



XIII
INTERNATIONAL
WINTER ROAD
CONGRESS

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Québec 

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

*Spreading-Agent-Management-System as
a Part of an all-embracing Winter Maintenance
Management System*

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CONTENT

- All-embracing Winter Maintenance Management Systems
- Stock Site Planning
- Determination of the Stock Amount
- Stock Keeping
- Loading Techniques
- Modern Compact Unit
- Resumee

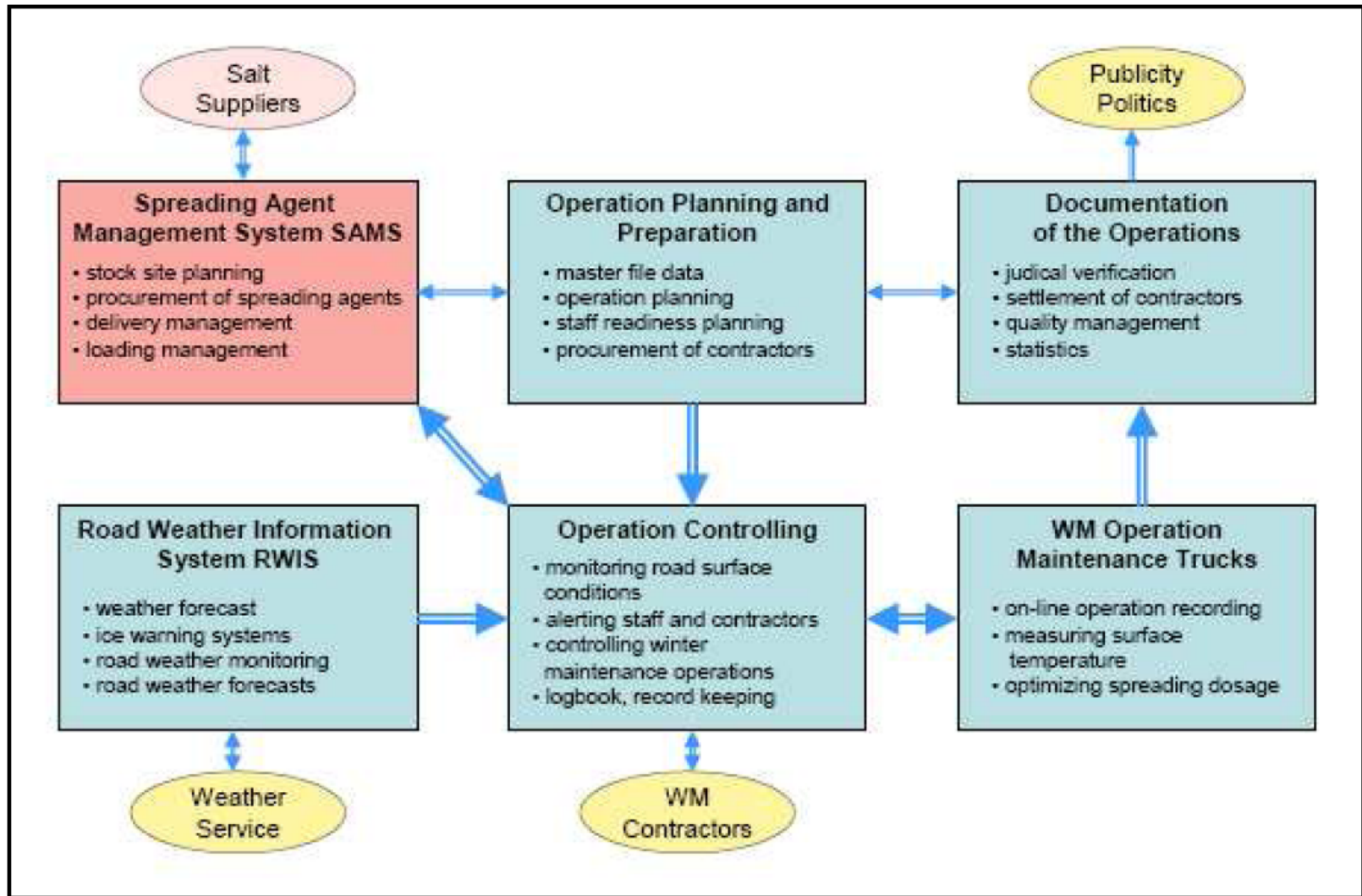


WINTER MAINTENANCE MANAGEMENT SYSTEM

- Support for the WM Planning and Operation
- Using modern communication and data processing
- Link of all data and information needed
- Inside of that:
Spreading Agent Management System (SAMS)
- German Pilot Project: State of Saarland



WINTER MAINTENANCE MANAGEMENT SYSTEM



STOCK SITE PLANNING

- Germany: WM is done centrally from the Maintenance Units
- MU: approximately 300 km rural roads, 80 km motorways
- Saarland: 2007 building of combined MU's
new sectioning → min. distances MU – road sections
- additional: Salt Stocks for additional loading in operation
some trucks (contractors) start from these stocks
- Site Planning:
 1. optimized route planning
 2. determine the optimal site of stocks for reloading
edges of the network → using for several MU's
also possible using for cities and villages nearby
- Cost-Benefit-Analysis: saved time and travel costs
also economical costs

DETERMINATION OF THE STOCK AMOUNT

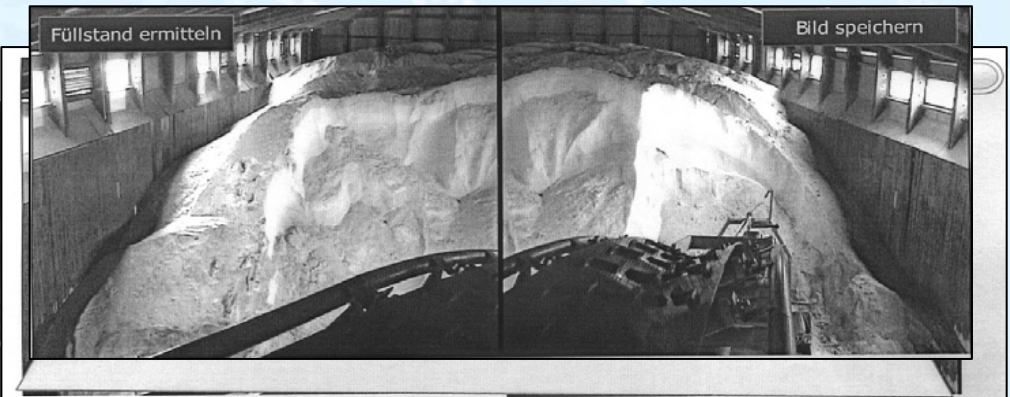
- Aim: enough salt for enduring extreme weather periods
- Old German Guidelines: half of the yearly consumption but great differences in the yearly consumption
→ too much in heavy snowfall areas, too less in other areas
- New recommendations in the new guidelines:
 - needed amount for one complete spreading of the network
 - maximum turns per day → maximum daily consumption
 - delivering time (3 days) + buffer (2 days certainty, ordering)
→ $5 * \text{max. daily consumption} = \text{minimum stock amount}$



STOCK KEEPING

- Minimizing Stock Capacity \leftrightarrow Maximum Certainty in Winter
→ Controlling of the filling amounts is necessary
new salt orders just in time
- Problem: external stockpiles, different users
- Spreading Agent Management System
 - Monitoring actual filling amounts
(weighing, ultrasound or Webcam)
 - automatic alarming (defined percentage of filling)
or automatic ordering (checked by the MU)
 - salt supplier can also see the filling amounts
 - Web-based ordering and delivering process with billing
- New Model: Stock Keeping as a task of the Salt Supplier
Billing when taking out the salt
→ decentral national salt reserve

Indunet Webcam Mon Mar 27 15:00:00 2006

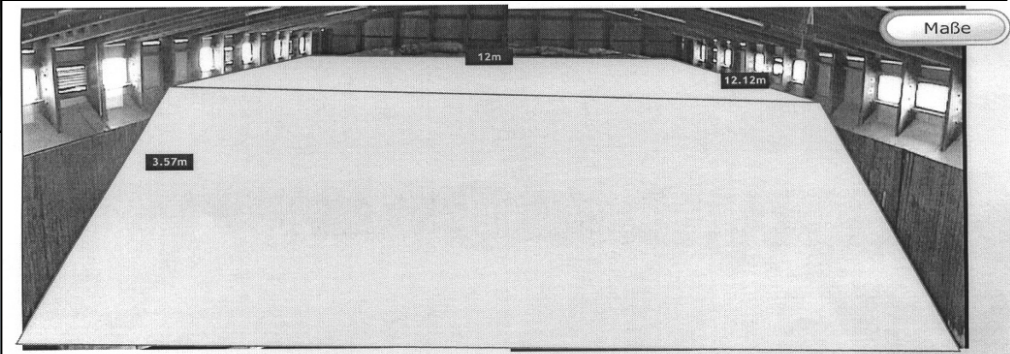


NEIGUNG NEIGUNG

TIEFE TIEFE

HÖHE HÖHE

Normal Kanten Gitter verschieben bestätigen 680m³



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SAMS FILLING AMOUNT MONITORING



WINTER 2009/2010 IN GERMANY



LOADING TECHNIQUES



Old: Salt Belt, too slow



Combination of Silos with brine tanks



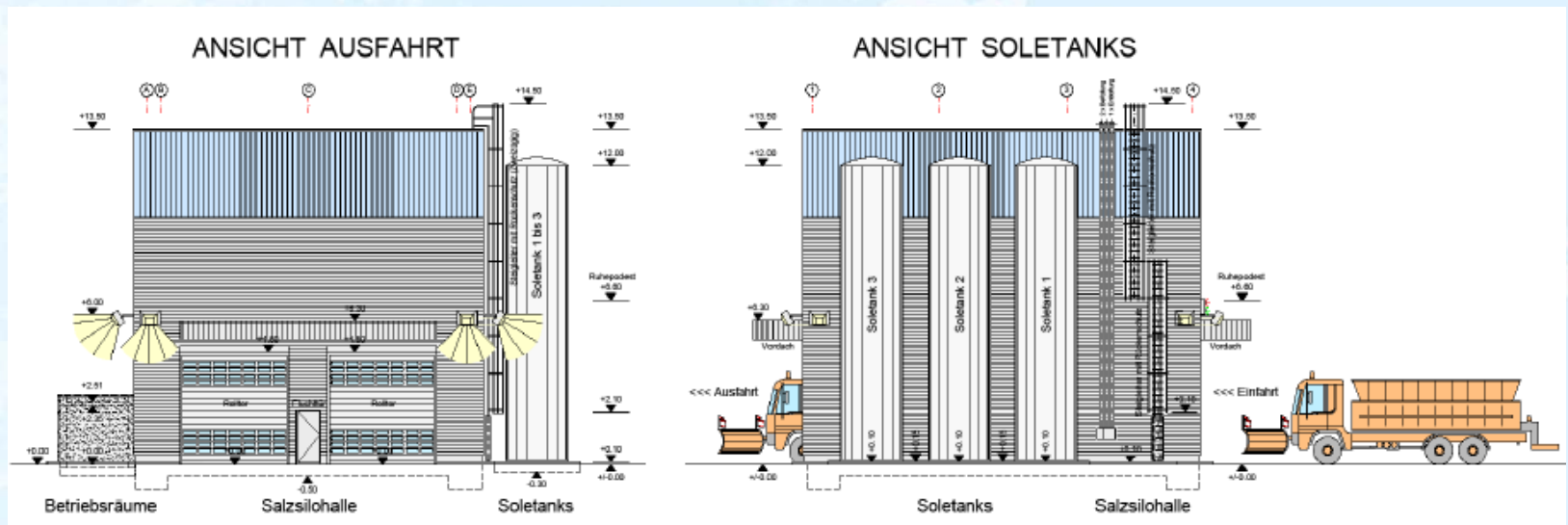
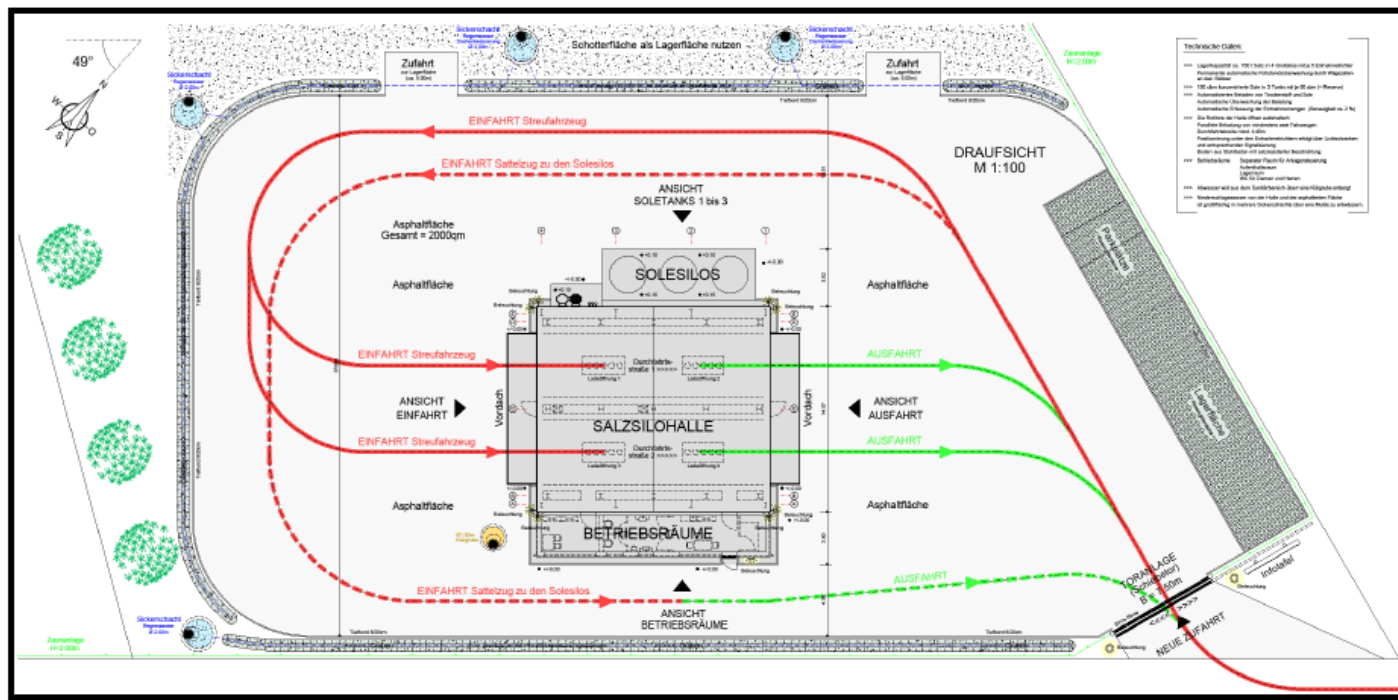
New Silo with
brine tank,
Automatical
weighing,
Moving funnel



Loading from barn with loader

NEW MODERN COMPACT UNIT

- At the edge of 4 Maintenance Districts
- additional 2 Cities load there
- 700 t Salt, 150 m³ Brine
- Compact Unit with all components under one roof
- 4 integrated silos with moving funnels
- 3 integrated brine tanks
- Automatic weighing and billing system, filling status control
- Closed system with drive through and staff facilities
- → warm, light and safe system



RESUME

- Strategic Salt Management is an interesting part of a Strategic Winter Maintenance Management
 - WM can be optimized by best locations of the stock sites and optimizing the loading techniques
 - Modern Compact Units can support WM in a good way
 - A Spreading Agent Management System can ensure better stock keeping and give better certainty in times of heavy winter weather
- This saves time and money in each maintenance operation and leads to more traffic safety by faster spreading

Thank you ...

... for your attention

