Treacherous conditions meet a sticky end

Lincolnshire County Council is taking the plunge and adding Safecote to its brine. David Wilson explains why.

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The combination of salt and vinegar is one that we are all familiar with. In UK winter service circles, more recent times has also seen the introduction of the more unlikely partnership of salt and sugar, with salt being the rock variety and the sugar element being Safecote. Safecote is a co-product from the sugar production process, and is blended from natural, environmentally friendly ingredients, to a consistent specification.

To date the Safecote part of the cocktail has never been considered as a useful addition to salt brine; that is until Lincolnshire County Council decided to take their pre-wetted salt operations to the next level.

Lincolnshire County Council has a reputation for being innovators when it comes to winter service. In the Surveyor magazine of 8th July 1999, David Davies, Principal Maintenance Engineer, explained why Lincolnshire was set to adopt pre-wetted salting across the county network. This was due to the nature of it’s lightly trafficked, open rural roads. Lincolnshire was looking for a de-icing technique that offered greater probability of the salt remaining on the road surface for longer, as well as not being reliant on the traffic to activate the materials de-icing capability. Pre-wetted salt allowed Lincolnshire to realise these aims.

Davies is an experienced winter service practitioner and a founder member of the National Salt Spreading Research Group, (NSSRG). Not only is Davies a founder member, he is also the Chairman of the group and has a real passion for winter service.

As a county, Lincolnshire is a large shire authority that treats 3,047 of it’s 8,800 km of network, 35%. It is worthy of note that Lincolnshire has annually increased their salting network since 1991/2. The county only contains 92 km of Highways Agency trunk roads within it’s boundaries. It operates a total of 43 routes out of its strategically located depots in the county, of which there are 8 in total across 4 divisions. Many of the routes are close to 100 km in length, significantly higher than the UK average.

Depending on the forecast weather conditions, Lincolnshire will treat the network at a rate of spread equating to either 10 or 20gm. of total chloride; salt and brine combined. They feel that the switch to pre-wetted salt has been justified given the following facts. In the winter of 1993/4, Lincolnshire treated their network on 90 separate occasions using dry salt. In 2005/6, they had the same number of turnouts and their salt usage was comparable, at 27,000 tonnes. However, in 2005/6 they were treating an extra 700km each night.

Despite being happy with the use of pre-wetted salt since it’s adoption, Lincolnshire are determined to strive for continuous improvement in winter service. In 1999, when the decision was made to switch to pre-wetted salt, this was the only de-icing technology available to offer greater control of salt distribution. Since then, Safecote has emerged as an alternative to pre-wetted salt to improve the distribution profile achieved for spreading de-icing salts on to the road surface. Additional benefits are now being achieved by Safecote users, such as a significant reduction in corrosion to the salting vehicles and an increased life on the carriageway of the chloride particles. Indeed one large shire authority in England last year compared all three de-icing techniques; dry salting, pre-wetted and Safecote treated salt. The results of this trial identified that unlike the other two techniques, Safecote treated salt was still working on the carriageway the morning after it’s application; this followed 4mm of rain during the previous night.

In the UK, Safecote has until now only been used as a liquid treatment to rock salt. However, in the USA and Europe it is predominantly used as a liquid treatment to chloride brines for either pre-wet or direct liquid applications. This is because in these markets, investment has already been put in to brine saturators and storage tanks. As Safecote is a liquid product, it makes sense to mix with other liquids being used, as it compliments liquid chlorides just as well as it compliments solid chlorides.

A recent report issued by a Swedish operator who has been trialling Safecote in brine on the outskirts of Stockholm has indicated that the residual amount of chloride on the carriageway is much greater than brine alone. This has resulted in a reduced number of treatments being carried out as confidence grows about the longevity of the chloride when mixed with Safecote. It is felt that a 30% reduction in the number of applications has now been achieved.

Given the very positive feedback now being received from Safecote’s client base in
Europe when using Safecote as part of their liquid chloride mix, Lincolnshire has committed to introduce Safecote to the brine production unit at their Ancaster depot in the south west of the county for the forthcoming winter.

Ancaster depot has a total of 6 salting routes running out of the facility. The depot itself contains 4 large tanks, all involved in the pre-wet process. These are made up of 1 x salt saturator, 2 x brine storage tanks with a total capacity of 100,000 litres of brine and 1 x 20,000 litre tank storing the Safecote. In addition, the tanks are contained within a bunded area as required by the Environment Agency. The brine is produced to a strength of 23%, with the Safecote then being mixed at the rate of 10% by volume. This is a continuous process, with more blended brine produced each time a gritter is loaded with material. Davies describes the introduction of Safecote in to his brine as a 'coming together of two de-icing technologies.' He continues 'we have achieved all that we set out to when we adopted pre-wetted salt in 1999. However, the world has moved on and there are now other pressures on the winter maintenance service. The biggest pressure for Lincolnshire and its term maintenance contractor, Ringway Highway Services, are the driver's hours regulations. To this end, we are now looking for a way of cutting down on the number of double runs on an evening caused by marginal, wet nights. By introducing Safecote to the brine we hope to improve the longevity of the treatment and therefore achieve our aim of reducing the number of turnouts.'

With Safecote having been adopted by some 50 plus local authorities across the UK since 1992, Davies is well aware of the benefits that are now being achieved by users country-wide. 'I have spoken with a number of experienced Safecote users over recent months and they have all reported very favorable comments about the product.' Davies continues 'Of particular interest to me are the comments I received from users regarding the residual life of the product on the road surface. Not only do Safecote users appear to be spreading at reduced spread rates due to the increased distribution control the material offers, they also believe that Safecote enables the salt to remain on the carriageway for longer. It is also commented by users that the Safecote material appears more capable of surviving a heavy shower than chloride’s alone.'

Cheshire County Council, who treats a busy county road over the Pennine’s, has been using Safecote treated salt out of their Macclesfield Depot for two seasons. As well as reducing rates of spread by some 35% they now believe that they have reduced their number of turnouts by circa. 20% on this exposed part of the network due to the residual nature of Safecote. Davies believes that 'with the brine and Safecote lasting longer on the carriageway we can look to reduce the number of occasions we have to re-treat the network, and rely on the residual salt affect a lot more.' Another potential benefit from introducing Safecote in to the pre-wet operation is the corrosion inhibition properties of the material. The NSSRG has identified that brine is 27% more corrosive than salt alone and as a result will reduce the expected life of a gritting vehicle by that amount. By blending Safecote with brine, whether it is sodium, calcium or magnesium, test results carried out by Capcis in 2003 demonstrate that you achieve a reduction in the corrosive properties of chlorides by up to 82%. This work has since been replicated by both Salt Union and Volkswagen in Germany, with similar results being achieved. Indications from Safecote users suggest that this corrosion benefit is now being achieved in the ‘live’ winter environment as reduced annual maintenance costs are being inurred when salting vehicles are having their summer overhauls. Davies adds ‘if Safecote offers a corrosion inhibition benefit that potentially increases the life of our gritting fleet then that will be a bonus we are currently not accounting for.’

Mark Dutton, Managing Director of Safecote comments ‘we are delighted to be working with Lincolnshire County Council to further enhance their winter service offering to the people of Lincolnshire. Safecote treated salt is now adopted as common practice across large areas of England, and increasingly so in Wales, Scotland and Northern Ireland also. However, the work we have been doing in Europe over recent years is linked more towards assisting pre-wetted salt users achieve extra life from their chloride’s on the road surface.’ Dutton continues ‘it is the aim of both Safecote Limited and Lincolnshire County Council to achieve similar results from their Ancaster facility. Not only will this assist them with the difficulty they are facing with drivers hours legislation, it will also reduce the environmental and carbon footprint impact from winter service.’

The step that Lincolnshire County Council is taking this winter is a significant one. By introducing Safecote to their pre-wetted system at Ancaster Depot they are aiming to further enhance their winter service offering to the road users of the county. Should this prove successful, in the same way that it is in Europe, then each grain of salt spread on the network will be made to work for a longer period of time on the carriageway. This will result in reduced applications and a less corrosive de-icer being used. A result that will please the motorists, environmentalists and practitioners alike.