NWSRG
NATIONAL WINTER SERVICE RESEARCH GROUP

nwsrg.org

Brine on time

Paddy Hastie and Stephen Nicholl, Peacock Salt

JC PEACOCK & CO. 1874 2024
150 YEARS

Section 5

Treatment methods and technologies

5.4.6 Brine concentration Pre-wetted treatment in the UK typically utilises sodium chloride brine, but alternative de- icers can be used on their own or added to salt to improve performance, particularly in extreme cold (see Section 10). The spread rates identified for pre-wetted treatments (see Section 8) are based on a 70:30 ratio by weight of dry salt to sodium chloride brine (sometimes denoted as FS 30) and a minimum brine concentration of 20%. If these ratios are varied for any reason, it is important that spread rates are adjusted and spreaders calibrated accordingly.

5.4.6 Capital investment and maintenance costs for pre-wetted treatment can be higher than dry treatment as a result of the need for more sophisticated spreading equipment, brine production and/or storage and increased maintenance requirements. However, pre-wetted treatment may provide service delivery economies through the use of lower spread rates in certain conditions (see Section 8).

Agenda

UK de-icer review

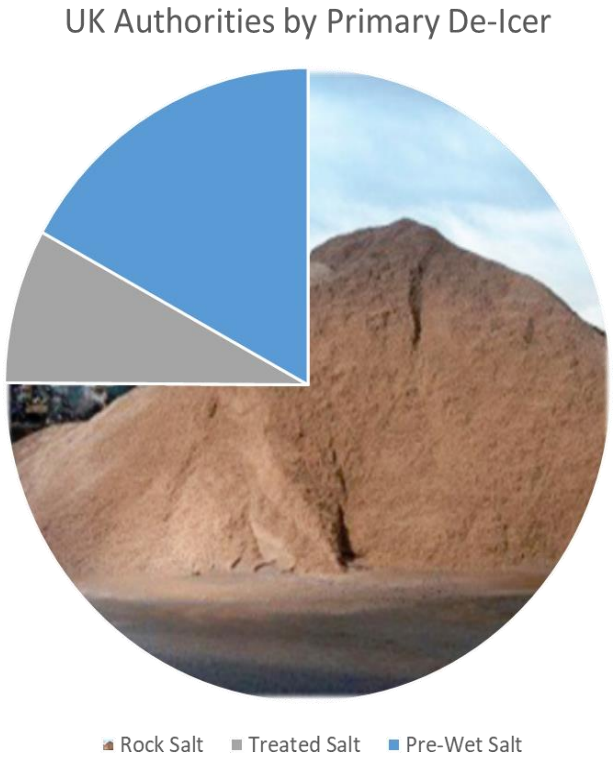
Concentration

Cost v benefit

Case studies

Considerations

What’s the spread?



UK ROADS LEADERSHIP GROUP

Emergency Preparedness, Response, & Recovery

3-yr Retrospective on DfT Highway Sector Learning from Extreme Weather Events review (2021): including analysis of UKRLG Hazards Survey (2024)

Dr Hugh Deeming
Commissioned by the UK ROADS LEADERSHIP GROUP (UKRLG)

3.1.9 Winter Service

Whilst winter service is covered in some detail by the annual DfT *Winter Survey*. The *Hazards Survey* also asked a series of questions in respect to salt stocks and winter decision-making.

Whilst the *Winter* Survey asks solely about salt stocks, and whether the council complies with the Quarmby 12-day reserve, the *Hazards* Survey explored whether knowledge of an authority's use of salt is sufficient to understand its winter service capability. From this perspective, Figure 15 illustrates how the sector is evolving from focus on covered or uncovered salt piles to a situation where a number of innovative alternatives are being experimented with: 41% of respondents stated they were also using other types of de-icer and liquid products.

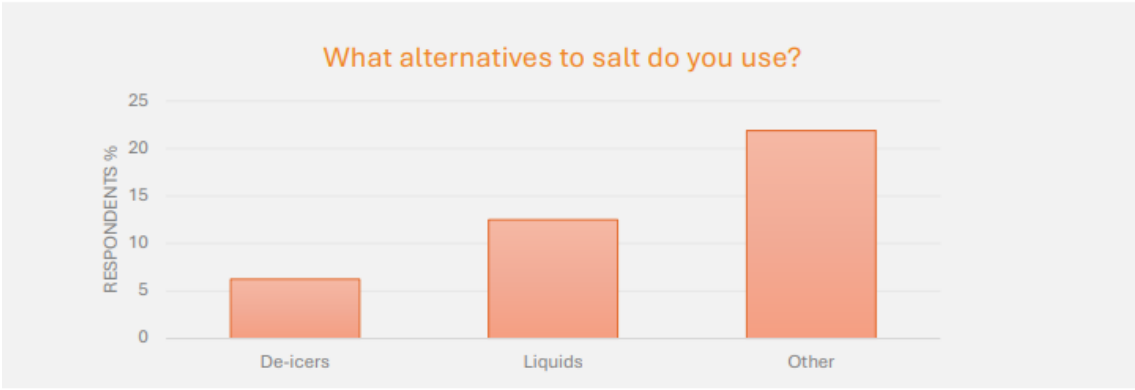
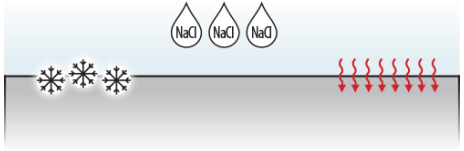


Figure 15

Concentration

Salt must enter liquid form to de-ice

De-icing

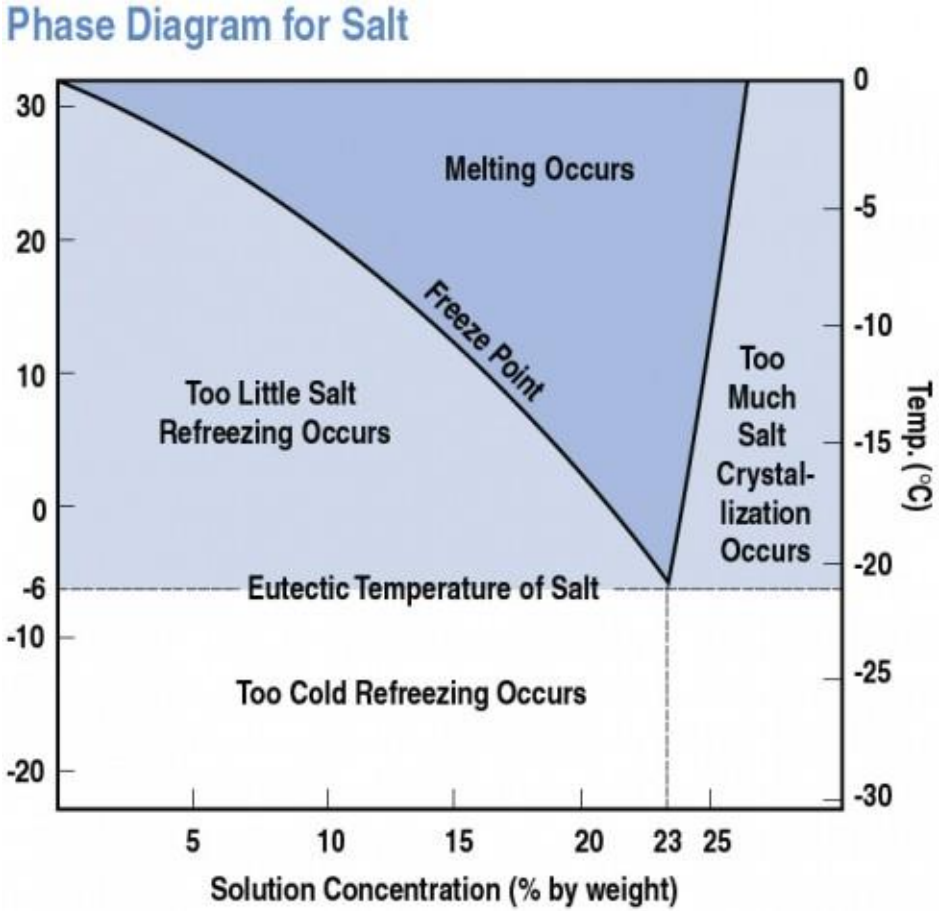


Anti-Icing

Liquid de-icers can include:

Low-corrosives

Environmentally more friendly (lower COD)

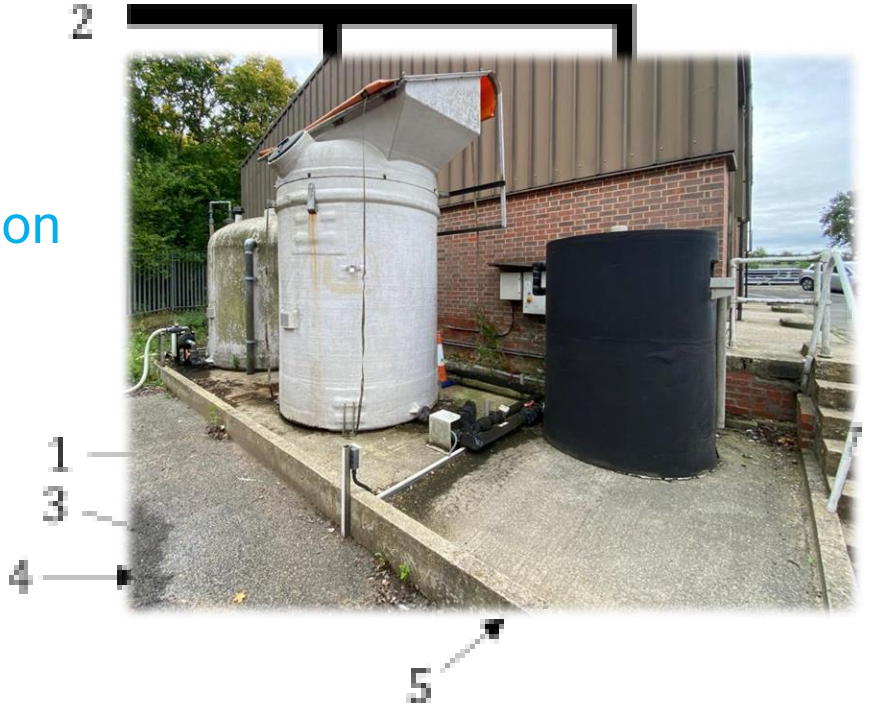


- Winter Applications
  - Pre-Wet Salt
    - FS 30 70:30 salt:brine
    - FS 50
  - Direct Liquid Application
    - Cycleways
    - Footpaths
    - Pedestrian Areas

The up and down journey to 23%

Downflow Saturators

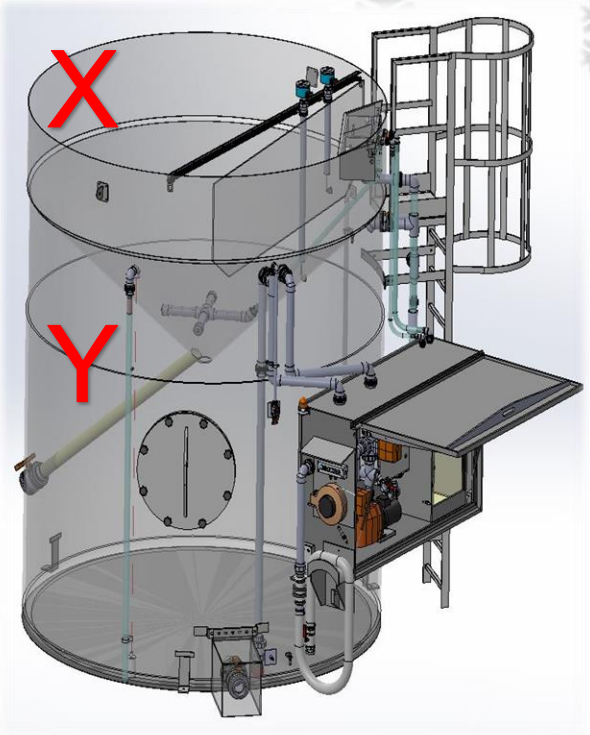
- Water sprayed onto salt and gravity pulls fluid DOWN through gravel bed
- Transferred to second chamber, dilution rate dependant on volumes
- Batch process
- Manual checks
- Gravel recharge



The up and down journey to 23%

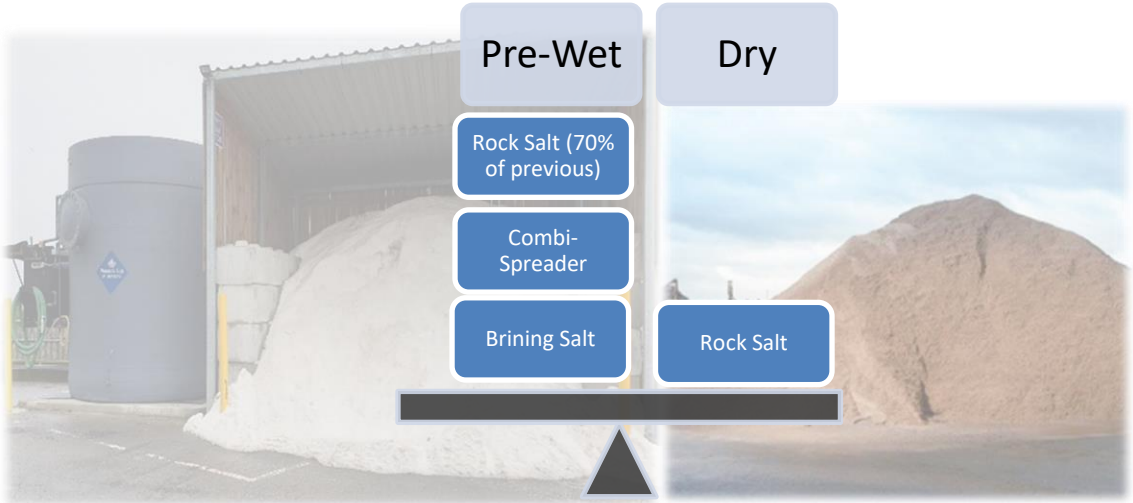
Upflow Saturators

- Salt added to water, passed UP through salt in hopper (X)
- Brine stored in chamber (Y) where it's reagitated, ready for spreader delivery
- Jumo regulates brine concentration and automatically adds more or less water to reach 23%
- Continuous brine production



Cost v benefit

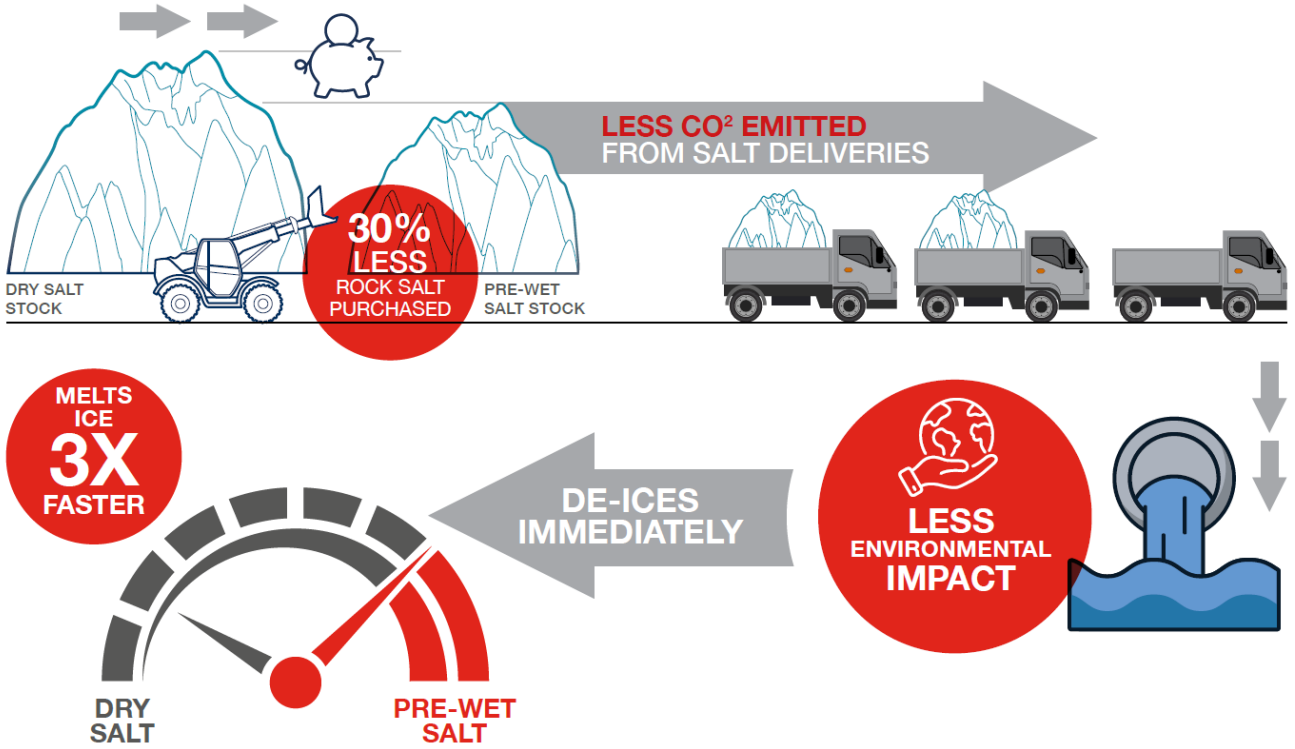
Cost benefit analysis to determine ROI



Cost v benefit

Courtesy of BEAR Scotland

Cost v benefit



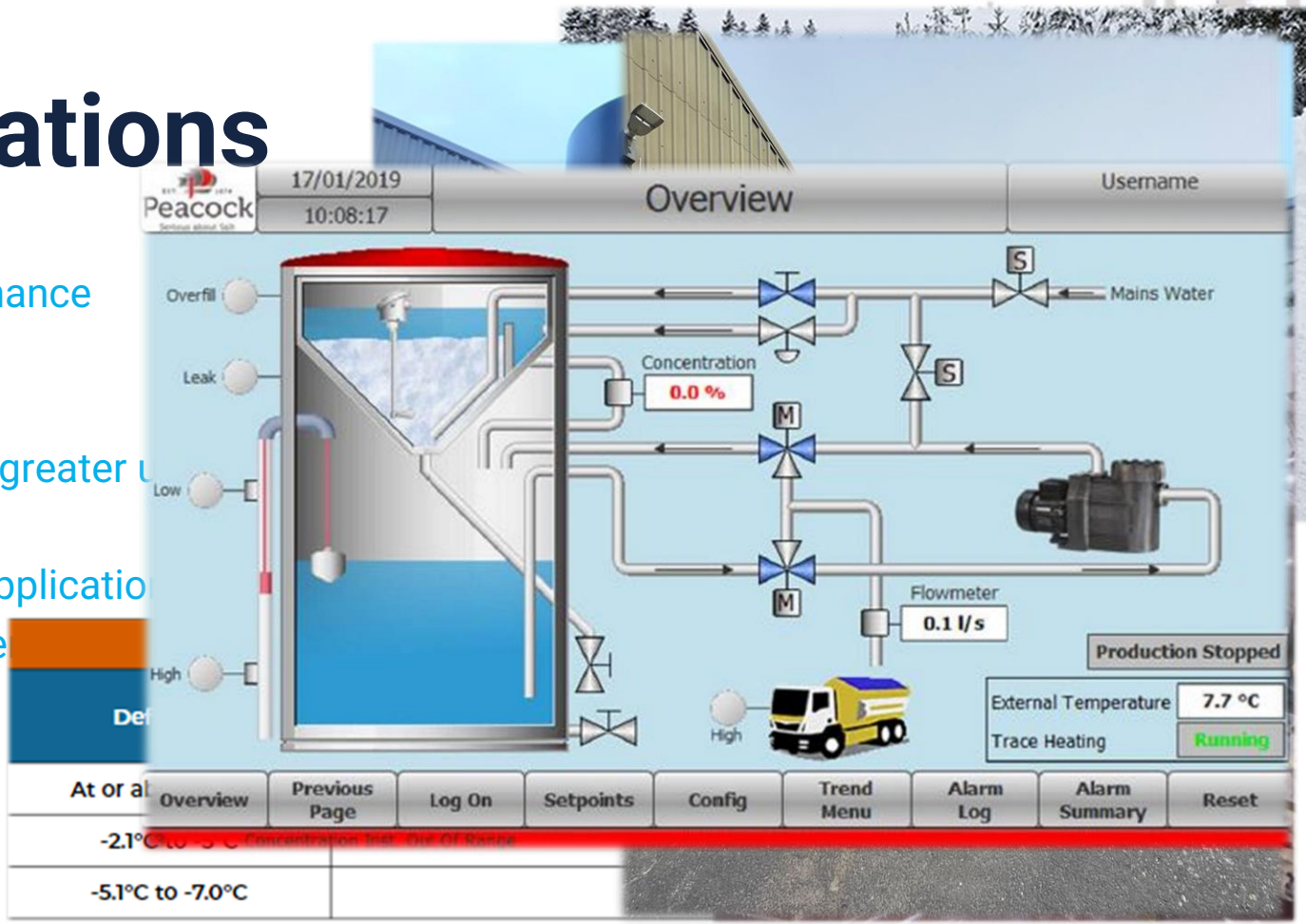
Case Study: STRUSE

- South East Trunk Roads Network
- 5 depots, 500km roads including 2 major bridges
- 40km of Active Travel routes:
    1. Brine in ice events
    2. Plough / salt in snow events
- Peacock solution:
    1. Brine saturators meeting a Transport Scotland-set spec
    2. Brining salt at each depot
    3. Liquid de-icers for extreme snow events
    4. Hilltip sprayers and spreaders, mounted onto footpath tractors
    5. HTrack tracking package on each machine to report treatments

Date-time	2018-02-07 09:19:16
Vehicle	VU65 VTK
Operating mode	Spraying brine
Liquid	Custom liquid 1
Amount	30 ml/m^2
Spray width	3 m
Vehicle speed	17 km/h

Considerations

- User training
- Service and maintenance
  - Downflow
  - Upflow
- Long term trend for greater u
  - FS50
  - Direct Liquid Applicatio
- Supplementary wate
  - Rainwater
  - Greywater
- Blended brines
- Alternative salts



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Thank you

Any questions?

Dedicated to advancing understanding of best practice for winter service delivery