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Environmental Friendly Technologies for Slippery Control in Norway

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Content

- Mixture of hot water and sand
- Prewetting NaCl with hot water
- Prewetting NaCl with MgCl



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Mixture of hot water and sand- The method

- The method is based on adding hot water to the sand and covering the sand particles with a film of water
- When the sand that has been sprinkled with water leaves the spreader and lands on the roadway, the film of water has a short melting effect and then the mixture of sand and water freezes to the surface
- The result on the roadway is a kind of sandpaper texture



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Mixture of hot water and sand- The method

- 30 weight percent water
- 20-25 km/h spreading speed
- Water temperature. 90-95° C
- Spinner
- The normal dosage of sand used is equivalent to 200 grams/m² as an average
- Requirements for gradation of the sand

[Link to video](#)



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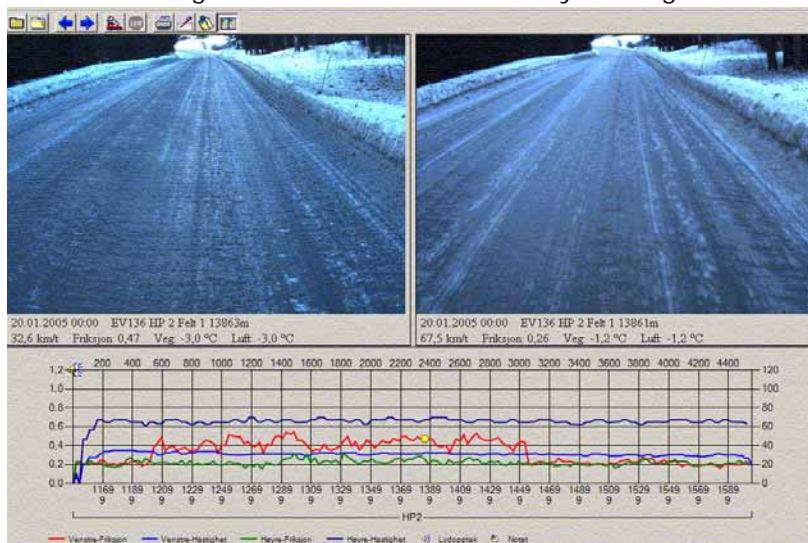
Development of the method

- 1998/99: Swedish prototype tested
- 2000/2001: New concept with a spinner
- 2000-2005: Convince the contractors that there is a good economy using the method. Focus on the spreader equipment



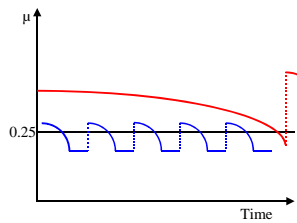
Effect 1

- Much higher friction level than ordinary sanding.



Effect 2

- Long lasting effect



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Environmental aspects

- Possible to reduce the sand consumption with 40-50 per cent



- Less nature encroachment
- Reduction of the annoyance caused by dust
- Less accumulation of sand in ditches and drainage systems
- Reduction in car window and coating damages



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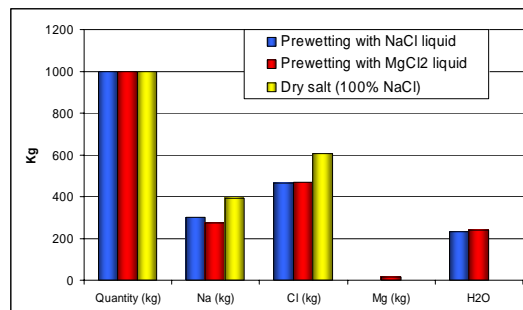
Prewetting NaCl with Use of Magnesium Chloride - Background

- Interesting observation during the winter season 2000/2001 with use of solid MgCl_2
 - Longer lasting effect
 - Lower salt consumption
 - Not documented in a scientific way
 - Too expensive to use alone
- Limitations of NaCl
 - Temperature limit
 - Environmental damages



NaCl prewetted with MgCl_2

- Solid NaCl prewetted with a 20 % MgCl_2 solution with a weight proportion of 30 % liquid and 70 % solid material
- Only a marginal difference in quantity of chloride between the method of prewetting with NaCl solution and MgCl_2 solution
- Only with a real reduction in quantity of salt will the choice of liquid have a environmental impact



Experimental Scheme

- Test area:
 - 42 km of national roads in inner city of Oslo
 - One road section treated with NaCl prewetted with $MgCl_2$ solution
 - One road section treated with NaCl prewetted with NaCl solution, used as a reference
 - Both roads are four lane roads

Test section: Rv 161
(marked with green)

Reference section: Rv 168
(marked with red)



Data Recording

Following data has been recorded

- Operational data from the truck
- Friction measurement
- RWIS data
- Traffic volume

Conclusions

- The difference in number of actions and total amount of salt per area indicates that prewetting with MgCl_2 -solution can lead to reduced salt consumption.
- Too early to draw final conclusions.



Prewetting NaCl with hot water-assumptions

- Hot water speeds up the chemical process
- The same spreaders used for the mixture of hot water can be used.



Experimental Scheme

- Two spreaders: One with salt prewetted with hot water and one with ordinary method prewetting with brine.



Data Recording

- Friction measurements
- Measuring of the residual salt
- Climate



Results-Environmental aspects

- The results indicates that it is possible to reduce the salt consumption with the new method and have the same friction development.
- Same amount of residual salt with the new method as with the traditional salting method. This indicates that the new method is suitable not only for de-icing but also anti-icing actions.
- More about all of these project in Torino next year.

