods of December, January and February when we were treating earlier in the night, we would have to go and re-salt certain areas again. "In time we recognised that we were using approximately 25% less salt using 7.5g with Safecote treated salt compared with 10g when we used dry salt and obviously with it being effective in other areas like the hoar frost, it has been very successful for us."

Mr Danson says the Safecote treatment has also worked well in snow conditions. "Our experience, and subsequent guidance, shows that Safecote treated salt is really good in these situations" says Mr Danson.

Both older Appendix H guidance and the new updated NWSRG chapter-based guidance say that treated salt can contribute towards savings in salt usage. Section 5 of the new guidance-Treatment Methods and Technologies-says: "The treatment tends to bind the finer salt particles and help prevent them being removed from the road surface by wind or vehicle draughts. This therefore reduces losses when compared to dry salting and can also improve flow characteristics and the uniformity of salt distribution.

"As a result, and in the same way as pre-wetted salting, treated salting allows the use of lower spread rates in certain conditions and may therefore also provide improved resilience when compared to dry treatment."

Research was also completed by TRL in 2000 looking at the overall effectiveness of Safecote treated salt. In terms of spreading, Spreading trials were carried out to compare the performance of the Safecote treated salt test formulation with virgin 6.3mm rock salt in order to assess whether the addition of Safecote to rock salt enhances the spreading performance and whether it improves the distribution of rock salt into the desired target spread area.

Safecote has been tested extensively in independent trials since its introduction on to the UK market as well as recognised by previous and current NWSRG guidance as an effective product to help with coverage on the network. Work was done by the

Safecote Limited carried out independent tests with CAPCIS to conduct a preliminary evaluation of its product for corrosion inhibition characteristics using electrochemical techniques. CAPCIS is one of the world's leading independent consultancy companies in the area of corrosion, failure investigation, materials specification, chemical treatment and corrosion management. These tests showed that Safecote is a significant corrosion inhibitor when mixed with chlorides.

Spreading trials of the Safecote treated salt formulation compared with the rock salt were undertaken using a Foden dual spinner spreader at the TRL Research Track. The experiment comprised of eight runs at 50km/h along a simulated three-lane motorway in accordance with BS 1622. This combination was designed to deliver salt to three lanes and a hard shoulder. The Safecote treated salt formulation of 22.2 litres per tonne of rock salt was applied at spread rates of 10g/m2 and 20g/m2.

The results of the 10g/m2 spread showed that more salt was spread into the target zone with the Safecote treated salt formulation than rock salt. The target spread was achieved in most of the hard shoulder, lanes 1 and 2 and the nearside of lane 3. The mean results of the 20g/m2 spread indicated that the Safecote treated salt formulation gave similar improved performance in the target area. Safecote treated salt was also found to have no adverse environmental effects or didn't damage the road network in any way. It also performed well in SHRP tests with ice melting, ice penetration and ice undercutting trials. It was also found to be not as corrosive as virgin rock salt on its own, according to the TRL report.

Use of Safecote is confirmed in Lancashire's Winter Service Plan, which states: "Salt stockpiled at the seven operational depots is treated with 3% 'Safecote', a molasses-based derivative; the strategic reserve is untreated salt. Treated salt gives a better distribution on the road and removes the wind-blown problems associated with untreated salt. Ensuring a greater proportion of the salt spread settles on the road allows a reduction in spread rates of 25% without compromising the de-icing effect, making the treatment cost neutral and contributing to enhanced resilience. 'Safecote' also acts as an anti-corrosion product potentially reducing the corrosive impact of salt on plant and infrastructure."

Around 17,000-18,000 tonnes of salt was treated with Safecote last winter and now Lancashire CC is moving to treat its strategic stock piles with it as well. "We want to make sure the strategic piles are ready to go if they are needed at any time and by treating with Safecote it will also help with keeping the moisture content at a good level as well-making sure it can be effective as possible if needed," says Mr Danson.

Lancashire moved to route-based forecasting four winters ago in an attempt to optimise the process with the county's network being so varied in length. "We wanted to manage our routes more effectively. Previously, because of their lengths, some gritter drivers were taking four hours to treat a route and another would take two hours to do another. With route-based forecasting, we got the average time down to approximately three hours and reduced our precautionary routes from 49 to 45," says Mr Danson. "One of the things we are always conscious of is overtreating and the impact that might have, especially with residual salt but the Safecote treatment helps us have the confidence to know we are using the salt as effectively as possible," he adds. "Through investment in this sort of technology and our own research we have actually reduced our intervention level (it was decided by Cabinet that for the winter 2019/20 season a +0.5 intervention level for winter gritting on the network was to be implemented). Now we know the variations on a route it means in some cases we only treat parts of a route whereas before we would just do the whole thing. We want to try and make more use of thermal maps etc to look at things more climatically and really pinpoint where we need to focus our spreading on," he says. "This is where we can get really effective and think about trying selective salting in the future as well."

But what advice would he give to anyone else thinking of investing in Safecote? "We have always had the confidence that it is a cost neutral exercise for us-it has never cost us anymore because of the savings we have made with salt usage. My advice would be to make sure you have excellent salt storage facilities-that is really important anyway but even more so with Safecote treated salt. It helps if you have a good fleet of spreaders as well with good calibration to help maximise the benefits of using it," says Mr Danson. "I have always been happy with the way Safecote treated salt has reacted on the network over the many years of using it and recent evidence from the guidance and testing done shows it as a worthwhile investment."