



weathering the storm

dealing with adverse winter weather conditions in the UK



Local Government Association

foreword

The extremely cold weather experienced across the UK last winter, followed by the unusually heavy snow falls in early February resulted in severe disruption to our transport networks, exposed failings in the supply chain we rely on to keep our road networks open and had a negative impact on the country's ability to do business as usual.

Cold winters will become less predictable, and may become even less common in future as a result of climate change, but this makes it all the more important that we are prepared to deal with extraordinary conditions when they do happen. We need to take action now to ensure that the country is prepared and that our transport networks, local economies and essential services are not at risk of grinding to a halt when unusual weather does occur.

Councils have been reviewing their winter service plans in the light of last year's experience. This report results from that experience. It examines what happened, the extent of the impact on transport networks and implications for services and businesses. It also looks at how councils, central government, individuals and businesses responded, and makes recommendations for how we can be better prepared in the future.



A handwritten signature in black ink, appearing to read 'David Sparks'.

Cllr David Sparks

executive summary and recommendations

The freezing weather and significant snowfalls experienced across the UK in February 2009 caused transport networks in parts of the country to almost grind to a halt and caused difficulty for thousands of people trying to get to work, school or provide many of the services that we rely on daily. Meteorological studies show that this was a one-in-twenty year event and that the UK is likely to experience severe weather with less predictability and more severity in future. Nevertheless, it is important that we do all we can to ensure that the country is prepared and that our transport networks, local economies and essential services are not at risk of grinding to a halt when unusual weather does occur.

The cold weather in February 2009 resulted in severe disruption to public transport, particularly in London and the South East. Whilst most services were up and running again within a few hours or days, we need to make sure that higher priority is given to keeping public transport operational to ensure that people have an alternative to using their car in hazardous conditions and that essential journeys can take place safely.

Contrary to suggestions in the media at the time, there was no widespread shut down of the road network across the country, but shortage of salt to treat the roads meant that highways authorities were forced to prioritise main roads, leaving parts of the road networks untreated. Councils found themselves at risk of running out of salt as demand outstripped supply and salt suppliers could not fulfil contractual arrangements with councils. In

addition to supply issues, the environmental and economic costs of salt use and lack of a viable alternative mean that salt should be used and stored in the most efficient way. Councils are reviewing their salt storage and procurement policies to ensure that their local networks are not placed under similar threat in future.

There are actions that can be taken by councils, salt suppliers, public transport operators and service providers to ensure that they are better equipped to deal with periods of severe weather. Individuals and businesses also have a role in limiting the disruptive impact by knowing what to do and altering their behaviour (eg driving patterns, arrangements to work from home, looking after neighbours) in the event of severe weather.

The recommendations stemming from this report and local government's experience of last winter can be summarised as follows:

- In reviewing their policy and practice in planning for and managing winter services in the light of the recent severe weather events, councils should consider:
 - maximising efficient use of salt;
 - salt storage and procurement policies to ensure resilience of supply;
 - supply chain management (communications with suppliers, etc);
 - partnership working with other authorities (including the highways agency);
 - mutual aid arrangements;

- engaging with public transport providers and emergency services to ensure that they have complementary plans in place and agreed channels for communication in the event of extreme weather;
- communication with the public¹.

All possible action should be taken to avoid a situation where a central prioritisation process is necessary in future. However, if as a measure of last resort, such intervention is required in future, government should ensure more transparency and clarity about such arrangements including:

- membership and how all parties will be equally represented;
- how the national situation will be monitored and the circumstances in which the salt cell will be convened;
- clarity over roles and responsibilities of different members of the group and how they are accountable;
- improved two-way communications between the centre and highways authorities.

Efforts should be made to raise awareness of how individuals and businesses can prepare for and cope with unusual weather events. This will include clear communications from councils, government, transport providers and the media in advance of the winter period. Businesses' continuity planning processes should include policies on extreme weather events, so that employees know how to respond and disruption to business is limited.

¹ These recommendations, based on feedback from councils and stakeholders, are consistent with many of the recommendations of the UKRLG *Lessons from Severe Weather* report.

1. introduction

At the beginning of February 2009, Britain was hit by a sustained period of very cold weather and a large amount of snow. There was widespread disruption to transport services, schools closed and thousands of people were unable to get to work, threatening essential services and economic productivity. The disruption led to questions as to why the country was not better prepared to cope with weather which, while it does not occur every year, is not unprecedented. Why were we unable to keep roads open and public transport running? Why did we fail to cope when other countries can keep networks open in much harsher weather conditions?

This report is based on feedback from councils' experience. It examines what happened, why, and makes recommendations as to how we can be better prepared in the future.

how unusual was the 2009 winter?

The British do like to moan about the weather, but the UK generally enjoys a temperate climate. Because periods of extreme heat and drought in summer, or extreme cold in winter are relatively rare in this country, it is harder to plan and prepare for them in the UK than in countries where very hot summers, or very cold winters are the norm.

Depending on the scale of global greenhouse-gas emissions, by the 2080s the average annual temperatures across the UK will have risen by between 2°C and 3.5°C. Extremely hot days will be more common, while cold winters will become increasingly rare. However, as the floods of 2007 and most recently, the extreme

winter weather of February 2009 demonstrate, unusually harsh weather conditions can and do happen. Climate change means that we are likely to experience adverse weather conditions with less predictability and more severity in the future. We need to make sure that we are better prepared for such events to ensure that transport networks are more resilient to extreme weather.

It is not acceptable that in the event of weather like that of February 2009, our cities should be at risk of grinding to a halt. Advice to the public in such circumstances is that they should avoid driving wherever possible, and it is logical therefore that priority should be given to public transport to ensure that people have an alternative to using their car. Problems we often experience on our rail network (even without such extreme weather), such as points freezing, ice forming on overhead wires, snow drifts on the lines can and should be dealt with by installing automatic point heaters, de-icing and anti-icing spray, snow fences and snow ploughs that can be fitted onto individual trains. Likewise, priority should be given to ensuring that access routes to bus stations are clear and that main bus routes are prioritised for treatment. Public transport operators should have contingency plans in place to operate and communicate revised services where necessary so that the travelling public do not find themselves stranded without information on their journey.

2. what happened in winter 2009?

The extreme weather experienced in the first week of February came on the back of a prolonged spell of unusually cold weather in January and a colder than normal winter which saw frosts and snowfall in many areas of the country from October 2008.

On the morning of 2 February, much of the country awoke to the biggest snowfall recorded since 1991, with many areas recording depth of over 16cm.

Amongst the largest snowfalls recorded at unofficial stations were 31cm at Epsom (Surrey), 26cm at Old Woking (Surrey), 13cm at Blackheath (SE London) and 9cm at Wokingham (Berks). In Wallington (Surrey), level depths of 24-27cm were measured in various locations. Later in the week depths of more than 16cm were also recorded in North Yorkshire, Northumberland, Wales and Scotland.

Source: Met Office: <http://www.metoffice.gov.uk/climate/uk/interesting/feb2009/>

Stations reporting 16cm snow or more 09.00 2 February 2009

Snow depth (cm)	Station	County
29	Mickleham	Surrey
23	Alice Holt Lodge	Hampshire
21	Guernsey Airport	Channel Islands
20	Cupar, Elmwood Agricultural College	Fife
19	Malham Tarn	North Yorkshire
17	Copley	Durham
17	High Beach	Hertfordshire
16	Andrewsfield	Essex
16	Hampstead	Greater London

Shouldn't we invest in the type of equipment they have in countries that regularly experience heavy snow and ice?

Because the UK experiences such severe weather so infrequently, we do not have the same levels of heavy clearing equipment such as snow ploughs, higher numbers of gritters etc that places such as Canada, USA or Russia do. Investment in and maintenance of such equipment would be at significant cost to the taxpayer and is arguably a poor use of public money due to the infrequency of the occasions when they would be required. It would be equivalent to asking all motorists to carry snow chains in anticipation of the same such event. In addition, it was the speed and amount of snowfall, the extreme cold and the shortage of salt rather than lack of equipment that councils identify as the primary cause of the problems experienced in February 2009.

impact on public transport

On 2 February and the days that followed, further snowfalls resulted in significant disruption to transport networks with knock-on effects on other services. Disruption to public transport occurred across much of the country, but the impact was most serious in London and the South East.

London

Over 30 bus-related accidents were reported in London on 1 February and all bus services were withdrawn early on 2 February. Transport for London reported that this was because 'it was judged unsafe either to get buses out of the garages or, where they could, to get them to access their routes'² Bus services in London were particularly heavily affected because roads had become impassable. Winter service teams conducted advance gritting, but the grit and salt was covered quickly and compacted during continuous heavy snowfall. Both the Transport Select Committee and London Assembly Committee accepted "the fact of the salting/ gritting regime being simply overwhelmed by the speed and weight of the snow and the fact that London was universally covered".³ The London Underground network was also affected on the morning of 2 February, with revised services running on 80 per cent of the network, delays to trains and partial closure of some lines.

2 Peter Hendy, Commissioner for TfL quoted in *Slipping up?: Impact of the extreme weather on London transport*, London Assembly Transport Committee pp 7

3 House of Commons Transport Select Committee report pp 4

Bus services⁴

Snow and ice caused delays and cancellations to bus services in many areas of the country as a result of bad road conditions. First group reported severe disruption to services from Monday 2 February through to Saturday 7 February, across the whole of its Bath, Bristol and the West operating area. In some parts of Somerset and Avon disruptions continued until Wednesday 11 February. In the South West a number of drivers had to be rescued from their vehicles after being stranded. In West Yorkshire, Metro reported that services were restricted at times to main roads, unable to serve minor routes and estates as salting treatment concentrated on primary route networks. In Northamptonshire, Stagecoach recalled all its vehicles to its depot, while Arriva suspended all its services in Hertfordshire.

Rail services

Rail services from the south into London were seriously disrupted. Southeastern Trains ran no services on 2 February and Southern ran a greatly reduced service. The snowstorm blanketed the northern Home Counties and the Midlands too, with Chiltern Railways suspending all services between Marylebone and Amersham, and almost all trains on the West Coast Main Line being cancelled or heavily delayed. Other routes to the north of London were more frequent, though commuters experienced severe delays and disruption. The situation did gradually improve during the day, and on 3 and 4 February most operators ran reduced services, and most stations reopened.

4 Information on disruption to bus services was collated from transport operator and local authority websites.

co-operation between public transport operators and local authorities

In many areas of the country, councils already consult with transport operators on emergency winter service plans, primary route networks and responding to situations as they arise. For example, Peterborough City Council's passenger transport team worked closely with bus operators to constantly review routes and return services to a normal level. However, both the House of Commons Transport Select Committee and the London General Assembly reports recognised that there is room for improvement. The Transport Select Committee recommended that "as part of their winter maintenance and emergency planning, all local authorities should discuss with bus and train operators in their area what action is necessary to help minimise disruption to public transport services in the event of snowfall and include such action in their plans."

The need for closer working with public transport operators on winter service plans should be viewed in the wider context of how public transport is delivered in the UK. Councils report that it is symptomatic of a lack of integrated planning and delivery of transport systems. Government has recognised that stronger partnership between local authorities and bus operators is essential to securing better bus services. The Local Transport Act 2008 aimed to give councils more powers to influence the services that bus companies provide in return for the substantial sums of money they receive in public subsidy.⁵

5 In 2007/08 total public subsidy to the bus industry was £2.5bn.

Councils' ability to implement these reforms in practice will lead to better engagement and joint planning with operators which would assist in more integrated planning and working during periods of disruption.

impact on roads

Though some disruption to public transport services continued for some days, most rail, underground and London bus services were resumed and operating near normal service within 24 hours. However, as further snow fell and freezing conditions persisted, hazardous driving conditions continued. Police reported a dramatic increase in the number of road traffic accidents. The AA said it received 5,000 more calls than it would on a normal day, whilst the RAC reported 2,000 calls in one hour.

Responsibility for winter maintenance and keeping roads clear of snow and ice rests with two types of highways authorities. The Highways Agency has responsibility for the main trunk road network (motorways and major A-roads) and local highways authorities for local roads, which make up more than 95 per cent of the road network. During the first week of February, highways authorities' winter maintenance teams worked day and night to clear snow and carry out treatment with salt and grit. With salt stocks depleted and salt suppliers failing to meet the exceptionally high demand for restocking, road networks across the country were seriously threatened. Contrary to suggestions in the press at the time, there was no widespread shut down of the road network across the country, but shortage of salt to treat the roads meant that highways

authorities were forced to prioritise main roads leaving parts of the road networks untreated.

Materials used in winter road maintenance

The most common material used to treat road surfaces prior to freezing conditions is **rock salt**. Rock salt is mined from underground mines and unrefined, is a brown colour, it is often therefore mistakenly referred to as grit.

Salt works by lowering the temperature at which water freezes. It relies on the action of vehicle tyres to be spread over the road, so requires traffic to be effective. It will work at temperatures down to minus 8-10 degrees C. Rain or snow will wash the salt away leaving road prone to re-icing. So, salting ideally needs to take place after rain but before freezing

Stone grit is only usually only used on hard-packed snow and ice. In conditions where snow has already settled, grit can be mixed with salt up to a ratio of 50/50 to provide traction and help break up frozen surfaces.

Pre-wetted salt can come in a number of different forms and works at similar temperatures to rock salt. The advantages to pre-wetted salt are that it can be spread more evenly and more quickly, cutting salt usage by up to 25 per cent, and it gets to work faster as it doesn't have to dissolve first. However, the equipment needed to spread the material is more expensive.

Pad white salt – a waste product of table salt can also be used as a de-icer, but it is more expensive and needs to be used in combination with rock salt and grit.

Some highways authorities also combine the **agricultural by-product**, molasses with rock salt. This material is more expensive, but improves adhesion so that more of the salt mixture ends up on the road surface rather than spraying onto verges

Other **materials that help provide traction**, such as sand can be effective in breaking up ice and providing traction, but most highways authorities do not consider them as suitable for use on roads because of reliability and longer-term maintenance issues and impacts on the drainage network. However, sand, gravel, even cat litter can be used by individuals in keeping driveways and pavements clear.

Other materials including potash or potassium chloride can also be effective as a de-icer, but is much more expensive, less widely available than salt and there are technical issues in spreading techniques that need to be overcome.

impact on the economy and services

Businesses also felt the effect of the bad weather. Disruption to travel and school closures meant that many people could not get to work during the first week in February. It was estimated that in London on 2 February, one in five people were unable to get to work. The London Chamber of Commerce and Industry reported that 90 per cent of businesses operated below full capacity.

The Federation of Small Businesses estimated the cost to the economy of this lost productivity on 2 February was £1.2bn.⁶

The weather also presented a severe threat to services. Social services, hospitals and the emergency services were faced with increased demand operating with fewer staff than normal. Hospitals cancelled non-essential appointments. Fire crews in East Sussex and West Sussex reported approximately 160 weather-related calls on the evening of 2 February. Thousands of schools and libraries closed due to staff shortages. Refuse collection and parking enforcement were suspended in many areas. Councils prioritised core social work and faced increased demand for services such as meals on wheels for people who could not reach day centres.

In the event, no area ran out of salt, the road network was kept open and essential services were maintained. However, it is clear that had the cold weather continued, this may not have been the case. There is a need to review the resilience of the salt supply chain to ensure the country is not placed under similar threat in future.

⁶ Press release, Federation of Small Businesses 2nd February <http://www.fsb.org.uk/default.aspx?id=30&loc=pressroom>

3. why did the shortage of salt arise?

Councils' policies on salt procurement and storage are based on the amount of salt required for an average winter, availability of storage capacity and procurement arrangements with salt suppliers. In recent years, as result of milder winters and in consideration of the cost to the tax payer of maintaining large salt stocks, many authorities have reduced the amount of salt held in situ and relied on contractual arrangements with salt suppliers to restock as necessary throughout the season. The severe weather experienced across the UK in early February followed a prolonged spell of cold weather in late 2008 and January 2009. This resulted in usually high salt usage and demand to replenish salt stocks outstripped the amount that could be supplied by UK salt suppliers. When the extreme weather hit, it quickly became apparent that the salt suppliers would be unable to deliver sufficient salt for re-stocking, leaving many highways authorities facing a real possibility that they would run out of salt to keep local road networks functioning.

To understand why the contractual arrangements between salt suppliers and councils failed to ensure adequate supply for extreme weather, it is helpful to understand the nature of the salt industry in the UK and the level of resilience in the supply chain.

Detailed production and sales figures for salt producers and suppliers are not in the public domain, but the UKRLG review identified total UK production in a normal year to be in the region of 2,000 kilotonnes.⁷ Prices are in the

order of £30-£40 per tonne in normal market conditions. During the crisis, prices for as high as £150-£200 per tonne were reported for alternative supplies. There are three salt mines in the UK, operated by Salt Union, in Cheshire, Cleveland Potash in Teeside; and Irish Salt Sales in Northern Ireland. The UK has substantial reserves and is a net exporter of rock salt. In addition to the salt suppliers, there are a number of salt merchants active in the UK who import salt from overseas and market UK produced salt. However, in practice, most highways authorities have supply contracts with a single supplier and Salt Union and Cleveland Potash between them supply 85-90 per cent of the UK market.⁸ Effectively, the country is almost completely reliant on two main suppliers operating deliveries on a 'just in time' basis. The issue is not overall availability of salt, but suppliers' ability to increase mining and delivery capacity at times of increased demand in order to meet their call off arrangements with highways authorities to re-stock.

Many authorities were unaware of the prospect of supply shortage until the orders they placed were not delivered. Advance warning of the problems experienced in meeting demand would have enabled authorities to identify alternative sources of supply. Improved procurement and communication arrangements between highways authorities and salt suppliers are necessary to avoid similar occurrence in future.

⁷ *Lessons from the severe weather February 2009*, UKRLG July 2009 pp 8

⁸ Salt Union claim to supply 50 per cent of the UK Salt Market and Cleveland Potash 35-40 per cent. *Lessons from the severe weather February 2009*, UKRLG July 2009.

implications for councils' policies on salt supply and storage

Clearly the current call off-based, price-driven market cannot provide sufficient resilience for severe weather events.

Councils will be reviewing their salt storage and procurement policies in the light of this years' severe weather events.

should councils hold more salt in reserve?

In reviewing their winter service plan arrangements, a number of councils have told us that they are assessing whether they should increase the amount of salt they hold in stock, individually or on partnership with others. Weighing up the costs and benefits of increased salt stocks and whether there are more cost-efficient solutions is particularly important in the current constrained financial environment. Increasing stocks in summer would reduce the risk of running out and reduce the price per tonne of salt by decreasing the need to re-stock in winter, when prices are higher. However, in many cases, increasing salt stocks would require capital investment, result in an increase in rateable value of depot assets and therefore taxation costs, and a higher facility maintenance cost in the longer term.

Therefore, councils need to consider strategic salt reserves alongside other options for improving their winter service plans and practice, including:

- a) ensuring access to adequate levels of salt supplies (either through holding larger stockpiles of salt or through contingency arrangements for alternative supplies should normal arrangements fail) to keep local networks open in the event of severe weather;
- b) revising procurement approaches between salt suppliers and highways authorities to manage risk better, improve communication mechanisms and agree performance standards;
- c) acquiring knowledge of alternative suppliers and putting in place contingency contracts so that if supply becomes an issue, councils can act quickly in terms of securing additional supplies from alternative suppliers within the UK or from overseas;
- d) identifying trigger points which would give advance warning of shortages to allow alternative supplies to be secured in time in the event of disruption to normal supplies;
- e) working in partnership with other councils to develop collaborative/joint salt procurement contracts.

A number of councils are considering co-ordination at regional or sub-regional level to secure efficiencies in managing salt and stocks and smooth distribution and supply problems in the event of future periods of severe weather. Possible roles for such partnership arrangements could include:

- a) co-ordinating relationships and contracts with suppliers;
- b) holding regional or sub-regional pools of surplus salt in the lead up to winter and agree a process for distributing stocks over and above individual requirements of local authorities;
- c) agreeing a local prioritisation process to facilitate supplies and mutual aid arrangements that can be initiated when demand out-strips supply within a region or sub-region;
- d) agreeing how negotiations with other regions would operate if a national shortage of salt occurred in the future;
- e) making contingency arrangements on a regional or sub-regional basis in anticipation of future supply issues.

4. other reviews and reports on learning from the severe weather

Following the extreme weather in February, a number of reviews have been carried out to identify lessons to be learnt in preparing for the future. The London Assembly produced their report *Slipping up* in March. The House of Commons Transport Committee published *The effects of adverse weather conditions on transport* in May 2009. And in July, the UK Roads Liaison Group, as requested by the Secretary of State for Transport published its report *Lessons from the severe weather February 2009*.⁹ The UKRLG report focused purely on the issues caused by the shortage of salt. Its recommendations contain useful advice on how highways authorities can improve preparation for winter service through closer collaboration, and by reviewing their approach to procurement, preparation and operation of winter service and communications with the public, many of which are echoed by councils' own review processes.

The report also recommends a winter service resilience standard of six days. This implies a stipulation of minimum salt stocks across the country. Whilst this may be something that councils choose to do, it is a matter for local decision-making and the national standard, in itself, will not help councils to be better prepared. **The problems that councils experienced were multi-dimensional, and effective solutions will need to go beyond stipulating minimum salt stocks. Better preparedness will come from improvements to policy and practice in planning for and managing winter services, including issues around use of salt, supply chain management and mutual aid** which the remainder of the recommendations address.

⁹ The recommendations resulting from the UKRLG report are set out in Annex A to this report.

5. central contingency arrangements in response to the salt shortage

On 5 February, the government identified the need to intervene in arrangements between salt suppliers and highways authorities and implemented a system to advise suppliers on how to prioritise delivery of salt to their highways agency customers. The aim was to ensure that all highways authorities would receive enough salt to keep their networks functioning. The “salt cell” as it became known, involved the Cabinet Office, Department for Transport, Department for Communities and Local Government, the Highways Agency and the Local Government Association (LGA). It provided advice to the two main salt suppliers, Salt Union and Cleveland Potash on prioritisation to their existing customers.

The Salt Cell was entirely advisory in its capacity and no emergency powers were enacted by government. Salt suppliers were under no obligation to act on the advice received, supply contracts and highways authorities statutory duties remained in force. The effective functioning of the Salt Cell relied therefore on the co-operation and goodwill of all parties involved.

Highways authorities were asked to report information about their salt supplies on a daily basis. Information required included amount of salt in stock, anticipated salting capacity for both heavy and normal levels of salt treatment, supplies received and their ability to help other authorities through mutual aid. This information was collated on a daily basis by the Government Office Regional Resilience Teams (RRTs) and submitted to the Salt Cell. The Highways Agency provided technical expertise and used this information along with weather forecasts to produce a draft priority list for salt deliveries to local highways authorities and the Agency's service providers. This draft list was then reviewed and agreed by members of the Salt Cell on a daily basis and, once agreed, passed to the two main salt suppliers. The suppliers were responsible for communicating with highways authorities about deliveries. Highways authorities concerned about the Salt Cell process were asked to get in touch with the RRTs. In practice, many of these concerns were also reported to the LGA who raised them at meetings of the Salt Cell.

In addition to providing advice on prioritisation of deliveries, the Salt Cell produced and updated a list of frequently asked questions to inform all stakeholders about the prioritisation process, and inform them of other available supplies of salt.

The role of the LGA

The LGA played a key role in establishing two-way communication that made sure councils' perspectives were fed into the Salt Cell process, that elected members and officers were kept abreast of developments, and that allowed good practice to be shared and advice to be circulated. At the beginning of the salt shortage LGA chairman, Margaret Eaton, wrote to all council leaders to raise awareness of the process in place to provide advice to salt suppliers on prioritisation of deliveries, and to seek their co-operation. Senior LGA representatives appeared in national news coverage to deliver key messages to councils and the public. The LGA's *First* magazine, read by councillors across the country, ran a feature on the severe weather to raise awareness.

Throughout the period, the LGA participated in the Salt Cell arrangements and fed in intelligence and views from councils' perspectives. It also issued daily bulletins to councils, targeted via email to networks of highways managers and emergency planners and placed on the LGA website. In conjunction with CSS, the LGA issued advice to local authorities on conserving salt stocks and on accessing alternative salt supplies. The LGA sent top line briefings to council media teams to help inform local press coverage.

how effective was the Salt Cell?

Prior to early February 2009, there were no plans in place to deal with a national shortage in salt, to collate information, or to co-ordinate supplies and distribution of available stocks. Despite this, the Salt Cell was operational within 24 hours. The arrangements proved effective in ensuring distribution of existing salt supplies where they were most needed, however as demand continued to outstrip supply it was clear that these arrangements would not have been sufficient in themselves to keep stock from running out in the longer term. In the event, crisis was averted as a result of improvements in the weather. If the cold conditions had continued, it is very possible that the system would not have been able to cope. Nevertheless, for the time it was operational the Salt Cell was effective in ensuring that no highways authority ran out of salt and communities were not cut off due to failure to keep road networks open.

Highways authorities agree that though a central prioritisation process was necessary on this occasion, all possible action should be taken to ensure that such intervention is not necessary should similar circumstances occur in the future. Actions identified as a result of councils reviewing their own practices and plans (as outlined above) will help to achieve this.

However, if, as a measure of last resort, central intervention is required in future, a number of issues arising from feedback from local authorities need to be considered.

- Many councils remained confused about the objectives, processes and powers of the Salt Cell.
- There was a perceived lack of transparency of the process, with some suspicion and accusation that certain authorities or service providers were being treated more favourably than others.
- Some confusion resulted from changes to the information requested by the Salt Cell as this developed over the period of operation, for example assessments of anticipated salting capacity changed from heavy to light gritting.
- Communication via the RRTs could have been more effective, some authorities complained that they did not receive information on a timely basis and that comments fed back were not met with a response or action from the centre.
- Information issued by the Salt Cell indicated that it was looking into alternative supplies of salt from overseas, but there was a long delay before details of these supply offers were made available to councils.
- The process was reactive and operating on very short-term timescales. Whilst this is understandable given the circumstances, it offered little or no certainty to authorities as to when supply might take place. Without a longer-term view about what quantities would arrive and when, it proved difficult to plan an appropriate service response.

This suggests a number of areas for improvement to ensure transparency and clarity about the arrangements should they be required as a last resort in future. This should include a clear description of the objectives, functions and powers of the group; an understanding of how the national situation will be monitored and how the decision to convene the Salt Cell will be triggered; a clear understanding of the roles and responsibilities of different members of the group; and improved two-way communications between the Salt Cell and highways authorities.

6. how councils responded to the salt shortage

Despite widespread salt shortage and uncertainties about quantities and timing of new supply, highways authorities coped well in difficult circumstances, taking necessary action to keep local road networks open.

mutual aid

Many authorities with severe shortages engaged in mutual aid to access salt supplies from other authorities and the highways agency with stocks to spare. Many of these arrangements were facilitated locally between neighbouring authorities. For example, Leeds offered assistance to other authorities in west and south Yorkshire. However, because large areas of the country were affected at the same time, in many cases it was not possible to access mutual aid from neighbouring authorities. The Salt Cell and the LGA helped identify surplus stocks and facilitate mutual aid between different parts of the country and there was some co-ordination by the RRTs. For example during the shortage, authorities in the north east released some of their stocks to aid councils in the West Midlands. **Better planning and advance mutual aid agreement between highways authorities would assist in making the process happen more smoothly and quickly in the future. Better co-ordination through the RRTs would also help.** It is worth noting that revised guidance for mutual aid had been put in place in late 2008 and this was the first time such arrangements were tested country-wide and for a significant length of time. It can therefore be expected that they will be up and running more quickly should similar events occur in future.

ensuring efficient use of existing salt stock

Many areas implemented policies to ensure that their salt stocks were used in the most efficient and effective way including:

- limiting salt spreading treatment to published priority networks (A and B roads);
- using grit only on minor roads to break up compacted snow and ice and improve traction;
- reducing spreading rates and varying ratio of salt to grit for general precautionary salting;
- spot salting rather than full spreading where possible;
- using technology such as salt sensors to check salinity levels and where there is adequate residual salt on the road not providing further treatment.

Many councils had plans in place in advance to define the priority network for treatment in emergency circumstances and communicated them via websites and leaflets. In instances where these plans were not in place in advance, feedback from councils suggests they were drawn up quickly once shortage of salt became apparent.

Extract from Vale of Glamorgan snow plan

In the event of severe snow, the council, as part of its emergency procedures, has a pre-determined snow plan. During such conditions all normal highway maintenance activities will cease and the priority given to keeping the roads clear and mobilising all available resources. An emergency room is established and liaison with all emergency services, the media and service providers takes place. The priority for snow clearance is as follows:

How are 'strategic routes' classified?

- Major roads.
- Important industrial commercial routes.
- Providing an access in and out of villages and towns.
- Routes serving hospitals, fire services, ambulance station and schools.
- Bus routes and milk collection points.
- Footways in shopping areas.
- Other roads giving access to other built-up areas.
- Roads serving isolated farms and houses.
- Salt bins are strategically provided across the Vale.
- They are available for immediate use by road users when required. If you observe that any such bins have been damaged or need re-filling, please contact us.

http://www.valeofglamorgan.gov.uk/living/traffic__highway_maintenance/highway_maintenance/winter_maintenance.aspx?theme=default

alternative supplies of salt

A number of authorities identified technical solutions to compensate for the lack of available rock salt.

Worcestershire – exploring technical solutions

When expected deliveries of salt fell behind schedule and existing stocks became depleted, Worcestershire obtained a quantity of pure soft salt (pad salt) and undertook trials with different materials and proportions to find a formulation that could be used effectively using existing gritters. A mixture of rock salt, pad salt and grit provided the means to considerably extend very low stocks of rock salt. In addition, the council mixed locally-sourced ash to refill grit bins without the use of rock salt.

Other authorities were successful in identifying alternative supplies of salt from overseas suppliers. A number of authorities secured additional deliveries from Germany and Morocco, however the lead-in times for further supplies meant that imports could not offer an immediate solution for most areas. Longer delivery times and cost premiums attached to last minute orders from overseas mean they are not a solution to be relied upon in times when UK supplies fail to keep up with demand. Information about stocks available overseas were disseminated through the Salt Cell, though some authorities remarked that it would have been useful to have this information at an earlier stage.

communication

An essential part of councils' response to the crisis was effective communication with the public. Councils used websites, council information teams and the media to provide updates on transport services and road conditions, advice to avoid non-essential journeys and to take precautions where journeys were essential. The weather conditions, disruption to public transport and the salt shortage were covered extensively by the national and local media. Councils utilised this media interest to disseminate information on how local networks were affected and to raise public awareness of difficult travelling conditions.

7. cost of extensive salt use

Extensive salt use can have severe environmental impacts as salt is washed off the roads by precipitation, and accumulates in soil and water courses. Most ecosystems cannot absorb this excess salt, and as levels of concentration increase during the winter season, it can cause damage to the vegetation and wildlife that depend on them. Britain's hills and high ground supply most of our drinking water. These areas are subject to the most severe weather, and therefore the heaviest salt treatment during winter. Since many of these roads are close to river courses, salting these roads poses a significant threat to the quality of our water supply.

The true extent to which roadside soils, vegetation and associated freshwater in the UK have been impacted by salting is still poorly understood. Further understanding of the impacts and techniques to mitigate them is needed to help remediation efforts. The environmental dangers of road-salt run-off have been the subject of much discussion in countries like the US and Canada that experience severe winter conditions every year¹⁰. Canada conducted a five year scientific study into the environmental impacts of salt and subsequently published a code of practice to help road authorities better manage their use of road salts in a way that reduces the harm they cause to the environment while maintaining road safety.

In addition to environmental costs, salt use also causes damage to roads, pavements and bridges by penetrating concrete and causing cracks and pot holes. The impact of the intensive period of salt use on highways maintenance budgets is not yet clear as the damage can take time to show, but anecdotally, councils report an increase in the costs of repairs as a result of last year's cold winter.

Salt also has costs for motorists. It damages vehicles, brake linings, frames, and bumpers, and can cause cosmetic corrosion. In the USA, the car industry spends \$4 billion per year to address corrosion caused by salt.¹¹

Countries that rely heavily on salt to deal with regularly severe winters have also been concerned with the health risks related to road salt. Past studies have linked increased salt concentrations in drinking water with highway operations and raised concerns about the health effect, particularly on people with high blood pressure¹².

10 For further information see: *Environmental Impacts of Road Salt and Alternatives in the New York City Watershed* <http://www.newyorkwater.org/downloadedArticles/ENVIRONMENTANIMPACT.cfm>
Environmental Impacts of Road Salts; Environment Canada <http://www.ec.gc.ca/nopp/roadsalt/en/index.cfm>

11 *Highway de-icing: comparing salt and calcium magnesium acetate* by National Research Council Committee on the Comparative Costs of Rock Salt and Calcium Magnesium Acetate for Highway Deicing, 1991

12 Ibid, Chapter 5.

alternatives to salt

Given the problems caused by salt use on the roads, considerable research has been conducted into more benign alternatives, such as Calcium Magnesium Acetate (CMA) or Potassium Acetate (KA). These products are proven to have a less damaging impact than rock salt and can work at lower temperatures. However, most studies have concluded that they could not be used as a wholesale alternative to salt, primarily because they are 20 to 30 times more expensive¹³. An acceptable alternative de-icer must have an effective melting range similar to that of salt, and must be cost-comparable or less expensive. Efforts to find a less expensive production technology for chemical alternatives have had limited success.

The lack of a viable alternative de-icer has meant that those countries with severe winter weather have focused on reducing salt usage through improved storage and spreading techniques, pre-wetting¹⁴, better timing and the use of other substances to aid in de-icing and provide traction, such as sand.

Much of this has already informed practice in the UK, though more could be done to disseminate examples of good practice, for example through the review of *Well Maintained Highways – the code of practice for Highways Management*, as recommended by the UKRLG Lessons learnt report.

Making sure salt is used and stored in the most efficient way possible will help preserve salt stocks in times of shortage, and help avoid the environmental, economic and health costs that have been experienced elsewhere.

13 Minimising effects from highway deicing United States Environmental Protection Agency 1999 <http://epa.gov/OWM/mtb/ice.pdf>

14 Wetting provides moisture to make brine. Faster melting action may be expected. In addition, the wet salt has less tendency to bounce or be blown off the road by traffic. Savings in lost or wasted salt of over 20 per cent to 30 per cent are possible.

8. behaviour change

As identified by this report, there are actions that can be taken to ensure that councils, salt suppliers, public transport operators and service providers are better equipped to deal with periods of severe weather and limit disruption to transport and services. However, there is also a role to be played by businesses and the general public in limiting the disruptive impact that severe weather can have.

Unusual weather events, like that in February, can result in a sense of panic, which can be reinforced by media coverage of dramatic events and a lack of reliable information about travel and services. Ensuring that people do not over-react, remain calm, take necessary precautions and know where to go to get information has an important part to play in minimising disruption to normal running of business and services.

Even before the events of winter 2008/09, severe weather was at fifth place on the Cabinet Office's National Risk Register's most feared risks¹⁵. The register aims to increase awareness of the kinds of risks the UK faces, and encourage individuals and organisations to think about their own preparedness. Yet, it was evident earlier this year that many individuals and businesses were inadequately prepared to respond to the unusual weather. This led to increased numbers of road traffic incidents and increased demands on emergency services. Individuals also have a role to play in looking after vulnerable and elderly members of their

community and can assist by checking they are warm, clearing paths and going shopping for them.

Councils have an important role in communicating with the general public to inform them of the actions that councils will take during periods of severe winter weather, including which parts of the road network will be treated and how services may be affected so that people can make plans in advance. Many councils, the Met Office and other local agencies also use their websites and local publications to raise awareness and give advice to the public on dealing with bad weather, including:

- avoiding journeys where possible;
- taking precautions when driving, including vehicle checks, driving techniques, emergency equipment;
- checking on vulnerable and elderly neighbours and assisting by clearing paths, running errands, etc;
- protecting homes from burst pipes.

¹⁵ http://www.cabinetoffice.gov.uk/reports/national_risk_register.aspx

Hampshire - advice on safe winter driving

Hampshire County Council issue information on their website on which parts of the road network they treat in severe winter weather and issue advice on how to drive safely in winter conditions if journeys are essential.

- Snow and ice can make driving treacherous, so try to manoeuvre gently and avoid any harsh braking or acceleration.
- Drive in the highest gear possible to avoid wheel spin, and allow extra space between your vehicle and the vehicle in front.
- It can take ten times longer to stop in icy conditions than in dry, fine weather, so drive slowly.
- If you do have to brake on snow or ice then get into a lower gear, earlier than normal, allow your speed to fall and use the brake pedal gently.
- If you start to skid then ease off the accelerator, but do not brake suddenly.
- Take a few minutes to prepare your vehicle before you set off on your journey. Make sure you clear all windscreens and windows and drive carefully.
- Always tell someone where you are going, and make sure that you keep essential items in your car in case of a breakdown such as a blanket, some warm clothing, a hot drink and a torch.
- Winter sun is also extremely bright and dazzling, so always keep a pair of sunglasses in the car and on long journeys ensure that you take regular breaks as tiredness can kill.

- You should also ensure that your lights, mirrors and windows are all kept clean and free from snow and ice.
- Keep your battery charged, add anti-freeze to the radiator during winter months and make sure your windscreen wipers are in good working order.
- Finally, ensure that your tyres are kept to the correct pressure and check them regularly.

When the area was hit by severe snow and ice at the beginning of February, Hampshire County Council worked quickly with the media and police to raise awareness and highlight safe driving advice to motorists. They reported a noticeable change in driver behaviour as a result. No incidents were reported to the police during the two days of severe snow and ice – remarkable given the circumstances.

<http://www3.hants.gov.uk/roads/highway-factsheets/winter-salting.htm>

businesses being more prepared

Among the first piece of advice issued by public bodies in the event of severe weather is not to travel unless it's absolutely necessary. Keeping traffic off the roads at these times is a significant factor in keeping the numbers of road accidents down and easing congestion for emergency and essential services. But following this advice will inevitably have an impact on people's ability to get to work, with significant impacts on productivity as discussed earlier in this report.

Many employers do have business continuity arrangements in place to prepare for unpredicted events. This should include a policy for severe weather so that employees know what to expect and can make their own contingency arrangements if their normal travel plans are disrupted.

For many businesses where employment is not location-dependent, having in place arrangements so that people can work from home is an important way in which disruption to businesses – and their bottom line – could be minimised as well as reducing the number of journeys attempted in treacherous weather conditions.

During the severe weather in February, those businesses that were equipped with appropriate mobile business technology to enable their employees to continue working and day-to-day operations to continue suffered less than those less well equipped.

BTA Limited – remote working

Early on the morning of the 2 February, with heavy snow coverage in London, the transport infrastructure ground to a halt which prevented all but one of our staff reaching the office. Everyone else was effectively ‘snowed in’ at home having discovered that their transport options that morning – be it car, bus, train or tube – had ceased to be available. For their own safety all staff were immediately instructed to “stay put” and work from home for the day (and the one person who made it in was told to go straight home again, carefully!).

BTA already makes use of a number of technologies to allow remote working so that to our clients it doesn't matter whether we're physically in the office or are working elsewhere. A number of key staff have telephone extensions at home via VoIP (voice over IP) and we maintain a number of different methods for allowing remote staff access to the office network and systems and thus to allow the help desk and engineering staff to continue to work and assist clients as normal via our usual remote support tools.

Full remote access to our network allowed those working at home complete access to all our internal systems including our remote support tools to allow us to diagnose and assist in fixing customer issues just as normal. Support calls were co-ordinated between the help desk and engineers as normal using mobile phones, email and instant messaging..... These solutions helped us continue working throughout the day as normal.

Scott Bartlett <http://www.frontios.com/index.php/2009/02/26/let-it-snow/>

What was bad news for the transport network was good news for companies that supply broadband services, mobile email and communications technology. *Computer Weekly* recorded a 30 per cent increase in mobile data usage throughout the day on 2 February as thousands of people turned to their mobile phones and dongles to keep on working.¹⁶ Over the course of the working week to 5 February, the extra use of mobile data continued at 20 per cent above average. As a result of heavy usage, a number of websites and remote technology platforms became very slow, with some (notably transport information sites) ceasing to function. There is a need to ensure that adequate capacity can be provided by technology service providers to deal with sudden increases in demands in future.

¹⁶ Every snow cloud has a mobile business silver lining, *Computer Weekly* 9th February 2009

9. summary and conclusions

The key conclusions of this report are that:

- as a result of climate change, the UK is likely to experience severe weather with less predictability and more severity in future;
- significant investment in heavy clearing equipment such as snow ploughs would be a poor use of public money due to the infrequency of the occasions when they would be required;
- the current situation in which the UK is almost completely reliant on two main suppliers operating deliveries on a just-in-time basis is not sufficiently resilient in times of high demand;
- in addition to supply issues, the environmental and economic costs of salt use and lack of a viable alternative mean that salt should be used and stored in the most efficient way;
- there are actions that can be taken by councils, salt suppliers, public transport operators and service providers to ensure that they are better equipped to deal with periods of severe weather;
- individuals and businesses also have a role in limiting the disruptive impact by knowing what to do and altering their behaviour (eg driving patterns, arrangements to work from home) in the event of severe weather.

The recommendations stemming from this report and local government's experience of last winter can be summarised as follows:

1. In reviewing their policy and practice in planning for and managing winter services in the light of the recent severe weather events, councils should consider:
 - maximising efficient use of salt,
 - salt storage and procurement policies to ensure resilience of supply;
 - supply chain management (communications with suppliers, etc);
 - partnership working with other authorities (including the highways agency);
 - mutual aid arrangements;
 - engaging with public transport providers and emergency services to ensure they have complementary plans in place and agreed channels for communication in the event of extreme weather;
 - communication with the public¹⁷.

¹⁷ These recommendations, based on feedback from councils and stakeholders are consistent with many of the recommendations of the UKRLG *Lessons from Severe Weather* report.

2. All possible action should be taken to avoid a situation where a central prioritisation process is necessary in future. However, if as a measure of last resort, such intervention is required in future, government should ensure more transparency and clarity about such arrangements including:

- membership and how all parties will be equally represented;
- how the national situation will be monitored and the circumstances in which the Salt Cell will be convened;
- clarity over roles and responsibilities of different members of the group and how they are accountable;
- improved two-way communications between the centre and highways authorities.

3. Efforts should be made to raise awareness of how individuals and businesses can prepare for and cope with unusual weather events. This will include clear communications from councils, government, transport providers and the media in advance of the winter period. Businesses' continuity planning processes should include policies on extreme weather events, so that employees know how to respond and disruption to business is limited.



Local Government Association

The Local Government Association is the national voice for more than 400 local authorities in England and Wales. The LGA group comprises the LGA and five partner organisations which work together to support, promote and improve local government.



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