Alpha Commodities: the true cost of salt

The word salary stems from the Latin term 'salarium' which was used to describe part of a Roman centurion's wages. Although a Roman soldier had to pay for his food and weapons, this being deducted from his wages at source, soldiers were actually paid an addition to their basic wage, after all deductions, to ensure that they would have enough money to buy salt. Salt was recognised as being both valuable in itself and good for the health of the soldiers, helping them to fight and march under the hot Mediterranean sun. A soldier was therefore paid an additional sum so that he could afford to buy salt. This is the source of the old saying which describes someone as being 'worth his salt', meaning of course that he is good at what he does, and is worth what he is being paid.

David Setton

In this issue Face FACTS features a man who is truly worth his salt.
David Setton is the President of Alpha Commodities and, for the last 25 years, has been travelling the world sourcing and selling salt. From his headquarters in Switzerland, David manages a worldwide operation which ranges from India to Israel and from Cherbourg to Toronto. We talk to him about salt and keeping our UK roads safe in winter.

FACTS: Tell us a little about Alpha Commodities

David Setton: Alpha is an international salt broker. We provide virtually any kind of salt, in bag-full or ship-full quantities, all over the world. We deal in food grade salt and we deliver a lot of commercial grade salt into the Chlor-alkali industry. Chlor-alkali chemistry produces three highly useful chemical building blocks: chlorine, sodium hydroxide and hydrogen. These building blocks react with other compounds to produce thousands of vital products used around the world each and every day. From energy-efficient building materials and solar energy panels, to pharmaceuticals and crop protection products, to electronics and fibre-optics, these are just a few products that rely on these key chemicals for production. Hydrogen is of course becoming even more important as we move towards the large scale deployment of Hydrogen fuel-cell driven vehicles.
In the UK our primary business is the provision of salt for clearing the roads during the winter. We have strong relationships with very high volume suppliers world-wide, and we specialise, in the provision of pure white Solar Salt, which is a much cleaner product when compared with the rock salt that most people will be familiar with in the UK. Solar Salt can be, we would argue, more effective and more cost-efficient than rock salt, especially when we look at more modern technologies used for treating roads in winter such as brine-based road pre-treatment protocols.

FACTS: Without getting too scientific, can you explain the advantages of using solar salt over rock salt?

David Setton: Well, the traditional way of dealing with snow, or the threat of snow, is to grit the roads, before after and during, with rock salt; dug up, stock-piled and scattered willy-nilly on the highways and byways. But the question arises, is the traditional way the right way? From Alpha's perspective, there are three key areas to be considered. Cost, efficacy and environmental impact. Lets deal with these individually, and then consider options as a whole.
Cost: This is a very complex area. Currently it is usually calculated based on cost per lane mile, figured from the weight of salt needed per lane mile, which is itself dependent on such factors as ground and air temperature, the forecast temperature range and snow fall depth prediction. The colder it is the more salt is needed to adequately decrease the melting point of the ice and snow. In extreme conditions, normal rock-salt will be largely ineffective on non pre-treated roads, because it is simply not concentrated enough to create the temperature change required to melt the snow and ice.

The typical reaction to extreme conditions is, quite literally, to throw more rock salt at the problem. But this is not necessarily the answer.
It is certainly not the most effective solution, and probably not the most cost effective either. The answer to the cost conundrum with regard to road salt is to look at mixed solutions. Rock salt can be used, for relatively high temperature snow conditions, but perhaps another solution would be better for lower temperatures and deeper snow. In these conditions pure salt, such as the Solar Salt which we specialise in, may be more effective. Solar Salt may cost more per Kg but in fact it is typically cheaper in terms of cost per kg of active solute, as rock-salt is made up of around 40% inactive mass whereas Solar Salt is more than 99% pure. In the real world, in steady temperatures below around -2° C, the cost per lane/mile is likely to be lower using the higher grade salt.
Efficacy: The effectiveness of salt treatment on roads is well-proven, but not particularly well researched, especially in the highly variable climate of the UK. In countries where winter is consistently harder and colder than it is in the UK, in areas such as North America and Scandinavia for example, there is only very limited use of salt-based road clearance systems because it is too expensive and largely ineffective. It is only really in a narrow band in the cooler regions of the temperate zones that this technique is widely used. The most effective strategy overall seems to be to closely monitor weather patterns, and to pre-treat roads prior to a significant snow fall. The optimum treatment seems to be to spray the surface with liquid brine, immediately prior to on coming predicted snow-fall, the concentration of the sprayed solution being dependent on the then current road temperature (The lower the temperature the higher the required salinity.) This treatment means that any snowfall can be much more easily cleared by ploughing where necessary, or by additional surface treatments. By stopping the snow freezing at both the road and air interfaces, the rate of snow melt will be much higher and therefore the road clearance rate will also be higher. The only viable approach to saline pre-treatment is the use of pure salt as opposed to rock salt, because of the level of impurities in the rock-salt and the subsequent difficulties of application, and because regulating the levels of salinity and flow, (and therefore cost per lane/mile) is much more straightforward using pure salt.
Environmental impact: this is an area which has had relatively little discussion, but which should be considered very closely. It is estimated that the run-off from a road which has been heavily gritted (Typically around 200lbs of rock-salt per lane/mile) is roughly one third as saline as the sea, but is also full of all the other impurities commonly found in rock-salt, such as gypsum and calcite clays. Some of this will of course sluice away through the drainage system, but, especially in more rural areas, much of the run-off will find its way into verges, gardens and fields. The effect on plants is very noticeable when the thaw begins. The effect on fauna remains un-researched as far as I am aware.
With pure salt treatments, there are no significant trace elements, and although the salinity of the treatment is much higher because of the purity of the Solar Salt component, this means a much lower overall usage of salt by weight, and the much lower volumes of salt required means that snow-melt dilution rate is much higher and creates more highly dilute and therefore less harmful run-off. Also, because of the purity of Solar Salt, there are no other chemicals in the mix.
In conclusion, I would just like to point out that the continued use of rock-salt for snow-clearance makes sense, but only in certain conditions. A much more efficient, and cost-effective approach overall is to base winter road treatment regimes on a close analysis of both temperature and snow-fall predictions and then to select the right treatment at the right level of salinity, and at the optimum cost per lane/mile, using the correct option, whether that is standard rock-salt gritting or the more precise Solar Salt option.

FACTS: OK, thanks for that David, that's a lot of information. In conclusion then, what is the current situation in the UK and what points would you like to make about our winter road de-icing operations overall?

David Setton: Overall, unsurprisingly, local councils tend to stick with their traditional suppliers and traditional methods; but slowly many of them are beginning to see the benefits of pure salt treatments. This is of course especially true of those who have moved towards brine pre-treatment, where only pure salt is functionally practicable. Purely in terms of cost and effectiveness, I think that those responsible for keeping our roads open during the winter should take a step back and consider the options and look at what are the best and most cost effective ways of achieving just that. The most effective strategy will, I am sure, include both pure and rock salt components.
Alpha is in a position to advise on how Solar Salt might most effectively be deployed, and we have never yet failed to deliver the quantity desired on the target date. Pure salt can help to get the job done better, cleaner and faster, and probably more cost effectively as well.