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SUB-ISSUE: Improved use of salt

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MR. GÖRAN BLOMQVIST

Organisation:

Swedish National Road and Transport Research Institute

Country:



e-mail:

goran.blomqvist@vti.se

Presentation title:

MEASUREMENTS OF RESIDUAL SALT ON A TEST TRACK UNDER CONTROLLED CONDITIONS

Other Authors

Eram, Michel, The Danish Road Directorate, Denmark, me5@vd.dk

Summary:

Under the Nordic research and development project MORS (Modelling Residual Salt), a designated test track for road salt experiments has been prepared in Bygholm, Horsens in Denmark. The MORS project was initiated under the NordFoU umbrella, the common platform of the Nordic road administrations for research collaboration. The funding partners for MORS are the road administrations of Denmark, Sweden, Norway and Iceland. The test facilities enables detailed measurements of residual salt on the pavement surface under controlled conditions, both with manual measurements and by automatic road sensors. In 2012, several intensive measurement campaigns were conducted in order to monitor the properties and performance of anti- and de-icing chemicals (liquid and pre-wetted NaCl). The objective was to develop a new residual salt model taking the effect of the various processes involved in salt/water re-distribution into account. Different processes contribute to salt and water leaving the road surface, and these processes are influenced by several factors, including salt spreading method, traffic characteristics, road surface wetness and present weather conditions. Processes included in the model are run-off, blow-off (solid salt), spray-off (liquid splash and spray), evaporation, condensation, precipitation, and salt spreading. The test site consists of an approximately 650 m long two-lane road with a turnaround at each end, enabling circular traffic to simulate traffic passing through the measurement section halfway down the track. Permanently mounted equipment includes a traffic counter, road surface sensors for salt amount, salt concentration, temperature and water amount, an automated weather station and an optic sensor for road conditions. Other manual measurement methods applied include salt amount by SOBO20 device and the Wet Dust Sampler, salt concentration by optical refractometer, water amount with the Wettex-method, trays on the road edge to collect run-off, and petri-dishes to collect redistributed droplets within and in the vicinity of the road. Liquid water on the road surface during experiments is either achieved by natural precipitation or through spreading. With the different measurement methods, an assessment of the contribution of the individual processes that govern the redistribution of salt and water was achieved. The measurement campaigns at Bygholm have resulted in a valuable dataset that contributes to a better understanding of the processes involved in residual salt development, and enables validation of automated sensors for real traffic situations. Implementing the results into winter services is thought to increase sustainability of winter maintenance operations without jeopardising traffic safety and road accessibility.

