



XIII
INTERNATIONAL
WINTER ROAD
CONGRESS

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Québec 

SUSTAINABLE WINTER SERVICE FOR ROAD USERS

*Follow up Study of Winter Standard as a
R&D Project*

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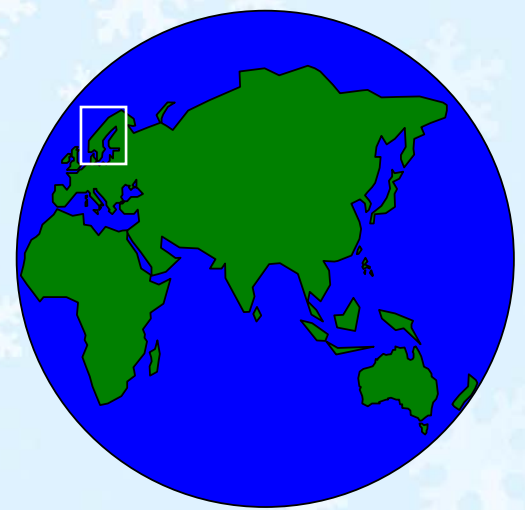
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Statens vegvesen

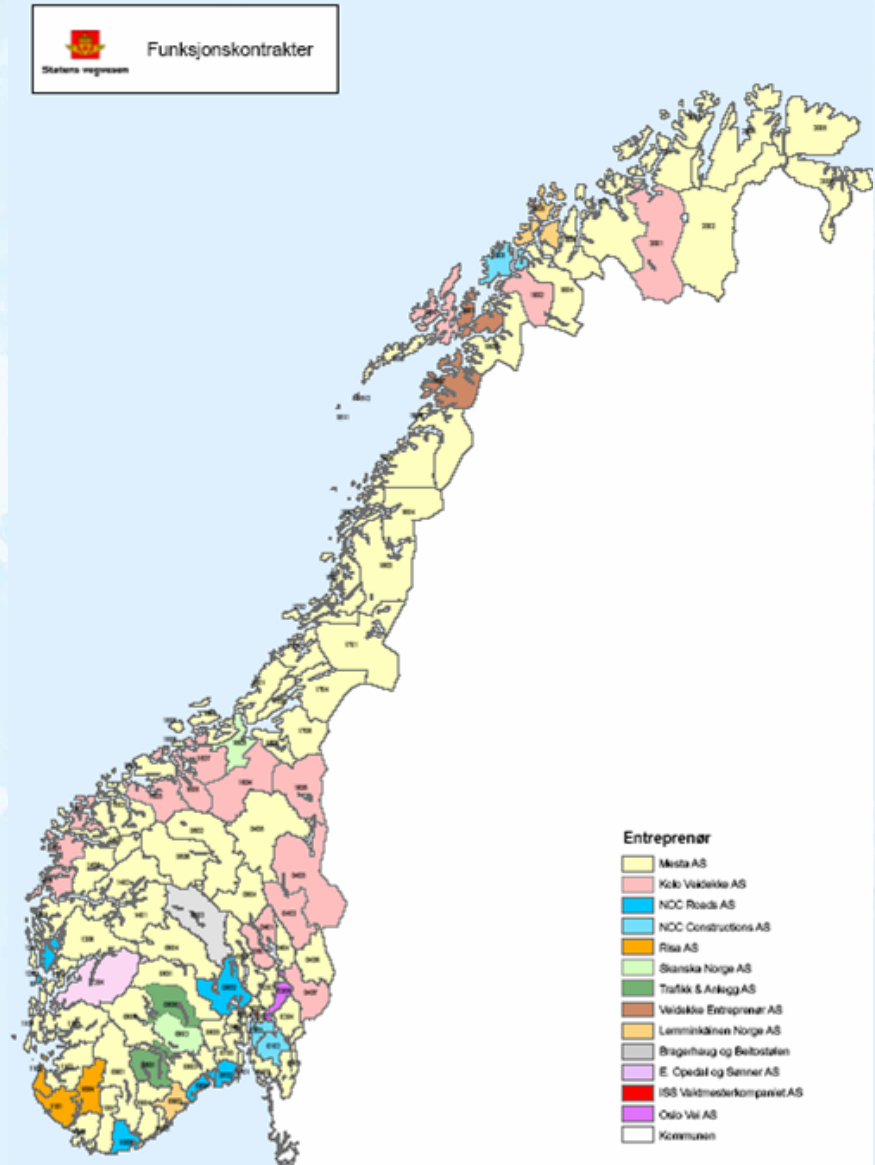
Content

- Background and goal with the project
- Project description
- Questions asked
- Maintenance strategy
- Results so far
- Conclusions



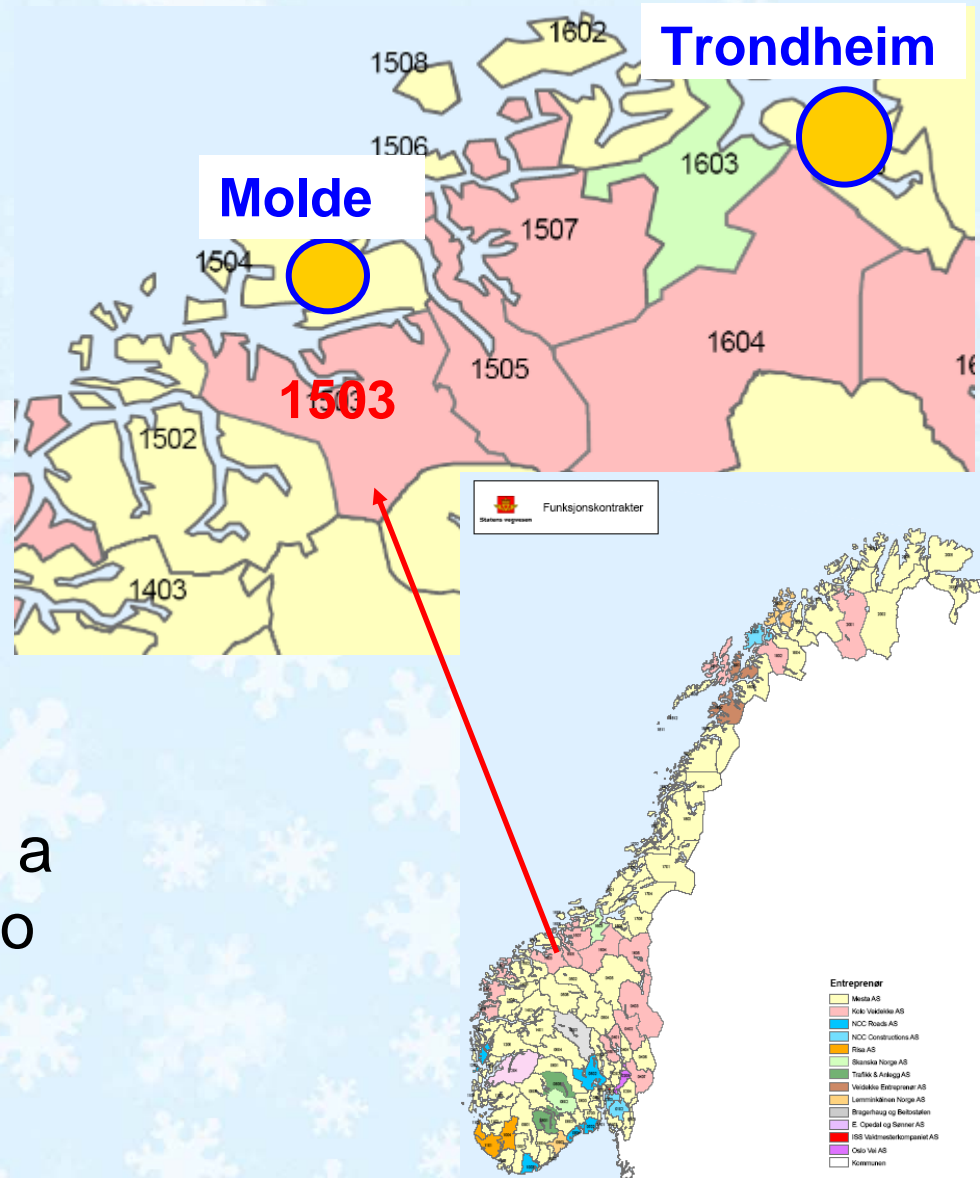
Performance contracts in Norway

- Norway is divided into 103 maintenance contracts – first ¼ on bid in 2003 and last ¼ on bid in 2006
- The contracts are performance based (friction, snow depth etc.)
- Typically 5 years durability
- 20 contracts renewed in 2009



R&D in performance contracts

- Performance contracts put aside to private companies implies a challenge to maintain and develop the expertise
- Contract 1503 Inner Romsdal brings in a new way of thinking
- 250,000 US\$ per year over a 7 year period is dedicated to R&D projects



R&D Inner Romsdal



A follow up study of the winter standard on E136 which is a trunk road and the most important road in the contract area

The main reasons for the choice of contract and the road section in the follow up study are:

- The area is very exposed to snow avalanches
- The area is an important route for trailer trucks and is of high national importance
- Many complaints from the public
- In addition to the functional requirements in the contract there are also special demand regarding the readiness and equipment

Objective

The goal with the project is to improve the traffic safety and traffic flow with correct use of resources.

The project focus on documenting the winter standard with the purpose to:

- Give a good basis for the contractor to carry out the correct measures to the correct time
- Give good and updated information to the public regarding the driving conditions through the winter
- Supply the road keeper with documentation of the winter standard and driving conditions on the road

Organization of the project and expected results

The follow up study is organized as a joint effort between the contractor and road keeper.

The project is expected to give benefit on short term:

- Better basis for decisions and faster reaction time for execution of winter operations
- Better information will be of service to the road users and make it possible for the transport industry to plan their deliveries in a better way

Expected results on long term

Documentation and analysis of the actual winter standard will provide knowledge that can be used as a basis for improvement of routines and methods:

- Overview of difficult road sections and places demanding extra effort
- Overview of how weather conditions influence on driving conditions and the need for actions
- Better basis to assess the effect of different methods, equipment and materials
- Better basis to evaluate standard requirements and contract descriptions

Questions addressed

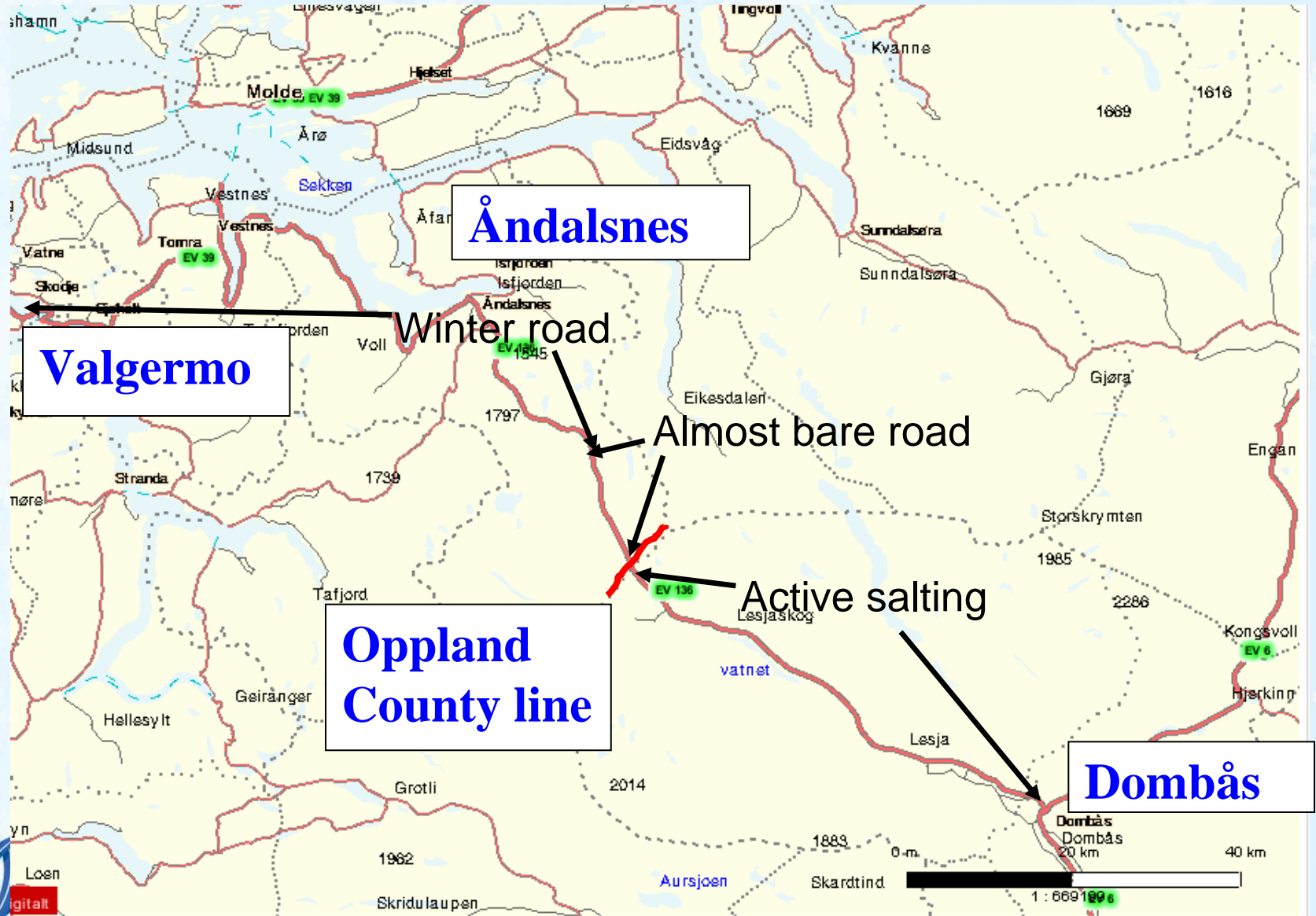
- What is the friction when measures are carried out?
- Is it possible to measure direct impact on the driving speed when actions are carried out?
- What is the friction when the driving conditions are experienced as difficult?
- How do the friction conditions vary?
- How much precipitation as snow is necessary to reduce the traffic conditions in a such extent that the traffic flow is reduced?

R&D Inner Romsdal

The follow up study covers a 180 km long road section on E136 between Valgermo and Dombås with the following characteristics:

- The project covers two regions
- Two different contractors are involved in the project
- The follow up study covers contracts with different terms of settlement; one with fixed price (contract 0502) and one with variable winter costs depending on the severity of the winter (contract 1503)
- The road section in the follow up study includes three different winter maintenance strategies; “Strategy winter road”, “Strategy almost bare road”, and “Strategy active salting”

Maintenance strategy



Friction requirements

Class of road	AADT	Local sanding		Continuous sanding	
		Start at	Finished within	Start at	Finished within
Trunk Roads		$\mu < 0.30$	1 hour	$\mu < 0.20$	2 hours
All other roads	> 1500	$\mu < 0.25$	1 hour	$\mu < 0.20$	2 hours
	501 – 1500	$\mu < 0.25$	2 hours	$\mu < 0.15$	3 hours
	0 - 500	$\mu < 0.20$	2 hours	$\mu < 0.15$	4hours

Tasks	Triggering criteria and maximum time for action in regard to different AADT		
	< 3000	3001 – 5000	> 5000
Anti-icing	If expected friction value < 0.30	If expected friction value < 0.30	If expected friction value < 0.30
De-icing. After snowfall: Bare in tracks before	6 hours	4 hours	2 hours

Data recording



A registration vehicle is provided for the follow-up study. The main instrument on the vehicle is a friction device of the type Traction Watcher One (TWO) which is a continuous measuring device



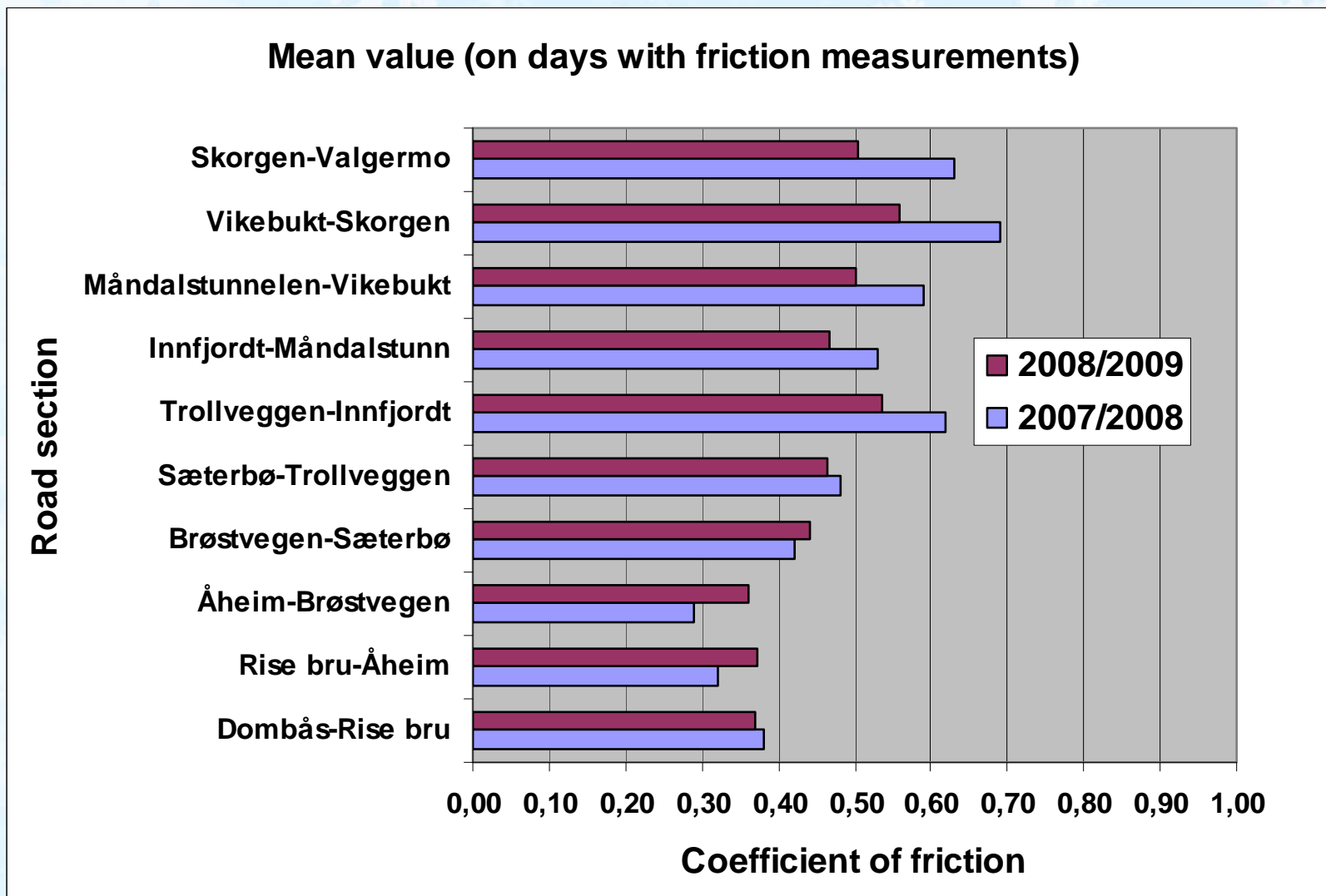
Type of data recorded

- Friction measurements, air temperature, road surface temperature, relative humidity
- Pictures in fixed points triggered by position registered by use of GPS
- Programmable pocket PC used to register additional information about the road conditions
- Road weather data from RWIS stations

Type of data recorded

- Registration of car rescue actions by use of pocket PC (new routine autumn 2007)
- All measures carried out by the contractor is registered by use of automatic data collection system
- Drivers on busses and trucks filling out a form to have their opinion on the driving conditions
- Automatic registration of driving speed by recognition of vehicles using piezoelectric cables (new routine autumn 2007)

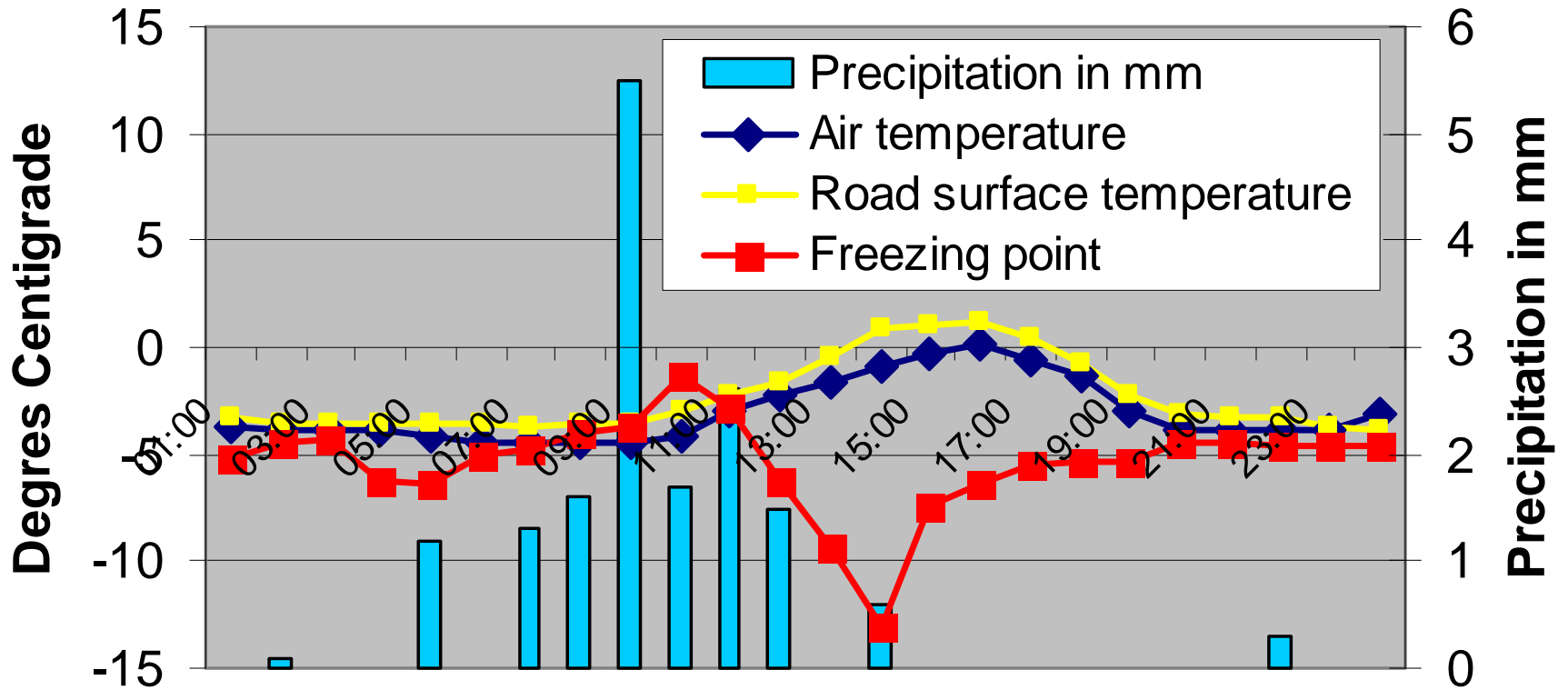
Results



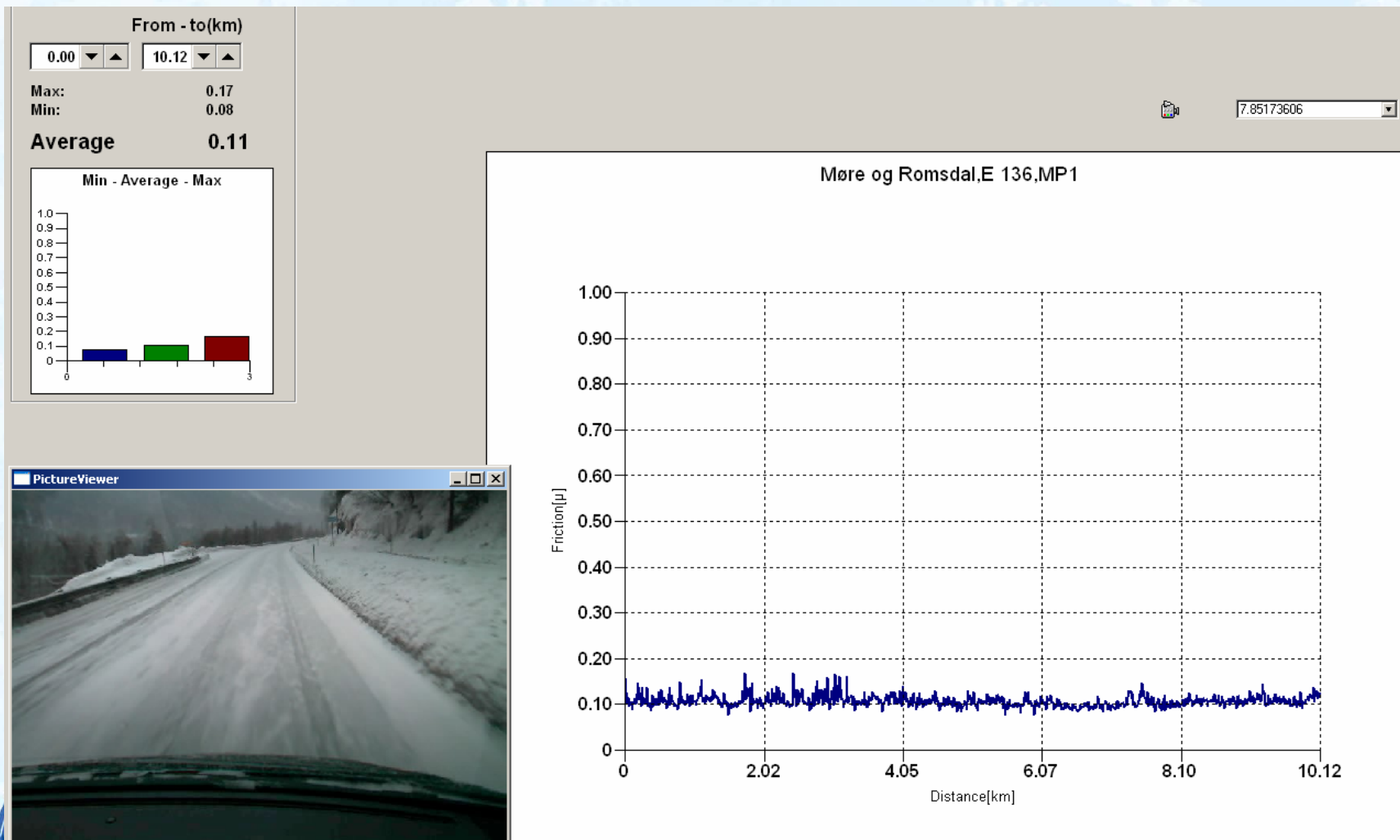
Results



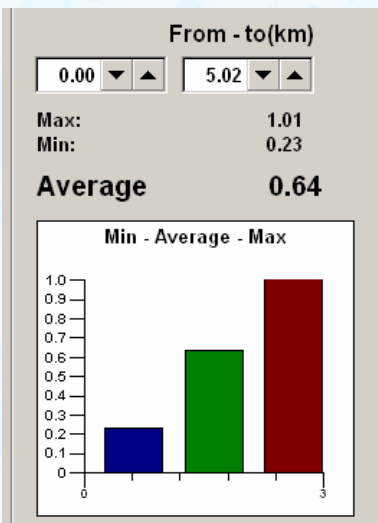
Brustuglia, February 27th 2007



Results

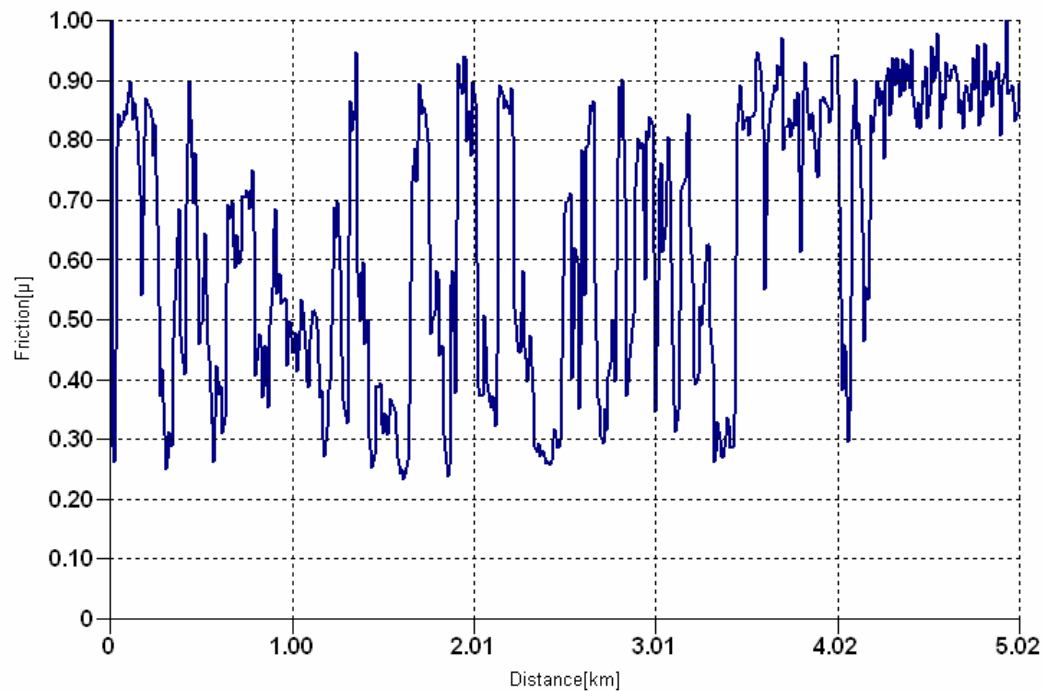


Results



25.972503

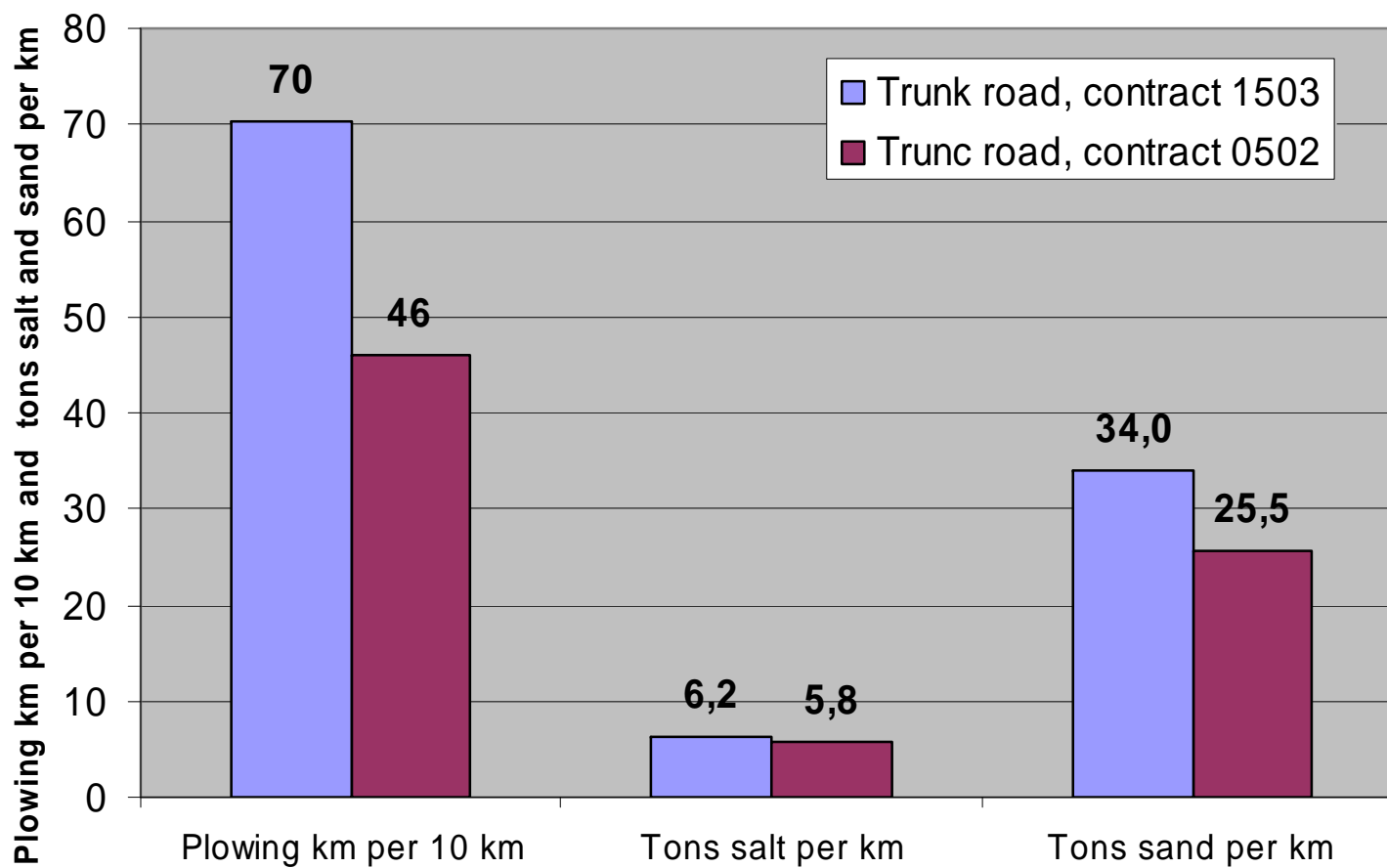
Møre og Romsdal,E 136,MP4



Results



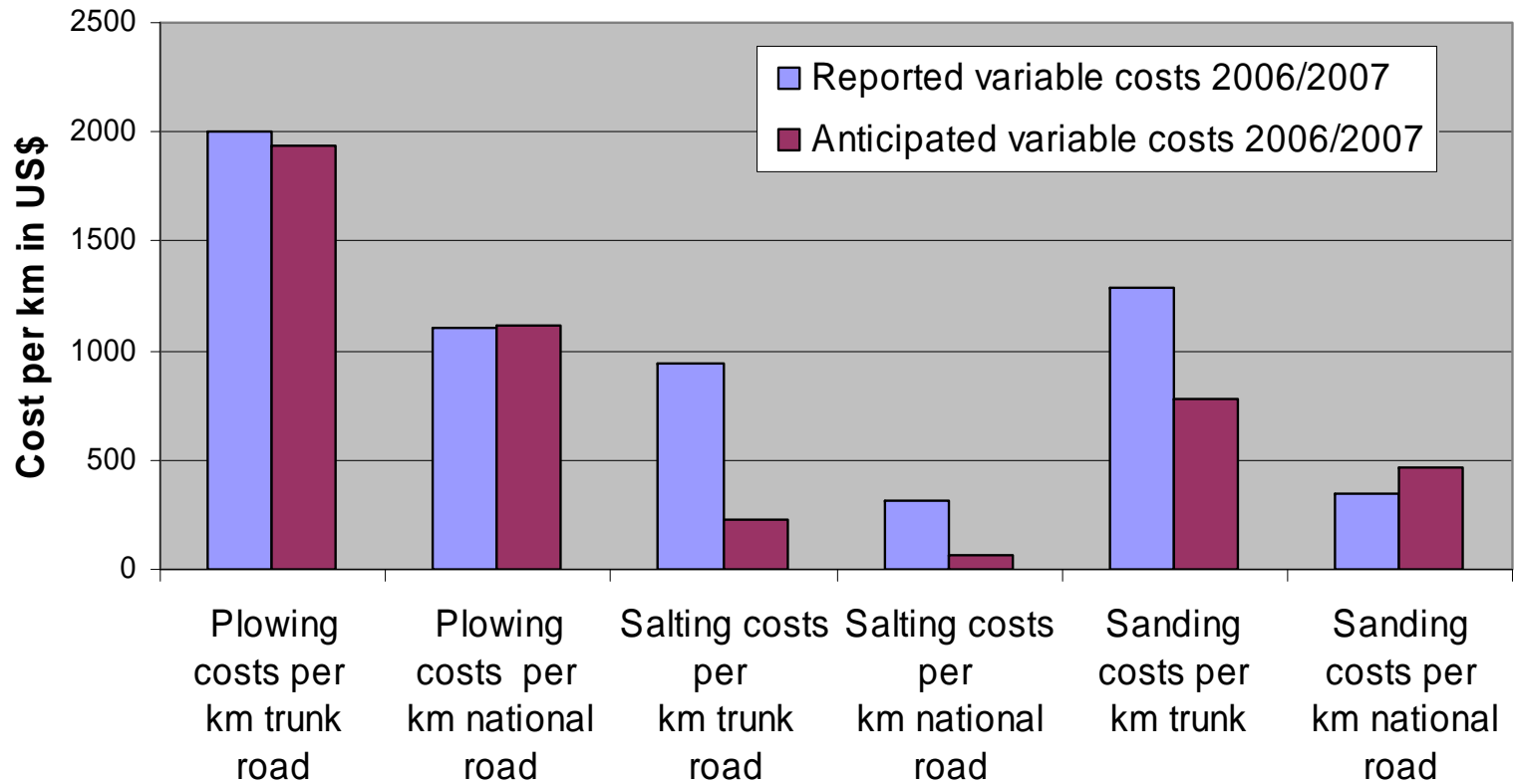
Winter Season 2006/2007



Results



Winter Season 2006/2007, contract 1503



Results



SimaVeg Portal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Mail Print Wordpad Internet Options

Address <http://www.simaveg.no:8080/googleMaps/mapsknl.html?z=12&lat=61.491863&lon=8.6170535&latmax=63.0689518&latmin=59.5> Go Links Google Search Sign In

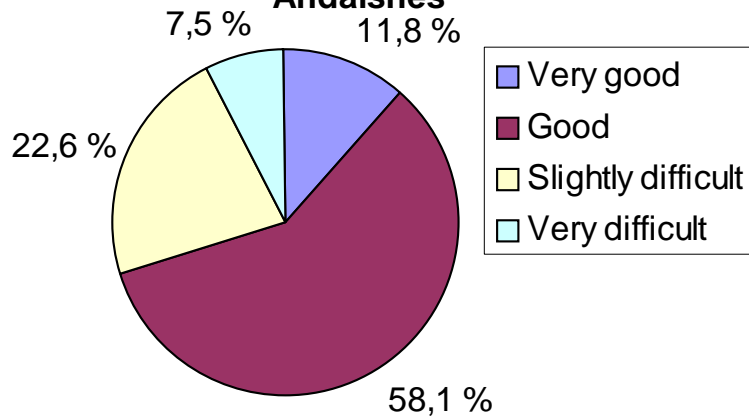
Hovedoppdrag : Registrering av bergingsoppdrag
Underoppdrag : Bilbergning
Person : Dombåsbil, 1
Hendelse : Velt/utforkjøring
Kjøretøy : Liten bil
Føre : Vinterføre SNØdekke
Nasjonalitet : Norsk
Temperatur : Under -10
Tidspunkt : 11.02.2009 14:07:36
Gatenavn : Opplandvukjent
Lokasjon : EV6 20/10.730
Kommentar : Brenden Mads (Dombås bil)

Results

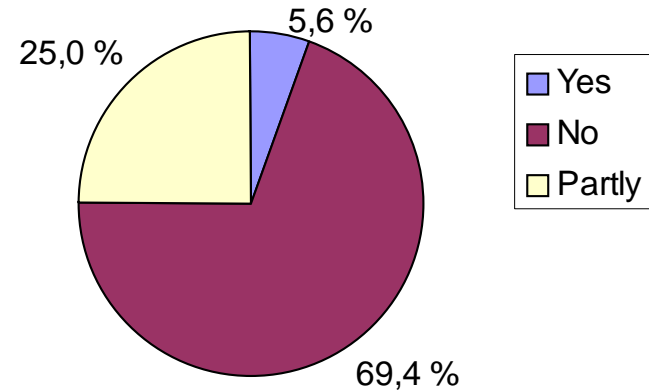


Reported driving conditions, Valgermo -

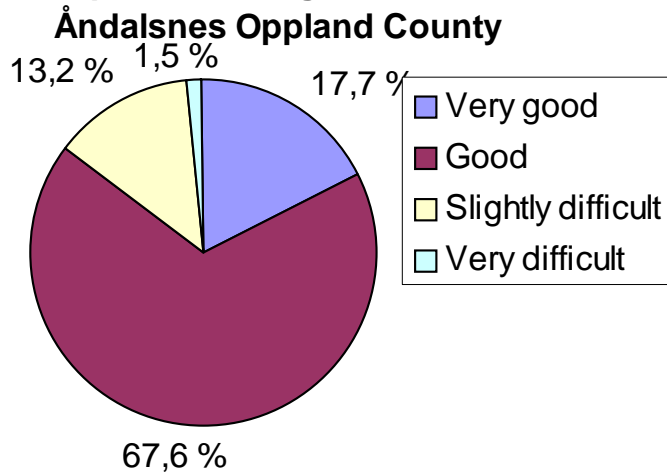
Åndalsnes



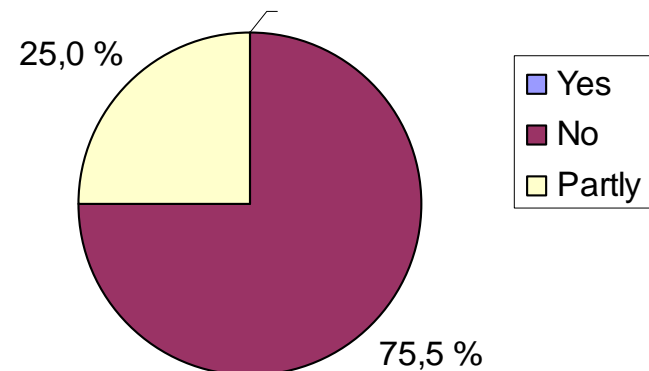
Need for salting/sanding actions, Valgermo - Åndalsnes



Reported driving conditions, Åndalsnes Oppland County



Need for salting/sanding actions, Åndalsnes - Oppland County



Conclusions

- The results from the project are very positive
- The results give support to the main idea behind the project that incorporating R&D in maintenance contracts is of value both to the road keeper and the contractor
- The project helps in increasing the general knowledge about
 - factors influencing on the driving conditions
 - the importance of doing the correct actions
 - and also the benefit of having a system to follow up the standard on winter roads

Thank you for your attention

