

# SOBO20 measurements on Motorway A-2 Madrid.

17.-18. march 2009



Jens Kristian Fønnesbech  
M.Eng.Sc

 **AIBAN**  
VINTER SERVICE  
Langgyden 3  
DK 5580 Nr. Aaby, Denmark  
[jkf@aiban.dk](mailto:jkf@aiban.dk)  
[www.aiban.dk](http://www.aiban.dk)

## **1. Introduction**

The measurement on A-2 was carried out to show how long a salt treatment will last on a dry road with heavy traffic. The plan was to measure residual salt 2, 5, 15 and 24 hours after spreading salt on sections with three different concentration.

The equipment used for measurements were three SOBO20 units, fabricated by Boschung mecatronic (enclosure 2, Salt Quantity Meter SOBO20). This is the internationally used method for similar tests and has been used in various countries. The equipment is modified and calibrated in Denmark.

## **2. Planning SOBO20 measurements March 17<sup>th</sup>-18<sup>th</sup>.**

It was planned to spread salt on both lanes ( 2 x 3,5 m) of the Motorway.

The salt spreading truck driving in the heavy lane and spreading salt asymmetrical 7 m, just about 10:00 a.m.

There were 3 test sections, each with a length of 500 meters and the SOBO20 measurement was planned 100 m before end of each section. Measurements was done with 3 SOBO20, every ½ m across the 2 lanes. See figure 1.

Section 1: Double brine treatment and one treatment with pre wetted salt. Theoretically 55 g/m<sup>2</sup>

Section 2: One brine treatment and one treatment with pre wetted salt. Theoretically 35 g/m<sup>2</sup>

Section 3: One brine treatment. Theoretically 20 g/m<sup>2</sup>

Weather was dry, with temperature on night 5°C and on day 20°C.



Figure 1. Antonio, Johannes and Alfonso use the SOBO20, Christina controlling

### **3. Measurement results.**

All results from the measurements are presented in "DATOS\_CAMPO\_17-18\_MARZO.xls" (enclosure 1)

The measurements 14-15 hours after spreading, show generally less residual salt, than the other measurements. This is most likely due to the change in operating personnel handling the SOBO20 equipment. If a little amount of water run out from the SOBO20 during the measurements, the result shows less salt. The last measurements (after 25 hours) were realized by the original personnel and these results are found more reliable for that reason.

Theoretically it should also be mentioned that the measurements 14-15 hours after spreading is done in night with low temperature. The SOBO20 do compensation for temperature, but we do not have dokumentation for the quality of this compensation. The calibration of SOBO20 is done in laboratory with room temperature similar to the other measurements.

#### **All measurements show high level of residual salt!**

The last measurements, 25 hours after spreading salt, show:

inner lane (fast lane):	19g/m <sup>2</sup> (1), 12g/m <sup>2</sup> (2) and 9g/m <sup>2</sup> (3)
outer lane (heavy lane):	31g/m <sup>2</sup> (1), 17g/m <sup>2</sup> (2) and 16g/m <sup>2</sup> (3)

In the former County of Funen in Denmark ([1] Use of brine . . .), the recommendation for pure salt, when using brine ([2] Anti icing, <http://www.dot.nd.gov/divisions/maintenance/docs/anti-icingfacts.pdf>) before a snowstorm on motorway was:

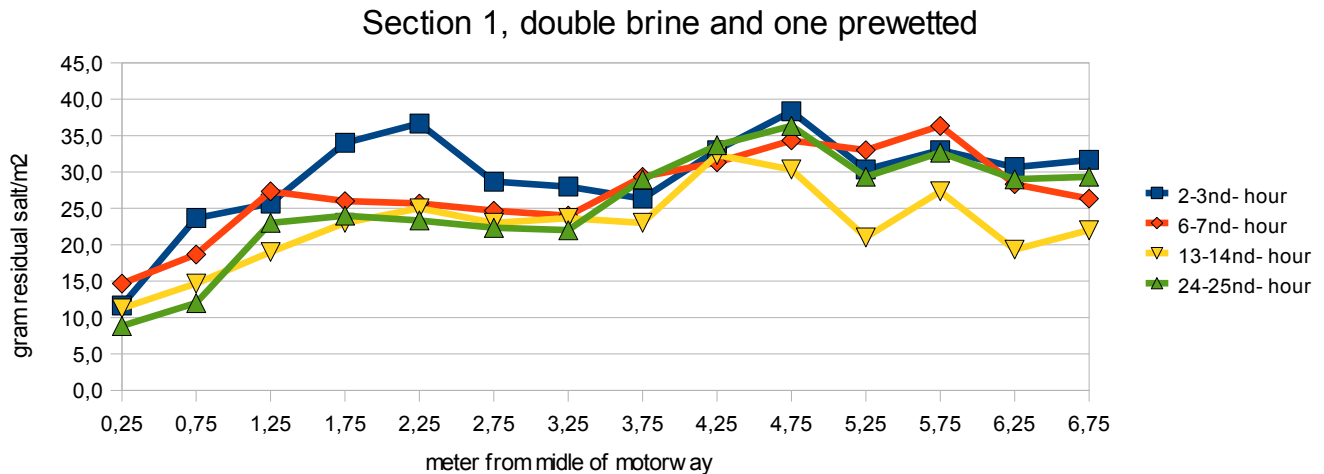
inner lane (fast lane):	40 ml/m <sup>2</sup> = 11 g NaCl/m <sup>2</sup>
outer lane (heavy lane):	25 ml/m <sup>2</sup> = 7 g NaCl/m <sup>2</sup>

These recommendations where based on the fact that the trucks in the heavy lane helped the melting process.

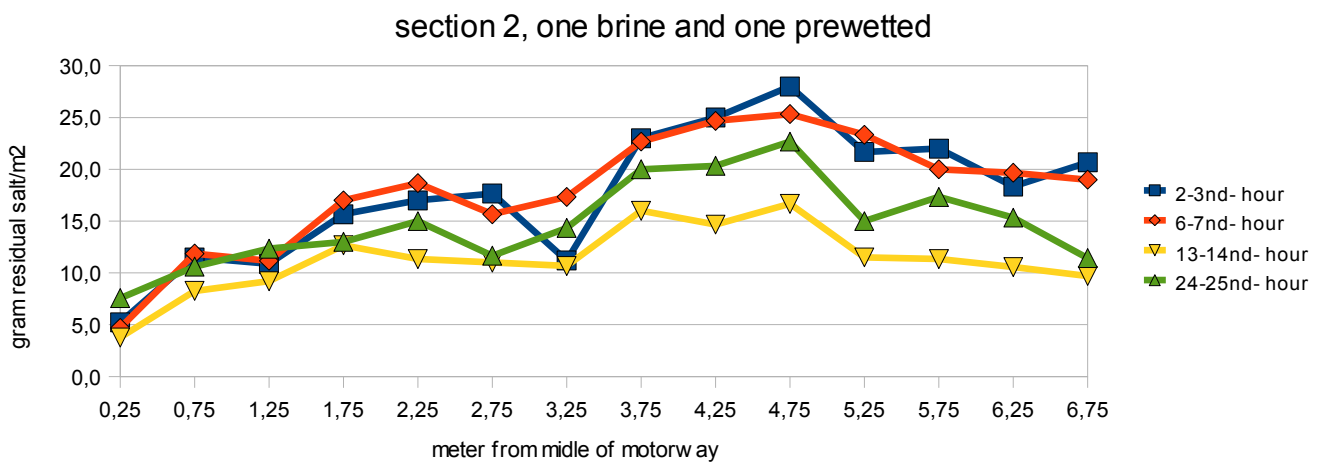
*The measurements of residual salt on A-2 all show the opposite situation, more residual salt in the heavy lane and less residual salt in the rapid lane.*

It is seen that the results after 25 hours are generally much above the limits recommended in Funen (Denmark) although the distribution between inner and outer lanes is different.

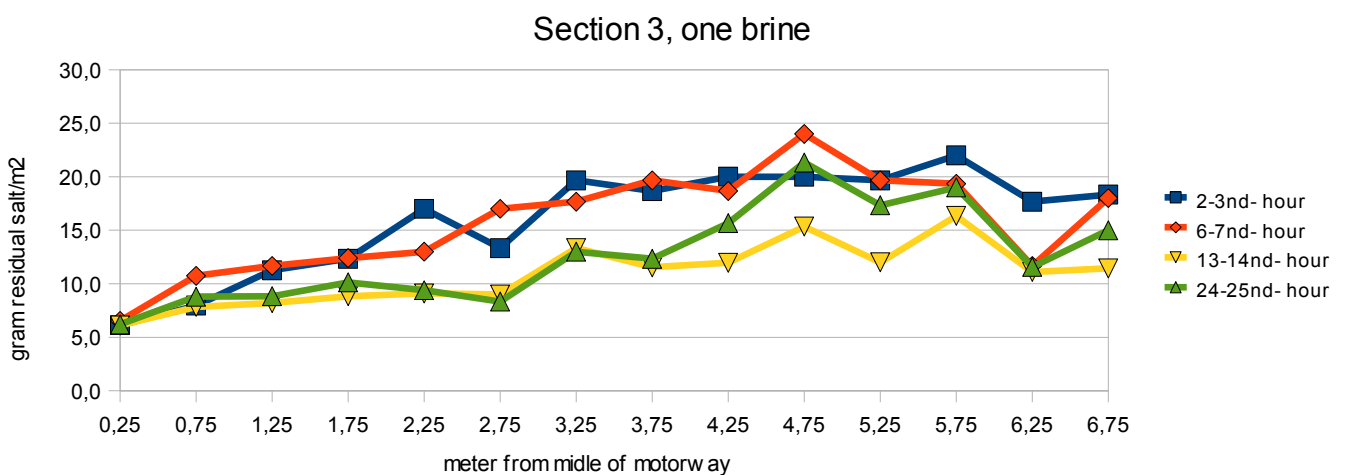
Section 1. Double brine treatment (2x20g/m<sup>2</sup>) and one treatment with pre wetted salt.(15 g/m<sup>2</sup>)



Section 2. One brine treatment (20g/m<sup>2</sup>) and one pre wetted treatment(15 g/m<sup>2</sup>).



Section 3. One brine treatment (20 g/m<sup>2</sup>).



When looking at the measurements at 24-25nd-hours, at section 2 and section 3, it is remarkable how similar they are.

## **4. Conclusion**

All measurements show high level of residual salt after 25 hours on the road, compared to Danish recommendation.

There is much more residual salt after 25 hours than necessary.

When doing salting preventively on a dry road, the measurements show the brine is much more efficient than prewetted salt and the most efficient is to use only brine. On highways, where the roads are dry, nearly all salt from pre wetted salt, will disappear in a few hours.

To follow Danish experience and recommendations there should be a change in the transversal spreading to achieve residual salt in the rapid lane and less in the heavy lane. The recommended salt concentration for preventive treatments before a snowstorm should be applied with 100% in the rapid lane and 60% in the heavy lane on motorway.

## **5. Postscript.**

We do not nationally or internationally have good documentation of the best winter service before and under a snowstorm. Practice is discussed very much, and besides the mentioned references [1] and [2] you could take part in the e-mail service "SNOW-ICE" list (\*\* \*\* To subscribe or unsubscribe from the SNOW-ICE list \*\* please visit: \*\* <http://www.transportation.org/?siteid=88&PAGEID=2174> \*\*).

I will recommend that we in EU try to make a project to learn the best practice before and under a snowstorm. The project, that could be a continuation of the interesting results from this study, should learn us, how to decrease environmental effects, minimize traffic accidents and optimize traffic flow.

## **6. References**

[1] Experiencia en el empleo de salmueras en tratamientos preventivos y curativos. Jens Kr. Fønnesbech. IX Jornados de Vialidad Invernal, 2008 "Sostenibilidad de la Vialidad Invernal" (Use of brine for preventive and curative treatments)

[2] Anti-Icingfacts 2009. <http://www.dot.nd.gov/divisions/maintenance/docs/anti-icingfacts.pdf>

enclosure:    1. DATOS\_CAMPO\_17-18\_MARZO.xls  
                  2. Salt Quantity Meter SOBO 20, Boschung.