



XIII
INTERNATIONAL
WINTER ROAD
CONGRESS

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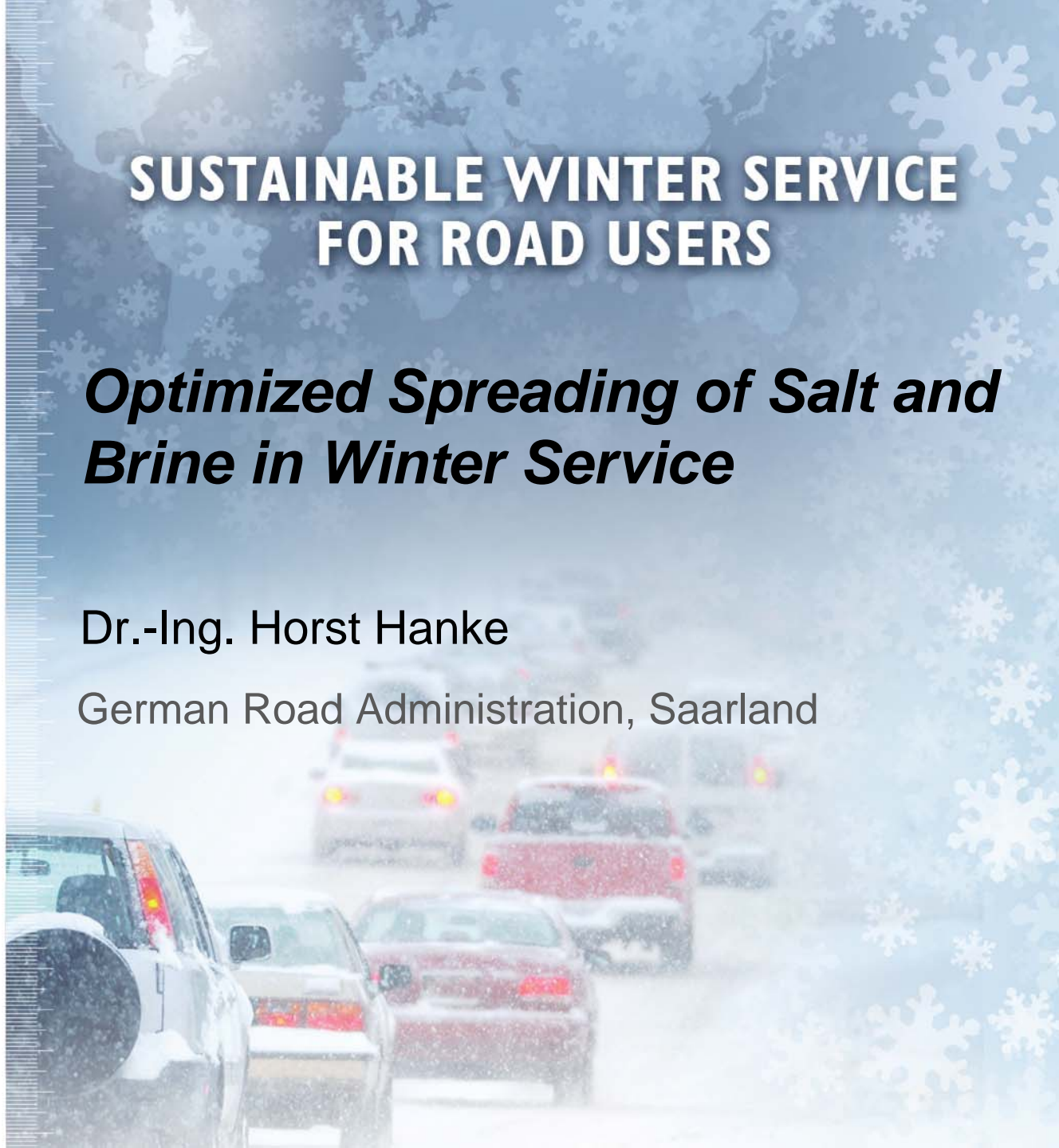
Québec 

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Optimized Spreading of Salt and Brine in Winter Service

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CONTENT

- Introduction
- Need of Preventive Spreading
- Recommendations for the practical Winter Maintenance
- Problems with the classical methods of Spreading
- Use of Brine for Preventive Spreading
- Resume



INTRODUCTION

- Task of WM: ensure safe and liquid traffic in winter time
- Germany: rising traffic volumes, rising speeds
- Road users expect ice-free roads at every time
- High speeds even at temperatures below 0°C
→ Ice is very dangerous with high accident risk
- Task of WM: avoid ice formation on the roads
more and more need of preventive spreading
- But: Know-How and Spreading Techniques must be further developed for that



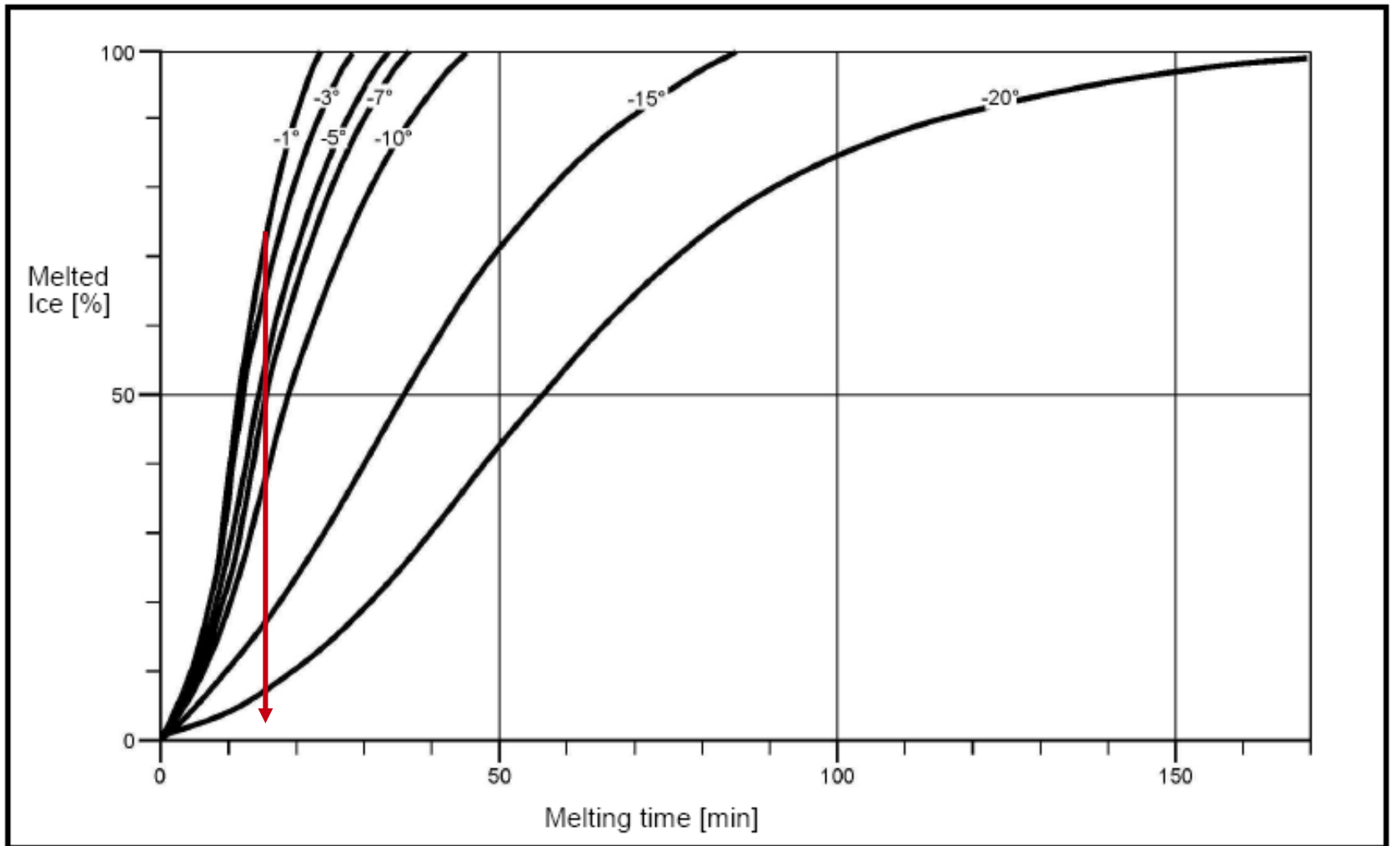
NEED OF PREVENTIVE SPREADING

- Climate in Germany: often temperatures round 0°C
freezing moisture, hoar frost
 - Research on Traffic Safety shows
punctual and unexpected slipperiness is most dangerous
accident risk is many times higher than after snowfall
 - Drivers do not reduce speed when temperature is below 0°C
They expect salted roads on any time, icy roads lead to
terrible accidents
- These forms of slipperiness must be avoided
- only possible by preventive spreading
just-in-time before the formation of ice



OTHER REASONS FOR PREVENTIVE SPREADING

- Juridicual situation in Germany: Spreading Duty
- Trucks can drive faster and safer on dry or wet roads
 - more safety for the staff
 - less costs
- Saving of Salt: Ice Prevention needs much less salt than the thawing process in a short time



The ice melting process is very slow, after 15 minutes only 7 to 75 % is melted

→ with pre-wetting 30 to 90 % of the salt can be saved

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→ Preventive spreading leads to

- better traffic safety (for the traffic and the staff)
- less costs
- better environment

but: good weather information and forecasts are necessary

RECOMMENDATIONS FOR PRACTICAL SPREADING

- Germany: up to now no detailed recommendations because of the great number of influences on the needed amount
- New WM Guidelines (2010):
Detailles recommendations for the spreading dosage depending on surface condition and temperature
- New: also recommendations for prevertive spreading



RECOMMENDED SPREADING DOSAGE (g/m²)

Actual Surface Condition	Expected Surface Condition	Expected Surface Temperature down to ...					Remarks
		ca. 0°C	-3°C	-6°C	-10°C	under 10°C	
dry	hoarfrost	5	7,5	10	15	-	below -6°C normally no hoarfrost to expect
hoarfrost							
moist	partly icy	5	10	15	25	30	rerun spreading with 5 to max. 10 g/m ² (Reason: if the surface is moist below 0°C there is residual salt)
partly icy							
moist ... wet	light black ice	10	15	25	35	40	
wet	black ice	15	20	30	40	40	
ice-covered	black ice						
dry	snowfall (packed snow)	20	25	30	40	40	
packed snow snowfall							combined with snow removal
dry	freezing rain (black ice)	30	40	40	40	40	preventive as promptly as possible before precipitation

spreading dosage with pre-wetted salt [g/m²]





„It seems, the budget deficit is greater than I thought“

„Das Haushaltsdefizit scheint doch größer zu sein, als ich dachte...“

TECHNIQUE FOR PREVENTIVE SPREADING

- Pre-wetted Salting is generally used today in Germany
- New European Standards (EN 15597, 2009/2010) set general requirements for the spreading amount and the spreading pattern and their accuracy
- But there are some problems when spreading preventive
 - spreading speed over 40 km/h make problems spreading patterns become worse
 - very small spreading dosages ($< 10 \text{ g/m}^2$) are difficult but would be enough for preventive actions
 - Laying performance of pre-wetted salt after the spreading: the solid parts are thrown away quickly (< 2 hours) → Presentation Hausmann

→ For preventive spreading
Solely liquid spreading is better



LIQUID SPREADING



LIQUID SPREADING

- Germany: tests
 - different types of spreaders
 - different Maintenance Units and road types
 - different Spreading Agents (NaCl- / CaCl₂-Brine / Additivs)
- Test of higher spreading speeds and lower dosages
- Research Project: measuring the amounts of dosage on the road depending on the time after spreading



NEU!
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FullWet
Flüssigstreumaschine

Achtung
Streufahrzeug
Mindestabstand 10 m einhalten

B S 2635



Achtung
Streiffahrzeug
Mindestabstand 10 m einhalten

D B S 2635





STRALIO

SCHMIDT

SCHMIDT

Winterdienst
STRALIO

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IVECO





boschung
KUPFER
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NEW!
Jethroom
with
FullWet
liquid de-icing system

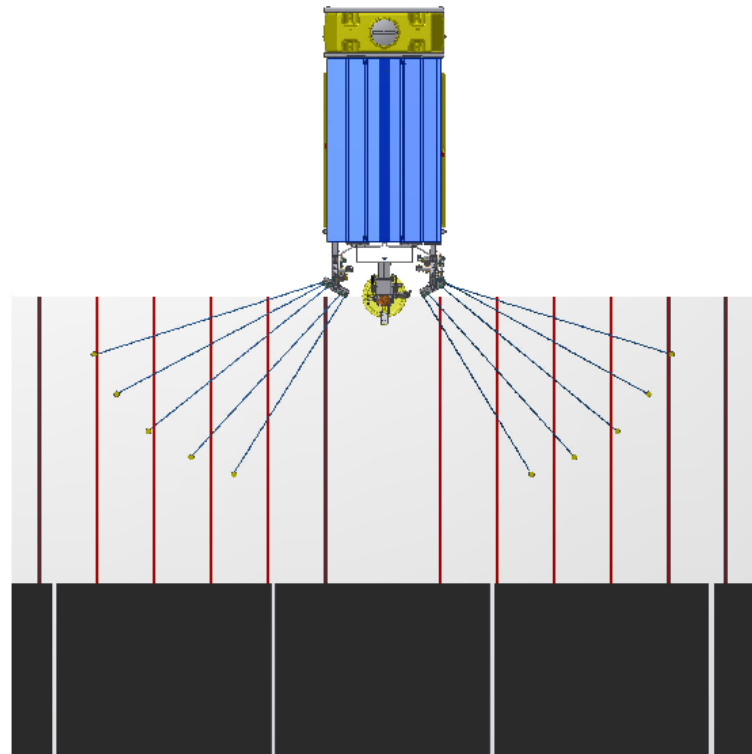
Winterdienst

FR 1703

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Combined spreader





IMS

KÜPPER
WEISSER

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MAN



Winterdienst

FIRST RESULTS

- Very good distribution of the spreading agent
- Even by high spreading speeds (- 80 km/h) and low dosages (20 ml/m² = 4 g/m² salt)
- Long laying performance, no great losses

→ This technique is the best for preventive spreading
It is a good supplementation for the pre-wetted spreading
(which will remain the standard for curative actions)
combined spreaders will be the future

Preventive Spreading with small amounts of brine lead to

- more traffic safety (also for the WM Staff)
- more cost-effectivity
- better environment

Thank you ...

... for your attention

