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# WINTER MAINTENANCE VEIDEKKE INDUSTRI AS

07.April 2016

Geir Atle Kvendset

Quality auditor

Veidekke Industri AS

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# GEIR ATLE KVENDSET QUALITY AUDITOR

## + About me:

- Army officer. Logistics. 1996-2005
- Officer in National Guard 2005-
- Iraq, Gulf War 2004.
- Veidekke Industri from 2010.
  - Quality auditor from 2012.
- Volunteer Firefighter. Driver firetruck.

## + Like to do

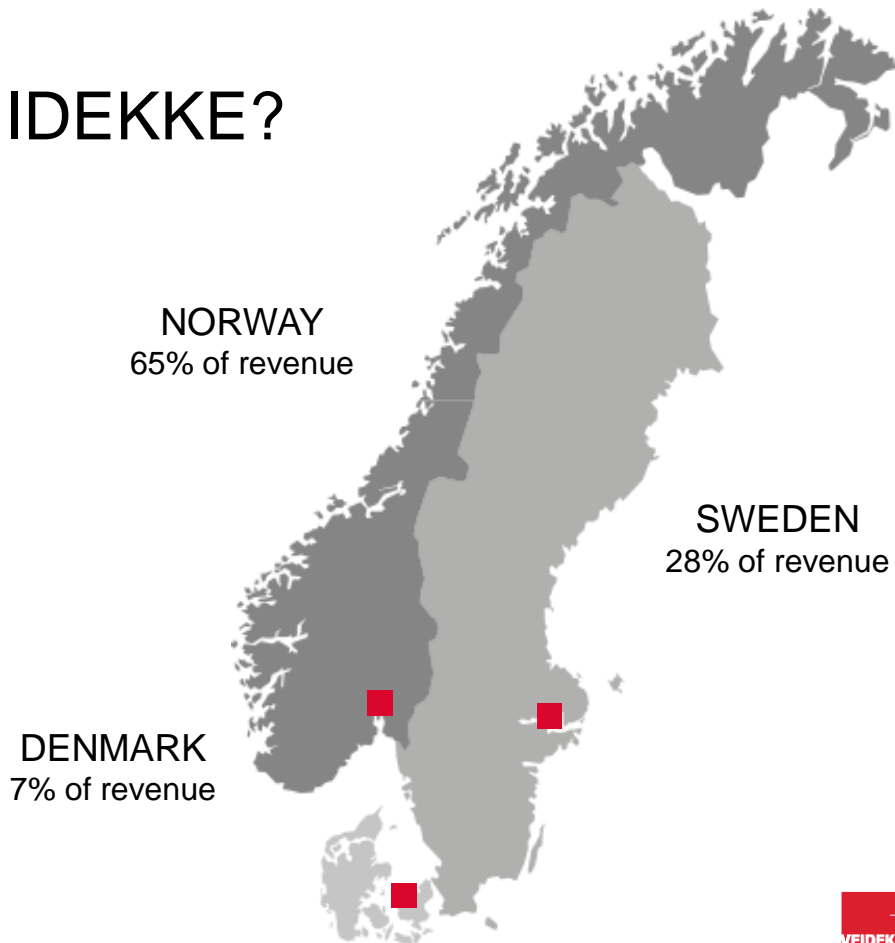
- Mountainbiking
- Snowmobiling



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# WHO, WHAT, WHERE IS VEIDEKKE?

- + Norway's largest and Scandinavia's fourth-largest construction and property development company
- + 7,000 competent employees in three countries
- + Annual turnover 24,5 bill. NOK in 2015 (2,8 bill. €)





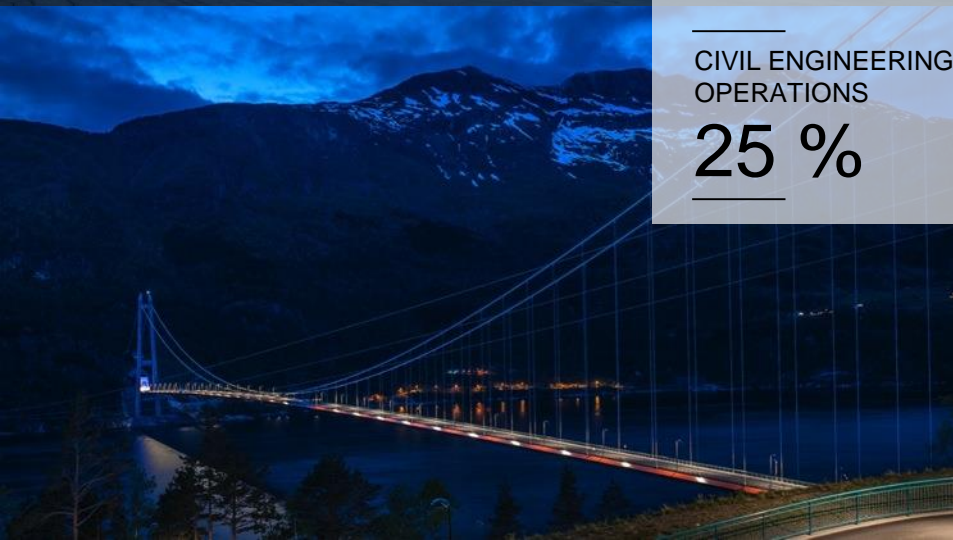
NON-RESIDENTIAL  
BUILDINGS

38 %



RESIDENTIAL  
BUILDINGS

21 %



CIVIL ENGINEERING  
OPERATIONS

25 %



INDUSTRIAL  
OPERATIONS

16 %

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# VEIDEKKE INDUSTRY

## + VEIDEKKE INDUSTRY



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### ASPHALT

- + Approx. 2,6 mill. tons yearly
- + 3 250 kilometers of road (8 m. wide)

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### AGGREGATES

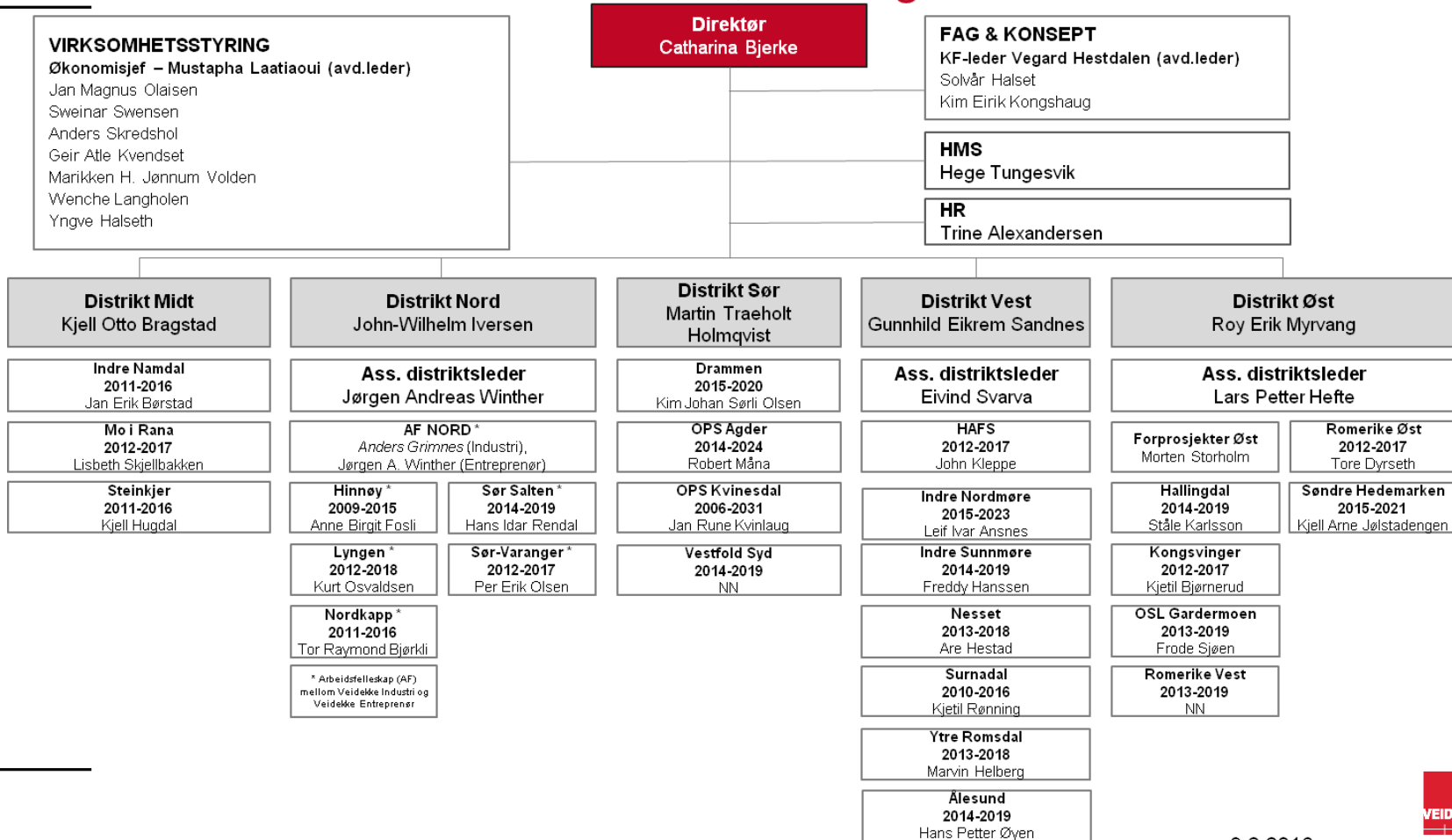
- + Approx. 8 mill. tons yearly
- + Largest player

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### ROAD MAINTENANCE

- + 11 330 kilometers road
  - + 21 maintenance contracts with NPRA, 2 PPP-contracts
  - + OSL Gardermoen airport
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# Veidekke Industri AS, Drift og Vedlikehold



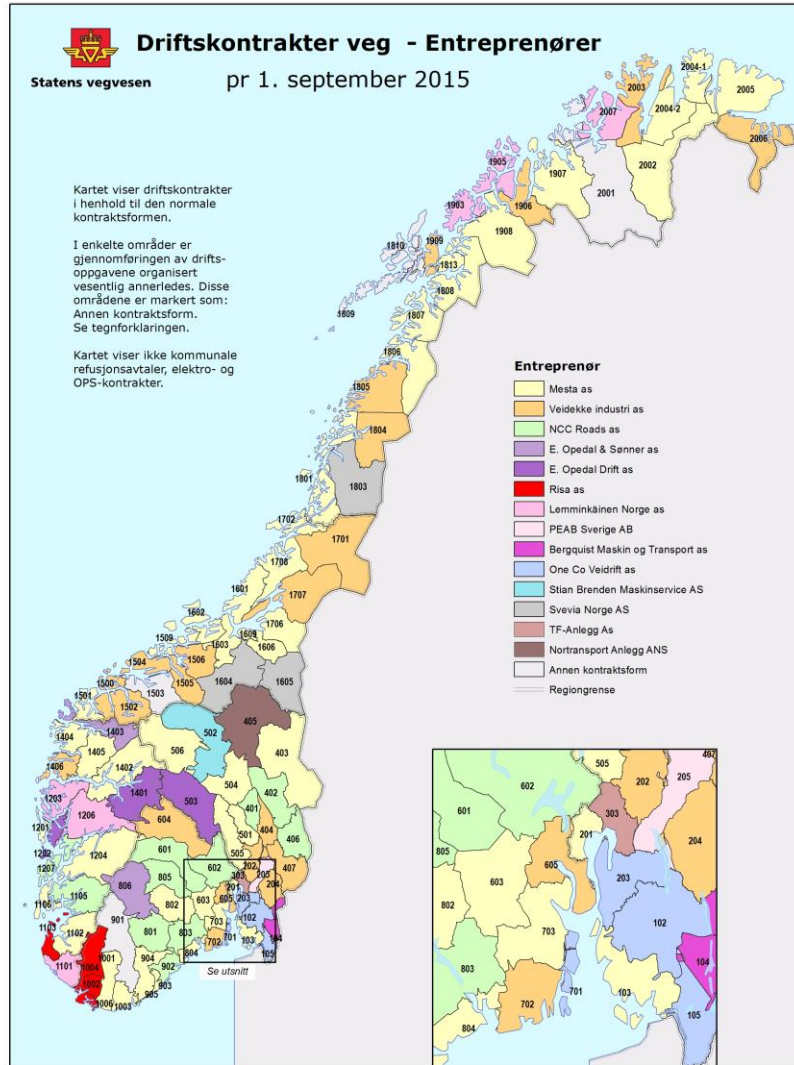
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# OPERATING CONTRACTS 2015

Second largest contractor in the market

3 «types» of contracts

Functions  
Operating  
Public Private Partnerships



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- STRATEGY.

- + Location and growth in the area we are established.
- + Profitability for all. Veidekke and Subcontractors.
- + Deliver according to contract. (neither more nor less)
- + Contracts in city-areas are demanding and difficult. Requires a lot off special equipment.  
We want to be good at «country» contracts first.



# CONTRACT METHOD 1:

- + Norwegian Public Roads Administrations/  
NPRAs determines standard requirements  
in contract.
- + We are responsible to deliver according to  
contract.
- + It is up to us how we achieve  
requirements.



**Statens vegvesen**  
contracting client



Main contractor



Subcontractor



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# CONTRACT METHOD 2:

- + NPRA takes all control.
- + Contract is detailed in method
- + NPRA instructs how to do the job. We perform after selected method



**Statens vegvesen**

Main contractor



**VEIDEKKE**

Subcontractor



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# PREPARATIONS IN TENDER PROCESS FOR CONTRACTORS



- Establish tendering team
- Establish progress plan
- Distribution of responsibilities
- Obtain tender documents
- Reading through all tender documents
- Inspection of the contract area
- Tender conference

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# ADVANTAGES IN TENDER PROCESS

- + Benefits for the contractor:
- + knowledge of the area and former operations.
- + access to individuals with local knowledge
- + knowledge of the market in relation to subcontractors
- + established in the area before with other business areas (aggregates, asphalt, etc)



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# DISADVANTAGES FOR THE CONTRACTOR WHEN RECONTRACTING

- + Know the contract area?
- + Is established in the area before with their own business areas?
- + Those who participate in the bidding process operates the contract today. May have difficulty finding new solutions.

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# USE OF SUBCONTRACTORS

## Benefits:

- + Local knowledge.
- + Want to do a good job.
- + They have the equipment for the job. Machine costs will be on subcontractors.
- + Payment by agreement on contract
- + Employment is at the subcontractor
- + Have other work beside this contract. (Agriculture in summer time.)



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# USE OF SUBCONTRACTORS

Drawbacks:

- + Don't know the contract well enough.
- + Is not aware of the requirements of the general contractor. HSE requirements.....
- + Difficult to adapt to new requirements.
- + Require more attention to follow up.
- + We lose practical experience with winter maintenance. The subcontractor gets all practical knowledge.
- + Has not the optimum equipment.





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# USE OF OWN EMPLOYEES

## + Benefits:

- Experience in company.
- Faster processing
- Equipment quickly accessible. Equipment is optimized for use in the contract.
- More employees on contract.
- More money is kept within the company.  
Maybe😊.....



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# USE OF OWN EMPLOYEES

## + Disadvantages:

- Difficult to employ only in winter
- expensive to have workers on a shift system.
- Has often only winter operation and not work in the summer for many employees.
- Large machine costs. 5 year depreciation on equipment.



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# OPERATION PROCESS

## WE MUST DO EVERYTHING.

- + Winter process:
- + 5 operation classes. From Black roads to winter roads
- + Requirements for friction.
- + Requirements for completion (cycle time). Decide how far you can drive and how many units you have to use in the contract area.
- + Functional requirements. (Visibility of road signs). Open and not frozen culverts...
- + Requirements to perform actions on winter maintenance.

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# COMPLETION (CYCLE TIME)

- + Time to process entire plowing area.
- + Contract requirements to maximum plow speed should not be exceeded.

(Max 40 km/h)

(Max 30 km/h Skid protection)

# OPERATION CLASSES



Done on the basis of traffic volume

Vinterdrifts- klasse	ÅDT								
	0	500	1500	3000	5000	10000	15000	20000	
DkA									
DkB									
DkC									
DkD									
DkE									

Vinterdriftsklasse <u>DkA</u>	Godkjent føreforhold er bar veg (tørr eller våt).
Vinterdriftsklasse <u>DkB</u> (Høy, middels, lav)	Godkjent føreforhold er bar veg (tørr eller våt), hard snø/is tillates utenom hjulspor i begrenset tidsrom.
Vinterdriftsklasse <u>DkC</u>	Godkjent føreforhold er bar veg (tørr eller våt) i milde perioder og hard snø/is i kalde perioder.
Vinterdriftsklasse <u>DkD</u>	Godkjent føreforhold er hard snø/is.
Vinterdriftsklasse <u>DkE</u>	Godkjent føreforhold er hard snø/is. <u>DkE</u> skal ikke nyttes på riksveg.
Vinterdriftsklasse <u>GsA</u>	Godkjent føreforhold er bar veg (tørr eller våt). Hard og jevn snø/is tillates i kalde perioder.
Vinterdriftsklasse <u>GsB</u>	Godkjent føreforhold er hard snø/is.
Sideanlegg	Godkjente føreforhold er hardt og jevnt snø- og isdekke med maksimalt 2 cm løs snø. På ferdselsareal for gående og syklende der det er indikatorer skal det være snø- og isfritt areal.

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# FRICITION, GRIP ON THE ROAD

**Våt is: 0,05-0,15**



**Tørr is: 0,15-0,30**



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# FRICITION, GRIP ON THE ROAD

**Tørr sand på is: 0,25-0,35**



**Fastsand: 0,30-0,50**



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# FRICITION, GRIP ON THE ROAD

**Våt veg: 0,40-0,90**



**Tørr veg: 0,90-1,00**





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# FRICTION, GRIP ON THE ROAD MEASUREMENT AND CONTROL METHOD



Peoples measurement method (and the police.....)



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# OPERATIONAL ORGANIZATION

- + 25% shall be done by our own employees.
- + New contracts require own operations on some roads. (2-3 units per contract)
- + Own operations: planning roads, friction measurement, monitoring and control of the road network, opening culverts due to ice.
- + Subcontractor: Plowing units, gritting units, cleaning traffic signs, clearing visibility zones, winter maintenance of bus stop. Walking and bicycle paths



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# OPERATIONAL ORGANIZATION

- + 2 methods used
- + Contractor engage subcontractor.
  - Advantage: Better control of salt and sand amounts
  - Disadvantage: The risk is on us
- + «Own engagement» (Subcontractors)
  - Advantage: Responsibility is forwarded to the subcontractor . They take more responsibility.
  - Disadvantage: amounts of salt and sand goes up 😊



# RESOURCES.

+ Meteorological data to be used:

- YR.no
- Xgeo.no
- Met.no

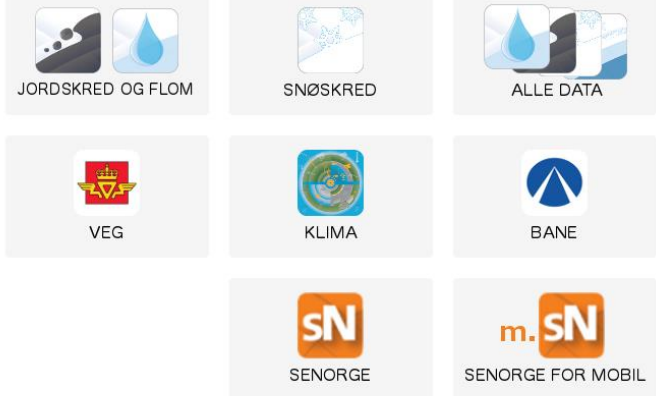
+ weather information is important when maintaining roads

The screenshot shows the YR.no website interface. At the top, there's a search bar and navigation links. Below that is a weather forecast table for several cities in Norway. The table has columns for the day of the week (Mandag, Tirsdag, Onsdag, torsdag) and icons representing weather conditions and temperatures. To the right of the table is a map of Norway with weather data overlaid. Below the table and map are various service links and social media icons. At the bottom, there's a news article titled 'Når øker dagens lengde raskest?' with a sub-headline 'Bedre treff på vind i langtidvarslet'.

Sted	Mandag	Tirsdag	Onsdag	torsdag
Tvedestrand	☁ 8°	☁ 4°	☁ 0°	☁ 0°
Haslum	☁ 7°	☁ 7°	☁ 5°	☁ 5°
Gjøra	☁ 6°	☁ 6°	☁ 5°	☁ 5°
Oslo	☁ 6°	☁ 6°	☁ 5°	☁ 5°
Bergen	☁ 7°	☁ 7°	☁ 7°	☁ 7°
Narvik	☁ 7°	☁ 7°	☁ 7°	☁ 7°
Kristiansund	☁ 7°	☁ 7°	☁ 7°	☁ 7°
Tromsø	☁ 9°	☁ 9°	☁ 9°	☁ 9°

Om xGeo: Dette er et ekspertverktøy som brukes til beredskap, overvåking og varsling av flom, jordskred og snøskred. Med kart og tid som utgangspunkt sammenstilles data fra stasjoner og modeller med hendelser og feltobservasjoner. [mer...]

xGeo's samarbeidspartnere er [NVE](#), [Statens Vegvesen](#), [Jernbanelverket](#), [met.no](#) og [Kartverket](#)



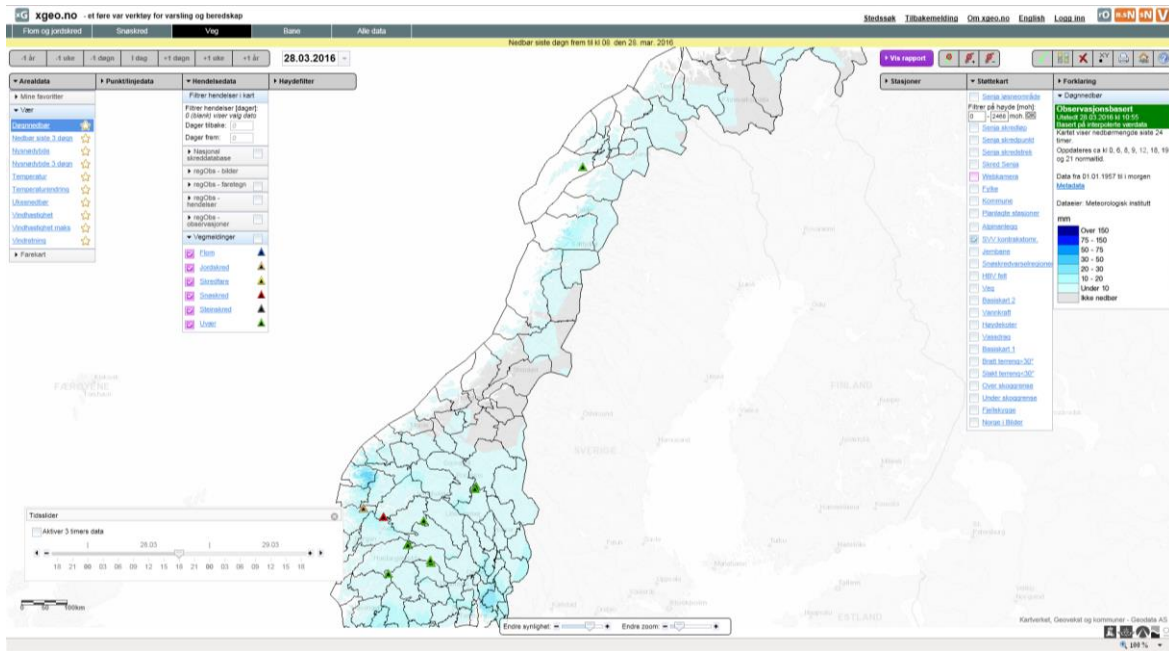
## Nyheter

**Oversomret snø i 2015**  
28.08.2015 08:31:00  
Vanligvis startes hver ny snøsesong i snøkartene den 1. September fra 'rent bord', det vil si, fra antatt barmark-tilstand ...

**Nye terskelverdier for visning av 'barmark' og 'ikke nysnø' i snøkartene.**  
11.02.2014 11:21:00  
Barmark vises nå i kart for snømengde (SWE) når SWE < 3 mm, og i kart for snødybde (SD) når SWE < 3 mm eller SD < 2 ...

**Ny versjon av snøkartene er lagt ut**  
16.01.2014 13:18:00  
Ny versjon 1.1.1 av snøkartene er blitt lagt ut og testet siden september 2013. Denne jobben er nå ferdig og alle kart siden ...

## Driftsmeldinger



# MANAGEMENT SYSTEM

- + administrative routines
- + Templates
- + Manuals / Guidelines

Office 365 E-post Kalender Personer Nytteliste OneDrive Nettsteder Oppgaver Drive Video Sway Bulkk Store Outlook.com Gett Alle Kjennerst...  
BLA GJENNOM SIDE

Styringsystemet Forbedringsportalen REDIGER KOBLINGER  
Styringsystemet

> Mine sider  
> Drift  
> Dokumenter  
> Lover og krav  
> Risikoeer  
> Mål og planlegging  
> Kompetanse  
> Hjelpe  
Områdeinnhold  
Site  
Papirkurv  
REDIGER KOBLINGER

Støtteprosessene i prosesskartet er under oppdatering. Dokumentene finner du ved å bruke søkefunksjon eller ved å navigere i det gamle prosesskartet som kommer frem når du trykker på "Støtte".

Forretningsområde: Drift og Vedlikehold

Hjem: Styringsystemet > Kjerne > Gjennomføre > Vinterprosess

Hovedprosess

Forberede → Avtale → Planlegge → Gjennomføre → Avslutte

Hovedprosessinformasjon - Gjennomføre | Prosesser: Vegard Hestdalen

Her finnes skjemaer for kontroll og kalibrering av utstyr, prosessbeskrivelser, håndbøker for bruk av elektronisk datafangst (EDF), skjema for inspeksjon og kontroll på vei, sjekkliste og mal for brakkemater og vaktlogger.

Delprosess

Kontroll/Kalibrer... → Sommerprosess → Vinterprosess → Høstprosesser → Registreringer → Avvikshåndtering

Delprosessinformasjon - Gjennomføre - Vinterprosess | Prosesser: Vegard Hestdalen

Ressurser

Styrende dokumenter

- 2. Arbeidsbeskrivelse
  - C2.03.01.34 Prosess 94.2 - Stenging og åpning av vinterstengte vegeer.docx
  - C2.03.01.35 Prosess 95 - Brøyting, rydding, strøing mm.docx
  - C2.03.01.36 Sikkerhetskontroll av plog og plogfeste.docx
  - C2.03.01.38 - Brøyting av gang- og sykkelvegeer.docx
  - C2.03.01.39 Kontroll av sand og saltspredere.docx
  - C2.03.01.44 Friksjonsmåling.docx
- 4. Skjema

Lenker for valgt forretningsområde

- A 1.02 Myndighetsmatrise Veidekke Industri 2014
- A 1.1 ledesystem Veidekke Industri AS 2016
- B4.0 - Styrringsplan Veidekke Drift og Vedlikehold (kvalitetshåndbok)
- B4.3.10 Internkontrollplan inkl. beredskapsplan
- H VARSLINGSPPLAN VED ULYKKE I Rapportering av personskade
- ISO-sertifikat Drift og vedlikehold
- Kjemi/kalibreregister ProductChange Lovdata
- Organisasjonskart Drift og Vedlikehold
- R Nye arbeidsmiljøforskrifter
- Regelhelp
- Sikkerhetskurs Drift og Vedlikehold
- Standard Norge
- Statens Vegvesen
- Statens Vegvesen dokumentaler for driftskontrakter
- Statens Vegvesen ELRAPP rapportering til SVV
- Statens Vegvesen håndbøker
- Statens Vegvesen Nasjonal Vegdatabank (kart)

Legg til ny

Sist endrede styrende dokumenter

Name	Modified
» Dokumenttype : (1)	
» Dokumenttype : 1. Styrringsplaner (1)	
» Dokumenttype : 2. Arbeidsbeskrivelse (1)	

100%

# WORK DONE - ASSESSMENT FORM

- + Document our assessments every day
- + Our employees submit documentation 3 to 4 times per day.

The screenshot displays a web application interface for 'Statens vegvesen'. The main title is 'ELRAPP TEST - D0203 Follo 2010-2015'. The interface includes a navigation menu on the left with options like 'Kontrakt', 'Innrappotering', 'Oppfølgingslogg', 'Arkiv', 'Rapporter', 'Oversiktslister', 'Grunndata', 'Administrasjon', and 'Hjelp'. The main content area is titled 'Oppfølgingslogg' and features a search filter 'Velg type: Vis alle' and 'Velg frist: 06.09.2013'. A table lists activities with columns for 'Aktivitet', 'Frist', 'Type', and 'Melding'. The table contains numerous entries, with the most recent one being 'D2 17.3.1 Inspeksjons- og kontrollplan' with a deadline of '19.01.2011'.

Aktivitet	Frist	Type	Melding
D2 17.4.10 Mengderapportering	30.08.2010	ADMINISTRATIVT KRAV	
D2 17.3.2 Beredskapsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 17.2.3 Årsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 17.3.2 Beredskapsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 17.1 Kvalitetsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 17.3.6 Restholtsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 18.14.1 Avfallsplan	01.09.2010	ADMINISTRATIVT KRAV	
D2 17.1 Revisjonsprogram	01.09.2010	ADMINISTRATIVT KRAV	
D2 31 Faktureringsplan øvrige kalenderår i kontraktperioden	01.09.2010	ADMINISTRATIVT KRAV	
Jeving vinterplan utsatt en uke	08.09.2010	OPPFØLGING	
D2 17.3.1 Inspeksjons- og kontrollplan	15.09.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	29.09.2010	ADMINISTRATIVT KRAV	
D2 17.4.10 Mengderapportering	30.09.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	13.10.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	27.10.2010	ADMINISTRATIVT KRAV	
D2 17.4.10 Mengderapportering	30.10.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	10.11.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	24.11.2010	ADMINISTRATIVT KRAV	
D2 17.4.10 Mengderapportering	30.11.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	08.12.2010	ADMINISTRATIVT KRAV	
D2 31 Faktureringsplan 1.kalenderår	15.12.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	22.12.2010	ADMINISTRATIVT KRAV	
D2 17.4.10 Mengderapportering	30.12.2010	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	05.01.2011	ADMINISTRATIVT KRAV	
D2 17.3.5 Grennplan	15.01.2011	ADMINISTRATIVT KRAV	
D2 17.3.1 Inspeksjons- og kontrollplan	19.01.2011	ADMINISTRATIVT KRAV	

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# GPS CONTROL

- + GPS tracker in all units.
- + payment by GPS tracking
- + Control - logs where we 've been.





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# EDUCATION OF WINTER MAINTENANCE PERSONELL

- + Requirements to participate in winter operations courses.
  - 3 days theory and 1 day practice
  - Examinations for all, including administrative personell on contract.
  - Valid for 5 years
- + Kick-off meeting each winter. Including safety inspections and risk assessment
- + Evaluation after each season.



# PRACTICAL EDUCATION



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# EQUIPMENT MAINTENANCE

- + Safety inspections and calibration before the start of winter process
- + Snow equipment checked at least 1 time per month. Written documentation required.
- + Equipment for sand/salt is calibrated at least 1 time per month, and after new shipment of sand and salt
- + A safety inspection is done at least 1 time per month
- + Accidents are reported throughout the year. All reports will be treated seriously.
- + It is required to have backup on critical materials / equipment in the contract.



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# WHAT IS THE BEST EQUIPMENT FOR WINTER MAINTENANCE?

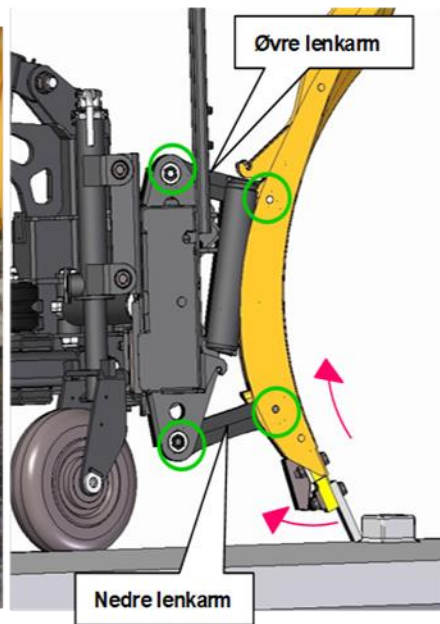
- + All equipment has its limitations.
- + Important that we and NPRA describe this in the contract. You get what you pay for.
- + There is a difference between highland and lowland, coastal and inland.
- + NPRA has requirements for equipment to be used in winter maintenance.
- + Plow Steel costs. Who should pay? Advantage and Disadvantages?
- + Brøyting isachsen





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# WINTER MAINTENANCE EQUIPMENT











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# WINTER ROAD SAND AND SALT

- + Demanding to do this right.
- + Requirements for friction
- + Salt dissolved in water is favored. It is effective and works instantly
- + Payment based on amount from NPRA.
- + Different payment terms with the subcontractor. Payment in hours worked has been the standard.
- + Mismatching between payment is a challenge.



26/01/2012 10:56

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# SPECIAL WINTER MAINTENANCE













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# AVALANCHE

- + Special procedure when avalanche
  - + Geologist / avalanche expert from NPRA determines clearing in consultation with the contractor
  - + Avalanche equipment is always present
  - + Geologist / avalanche expert from NPRA determines whether the road should be opened or not.
  - + Road to be opened only in the daytime.
- 
- + Contractor may close the road at risk of avalanches but NPRA shall immediately be informed



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# CONVOY

- + Own routines for this at all relevant road sections.
- + Snowplough front and convoy escort vehicle behind .
- + Radio communications between work vehicles.
- + limited opening time for convoy.



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# OPENING OF ICED CULVERT



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# WHAT ARE THE CHALLENGES?

- + Demanding contracts
- + Education and training of crews. Many theoretical requirements.
- + Ways of doing things practically and maybe in a different way than before.
- + "Short" tender process.
- + Much documentation and requirements in contracts
- + Proper personnel in the right place.

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# RESEARCH AND DEVELOPMENT PROJECTS

## + Compact Salt / table salt

- Dissolves faster with water. Works faster on the road.
- Requires more advanced storage facilities (heat and humidity)
- The impact is still under testing.

## + Weight measuring on gritting equipment

- More accurate measurement of consumption
- Possibly a more stable measurement method than plate spreader.
- Source of error can be snow and ice that settles on the load platform
- Still being tested