

SSAB:n Teräspaalupäivä

27.1.2022



SSAB



Kattegat Quay Extension

Large diameter piles in deep and demanding ground conditions

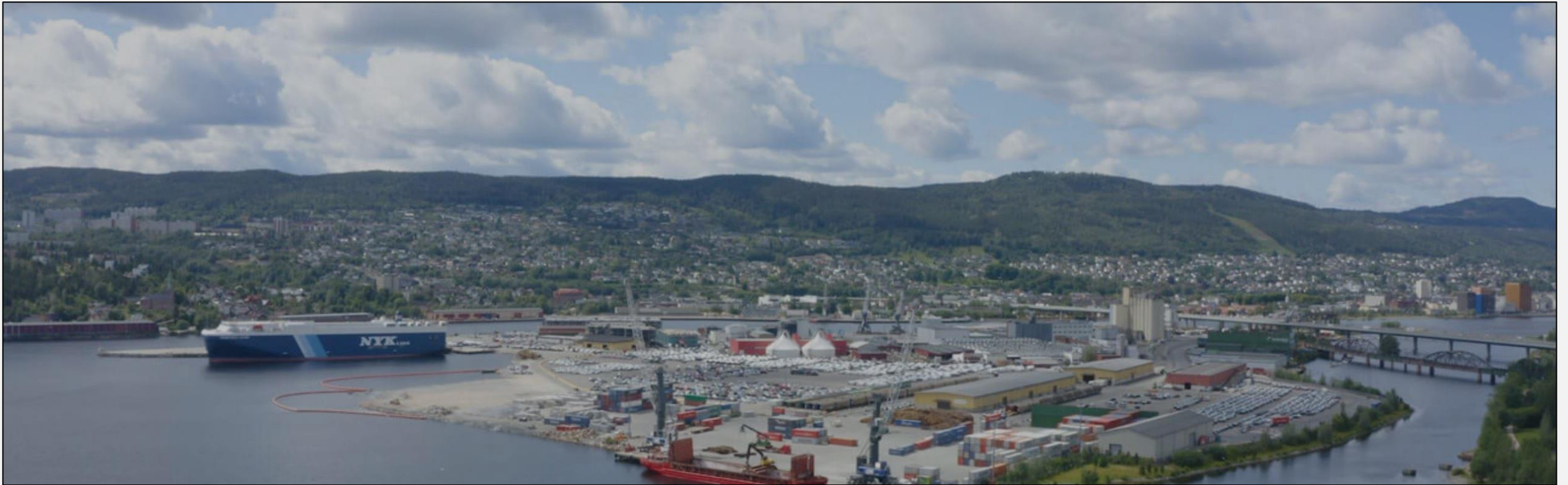
Sondre Smeland

Technical Manager – SSAB

SSAB

Project information

- Harbor located in Drammen (Norway's 5th largest city)



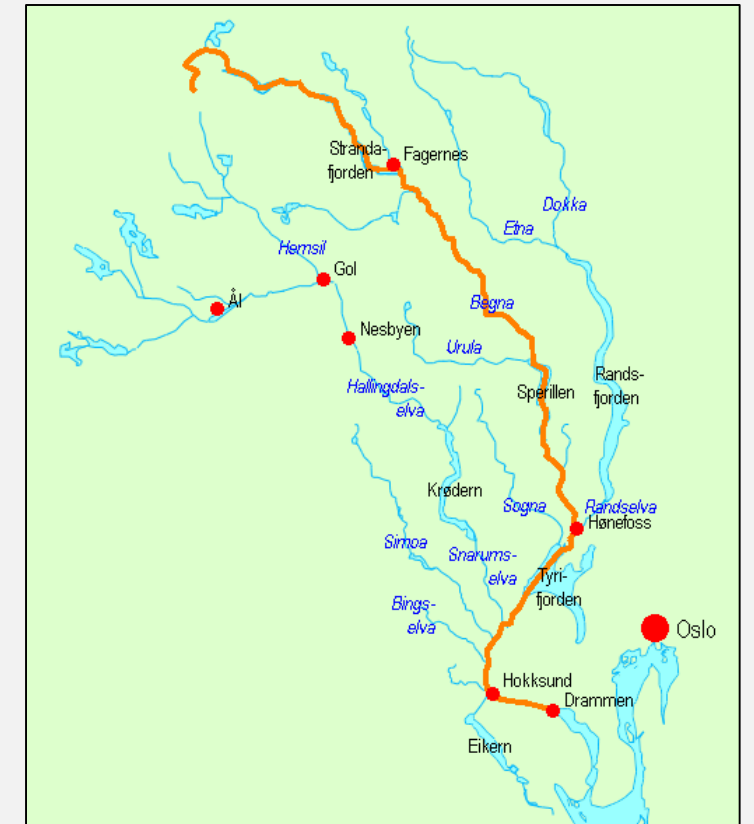
Project information

- Old history going back to the Viking Age



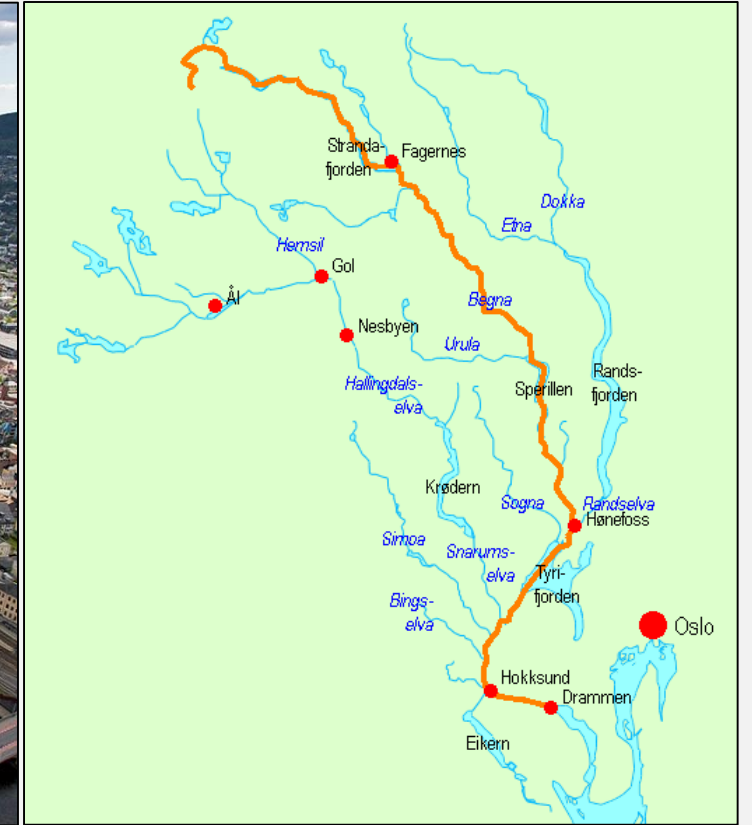
Project information

- Became Norway's principal gateway for timber exports



Project information

- The port has a total of 200.000 sq.m of open storage



Project information

- Size and importance of the harbour
 - Quay length of 850m
 - 4 individual quays
 - Max ship size
 - Length 250m
 - Height 45m
 - Depth 11m
 - 4 operative cranes
 - El-power connection for ships
 - Close to highway and railroad

- Extension of 200m of the Kattegat Quay



Project information

- ▶ Size and importance of the harbour
 - Quay length of 850m
 - 4 individual quays
 - Max ship size
 - Length 250m
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 - Close to highway and railroad
- ▶ Extension of 200m of the Kattegat Quay
- ▶ Biggest harbor in Norway for car import



Project information

► SSAB deliveries

– RD750/20 S355J2H

- 3100m
- 18m lengths

– RR600/18 S440J2H + rock shoes

- 8100m

► TOTAL: 3250ton

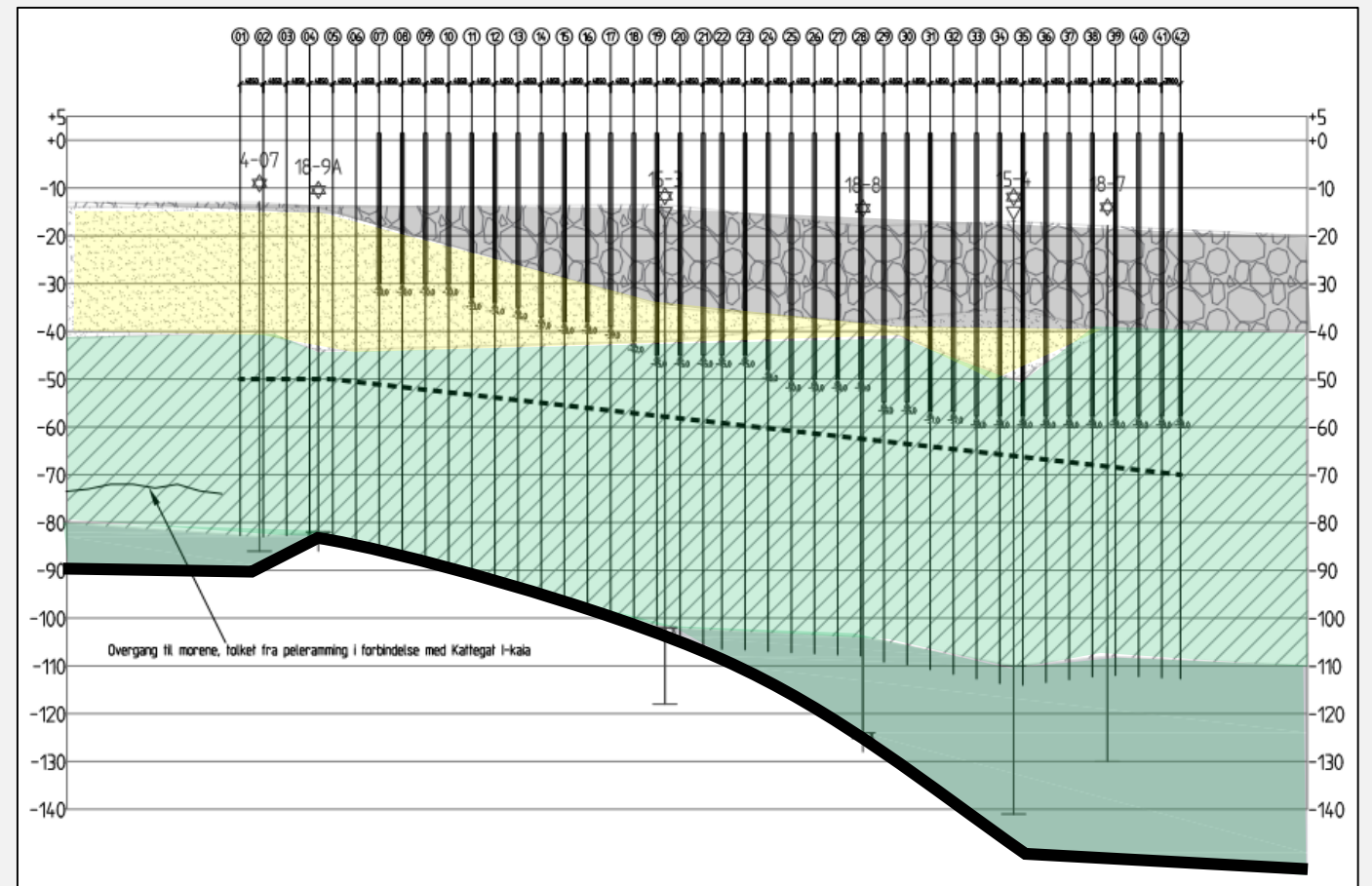
- 120 truck deliveries from Oulainen



Design and installation

► Ground conditions:

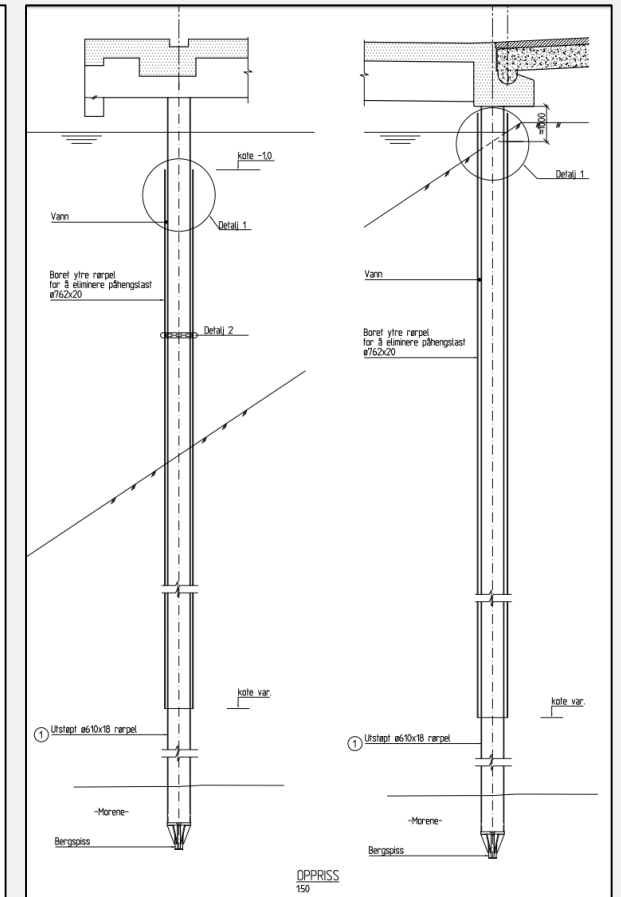
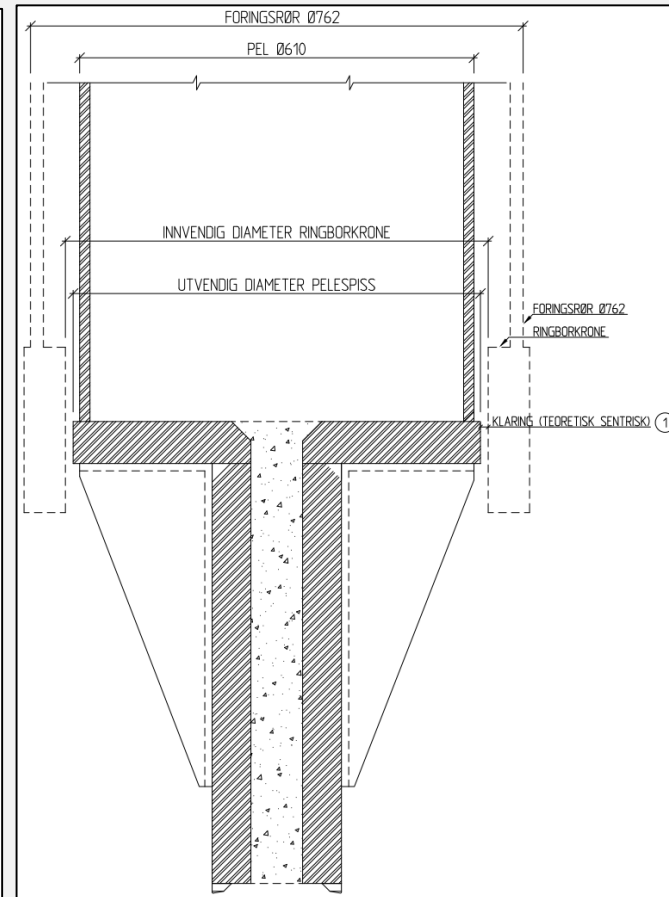
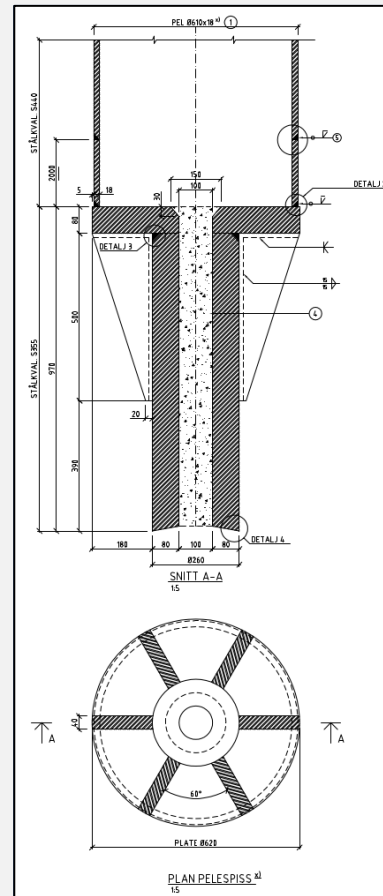
- Rock filling
- Sand and saw dust
- Clay
- Morain
- Bedrock



Design and installation

► Pile design

- RD750 as casing tube
 - Drilled
- RR600 as end-bearing pile
 - Rammed
- Rock shoe manufactured and robot-welded by SSAB

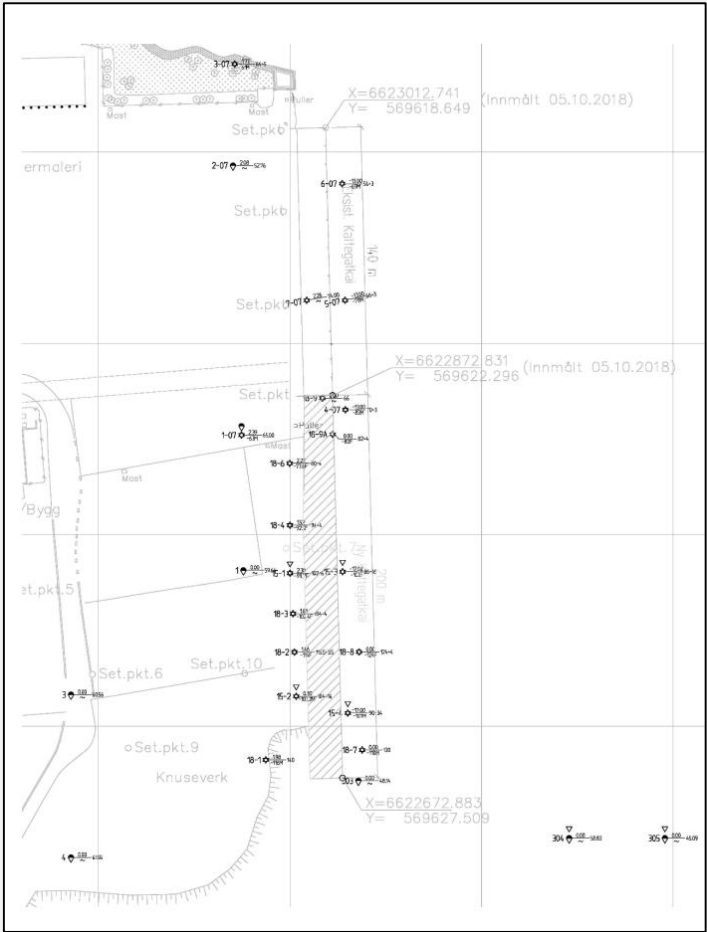


Design and installation



Capacity calculation

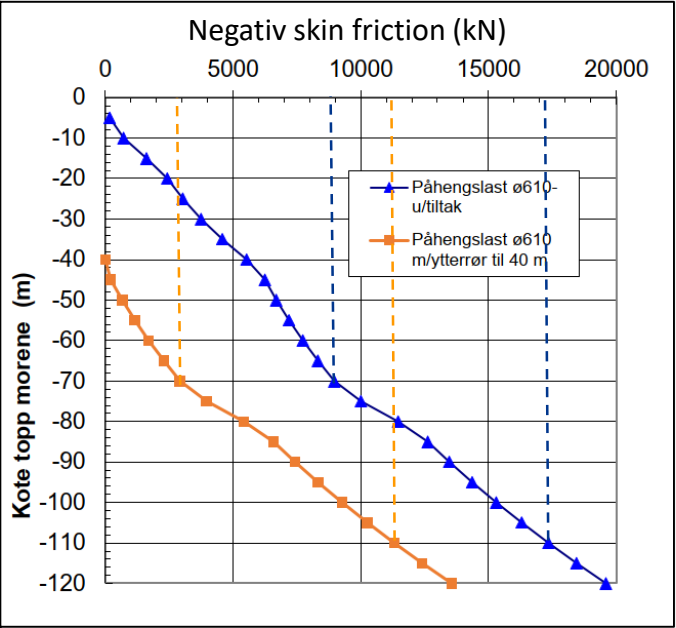
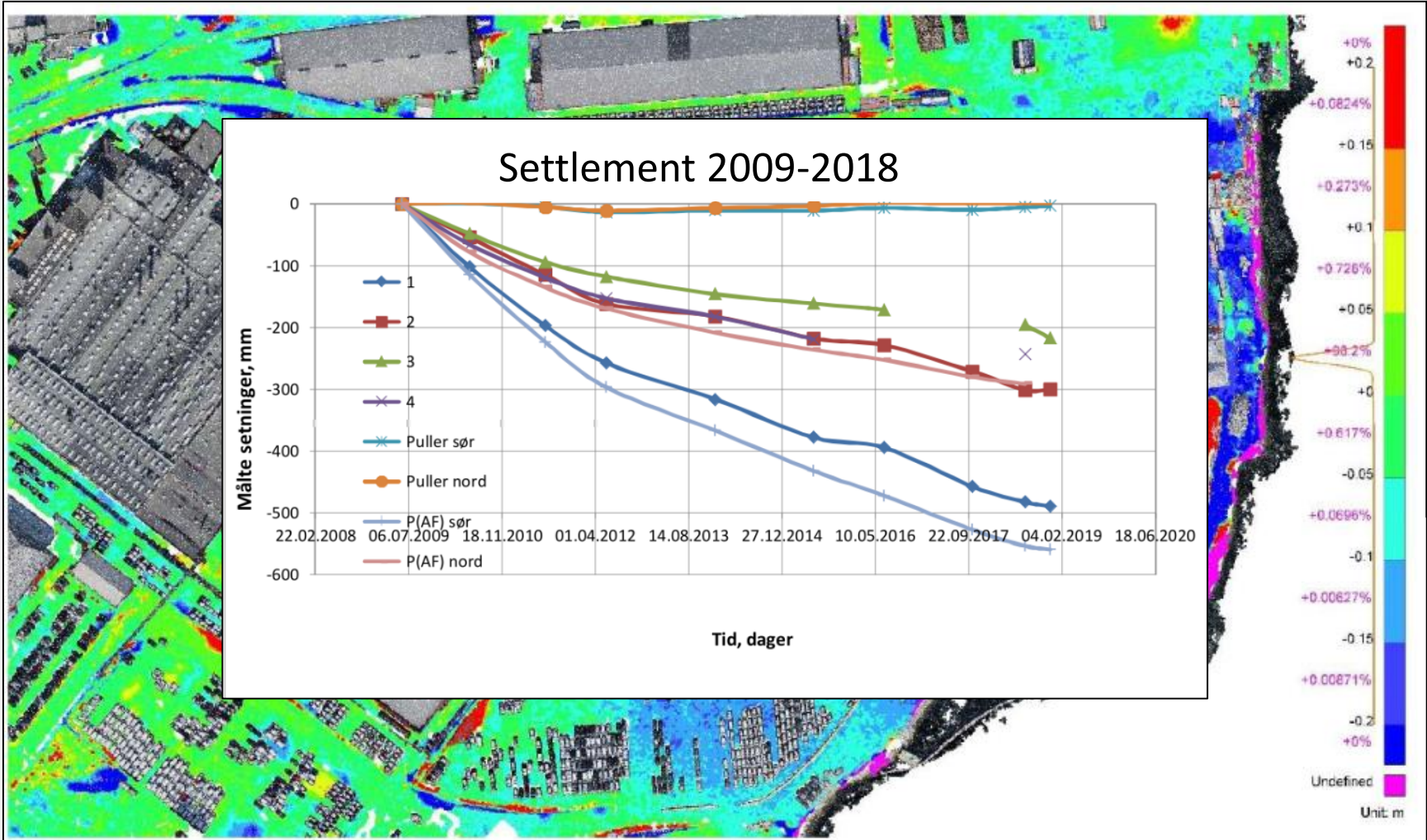
Pile row	Permanent load (kN)	Variable load (kN)	Total load (kN)
A – inner row	1108	3904	5011
B – outer row	1808	3359	5167



Capacity calculation

Pile row	Permanent load (kN)	Variable load (kN)	Total load (kN)		
A – inner row	1108	3904	5011	Reduction factor:	0,8
B – outer row	1808	3359	5167	Corrosion:	1,5mm/ 100year
				Concrete	B35
Diameter	Wall thickness	Steel grade	Capacity (kN)	Concrete (kN)	TOTAL (kN)
RR600	18mm	S440J2H	10 261	4 106	14 367
RD760	20mm	S355J2H	11 641	6 550	18 191

Capacity calculation



Designed for 10MN
skin friction

Questions?

Sondre Smeland

Technical Manager – SSAB

Facts:

Project: *Kattegat quai II*

Owner: *Drammen Havn*

Contractor: *NRC Group AS*

Pile contractor: *Fundamentering AS*

Sub-contractor: *Destia OY*

Consultants: *Norconsult, Rambøll and NGL*

Budget: *31 mill EUR*

SSAB delivery: *3,2 kton*

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