

**SSAB**



*A stronger,  
lighter and more  
sustainable world*

# SSAB in brief

**129** BILLION  
SEK  
Revenue in 2022



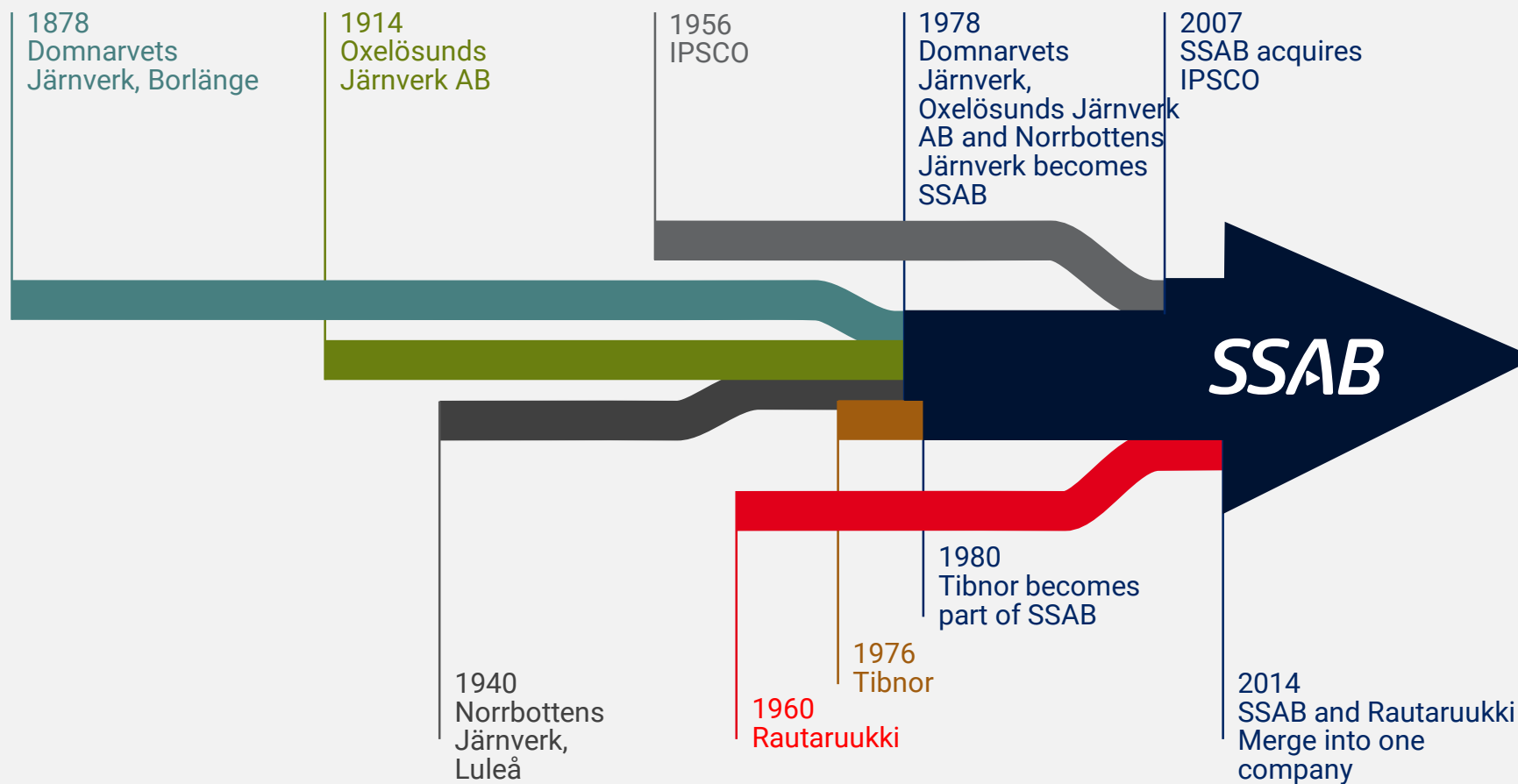
Annual steel  
production capacity:  
**8.8** MILLION  
TONNES

Steel making since  
**1878**

**14,500**  
professionals  
in over 50 countries

**OUR BUSINESSES:**  
SSAB Special Steels,  
SSAB Europe,  
SSAB Americas, Tibnor,  
Ruukki Construction

# This is where we come from



# Strong global and local



# SSAB in the global steel market

SSAB is market leader in defined areas of the global steel market

Global carbon steel market  
100%:  
~1800 million tonnes



SSAB  
3%

## SSAB focus markets

Special steels  
Globally<sup>1</sup>

Automotive premium steel  
Globally<sup>2</sup>

Flat carbon steels and tubes in  
The Nordics

Heavy plate in  
North America

### Market size, million tonnes

~5

~20

4-5

~10



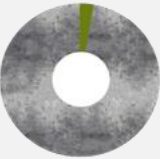
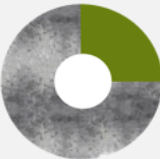
### SSAB market share, %

~25%

~3%

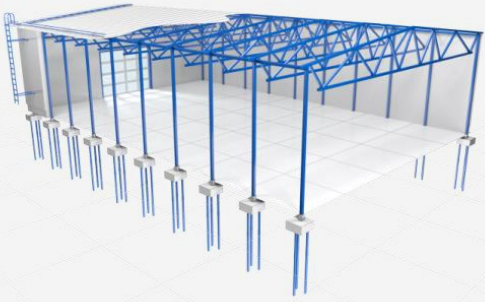
~40%

30-35%



1) Defined as Quenched & Tempered (Q&T) flat products and Hot-rolled Advanced High-Strength Steel (AHSS)  $\geq 700\text{MPa}$   
2) Defined as hot-rolled, cold-rolled and coated Advanced High-Strength Steel (AHSS) strip products for automotive  $\geq 420\text{MPa}$

# TUBULAR



CONSTRUCTION



LEISURE & OUTDOOR



AGRICULTURE



INDUSTRIAL APPLICATION



TRANSPORTATION



LIFTING & HANDLING



AUTOMOTIVE



FURNITURE



BUS

# SSAB Tubular Products

## STRUCTURAL HOLLOW SECTIONS

SSAB DOMEX TUBES

**STRENX™** TUBES  
PERFORMANCE STEEL

SSAB WEATHERING TUBES



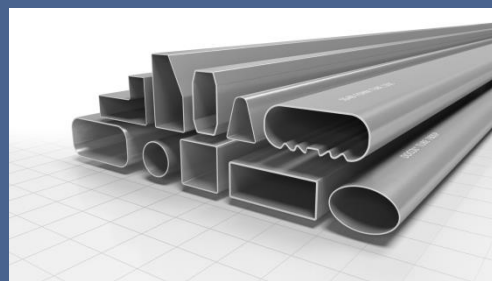
## PRECISION TUBES

SSAB FORM TUBES

SSAB FORM TUBE PLUS

SSAB BORON TUBES

**DOCOL®** TUBES  
THE AUTOMOTIVE STEEL

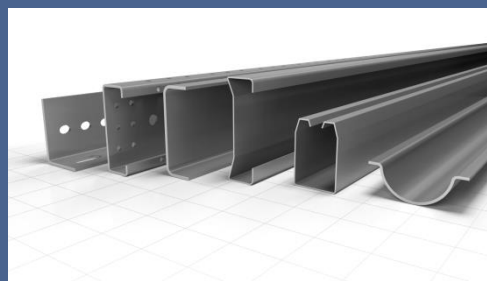


## COLD-FORMED SECTIONS

SSAB DOMEX SECTIONS

**STRENX™** SECTIONS  
PERFORMANCE STEEL

TAILORED SECTIONS



## INFRASTRUCTURE PRODUCTS

RR® PILES

RD® PILES

RD® PILE WALL & COMBI WALL

TRAPEZOIDAL SECTIONS

SAFETY BARRIER SYSTEMS

WATER MAINS



**SSAB**

# History of the "steel pipe piles"

Concrete piles:	1 509 647m	(56%)
Driven steel piles:	652 774m	(24%)
Drilled steel piles:	334 294m	(13%)
Steel core piles:	11 670m	(<1%)
Wooden piles:	74 330m	(3%)
Other:	78 731m	(3%)
Sum:	2 661 346m	(100%)

Steel piles

Stålpålar	
2021	1 028 000
2020	1 052 000
2019	1 011 000
2018	1 050 000
2017	1 352 000
2016	956 000
2015	633 000
2014	766 000
2013	710 000
2012	689 000
2011	687 000
2010	633 000
2009	510 000
2008	594 000
2007	728 000
2006	551 000
2005	587 000
2004	589 000
2003	401 000
2002	431 000
2001	386 000
2000	334 000
1999	310 000
1998	258 000
1997	241 000
1996	238 000
1995	167 000

800%



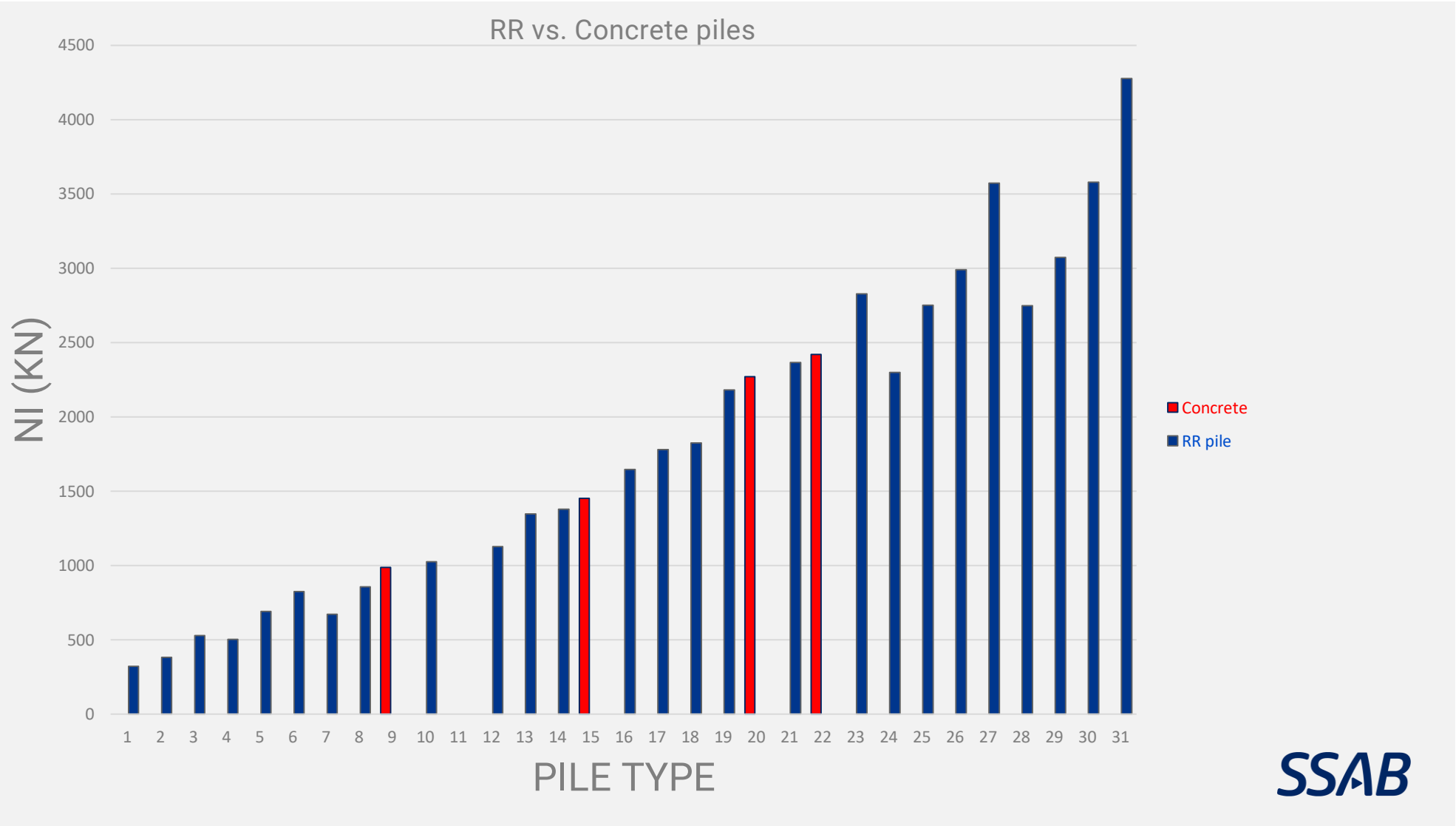


## RR<sup>®</sup> and RD<sup>®</sup> micro piles

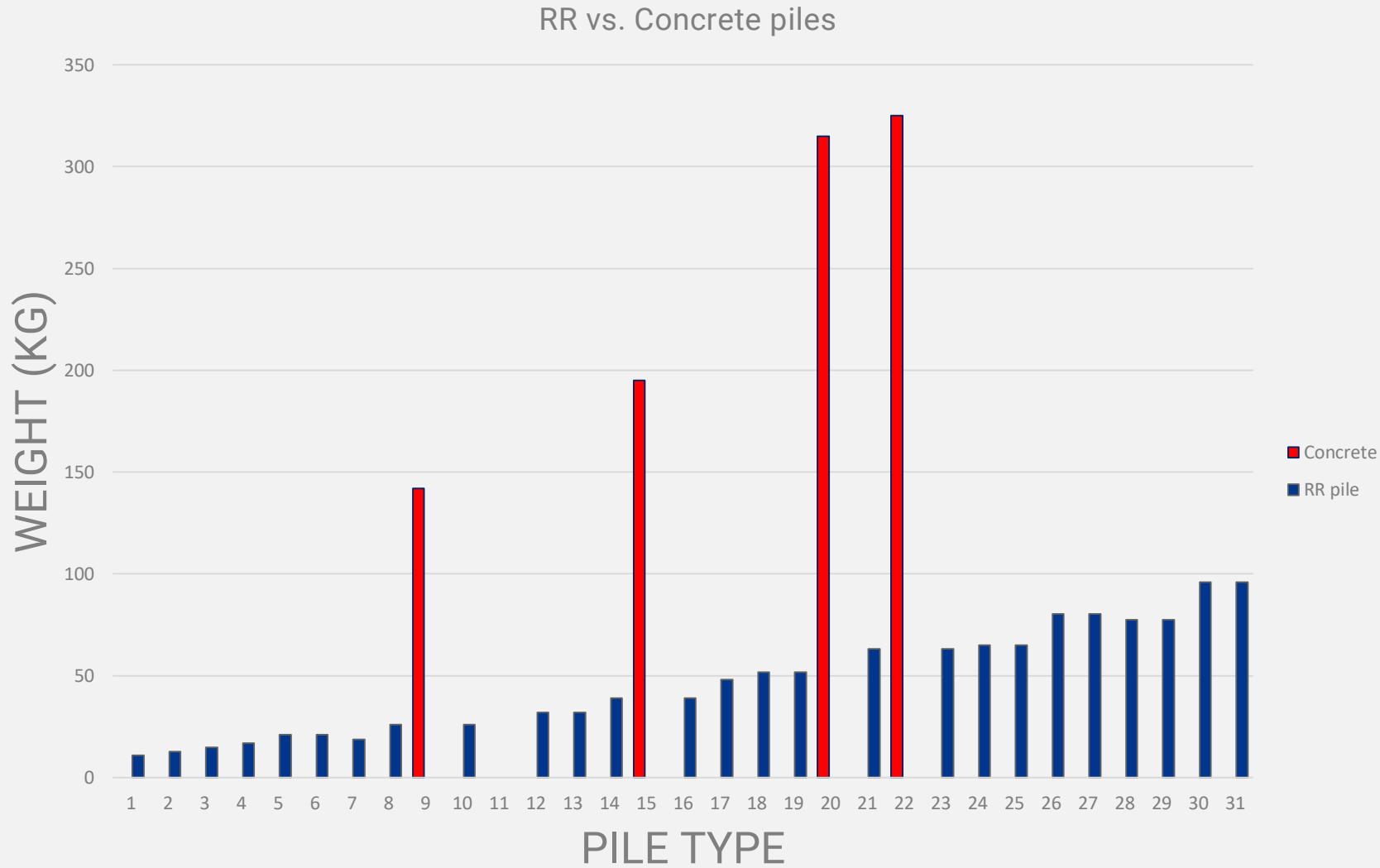
- ▶ Named after installation method
  - RR<sup>®</sup> driven pile
  - RD<sup>®</sup> drilled pile
- ▶ Dimensions
  - diameter 75 – 320 mm
  - wall thickness 6.3 – 12.5 mm
  - Capacity = 300 – 3700 kN
- ▶ Steel grades
  - RR<sup>®</sup>/RD<sup>®</sup> pile S460MH
  - RR<sup>s</sup><sup>®</sup>/RD<sup>s</sup><sup>®</sup> pile S550J2H



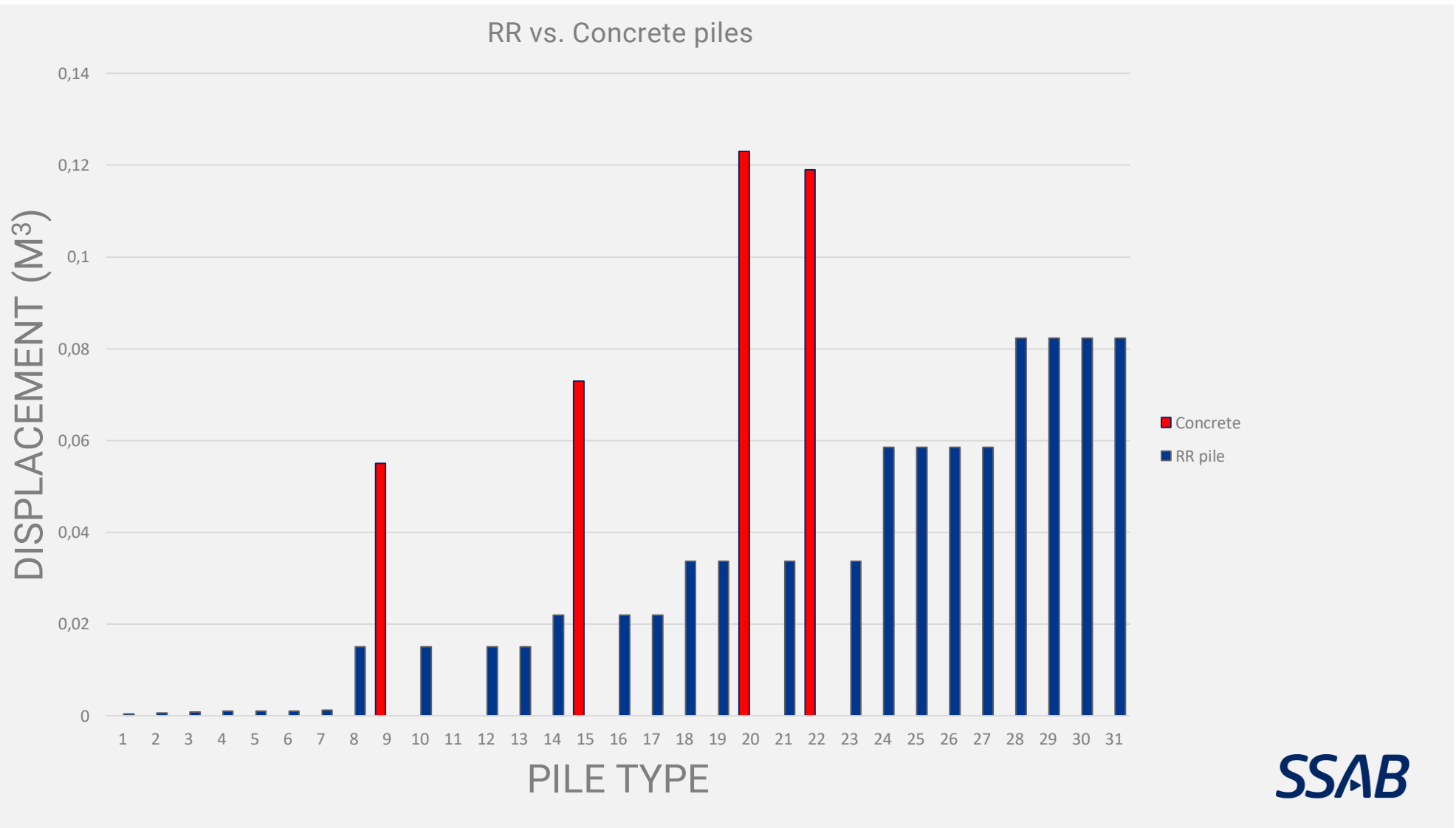
# RR<sup>®</sup> piles vs. concrete piles



# RR<sup>®</sup> piles vs. concrete piles



## RR<sup>®</sup> piles vs. concrete piles

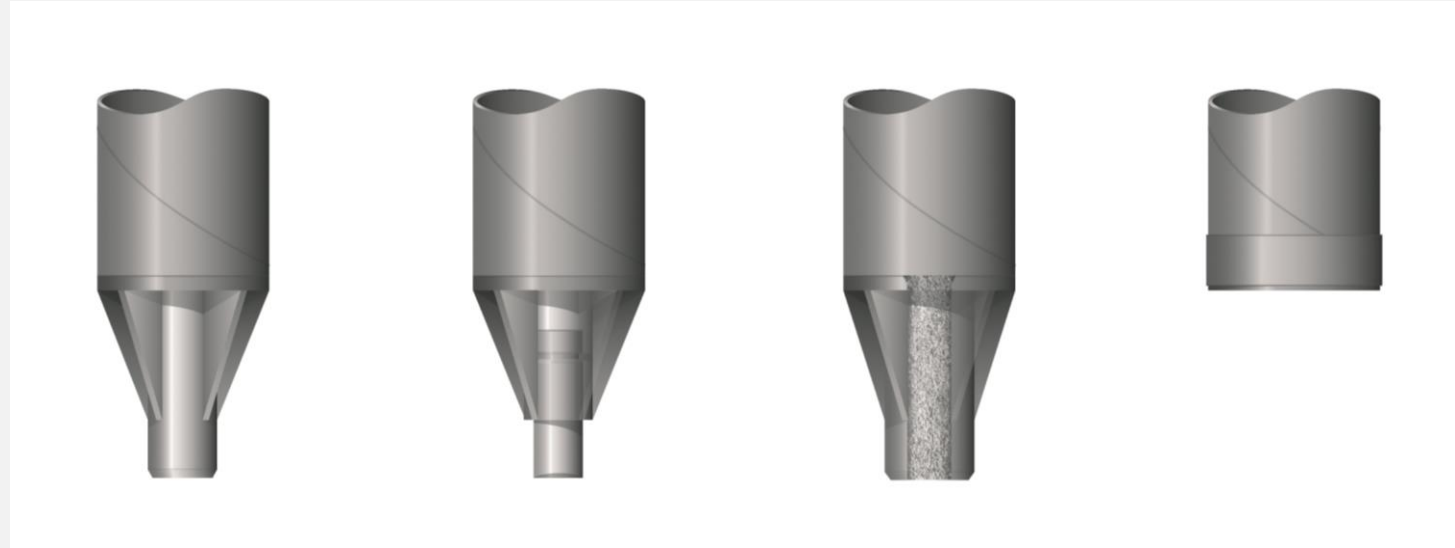


## RR<sup>®</sup> and RD<sup>®</sup> large diameter piles

- ▶ Named after the installation method
  - RR<sup>®</sup> Rammed pile
  - RD<sup>®</sup> Drilled pile
- ▶ Dimensions
  - RR400 – RR/RD1200
  - Wall thickness 8 – 23 mm
- ▶ Steel quality
  - RR<sup>®</sup>/RD<sup>®</sup> pile S355J2H, S440J2H and S460MH
  - RR<sup>s</sup><sup>®</sup>/RD<sup>s</sup><sup>®</sup> pile S550J2H



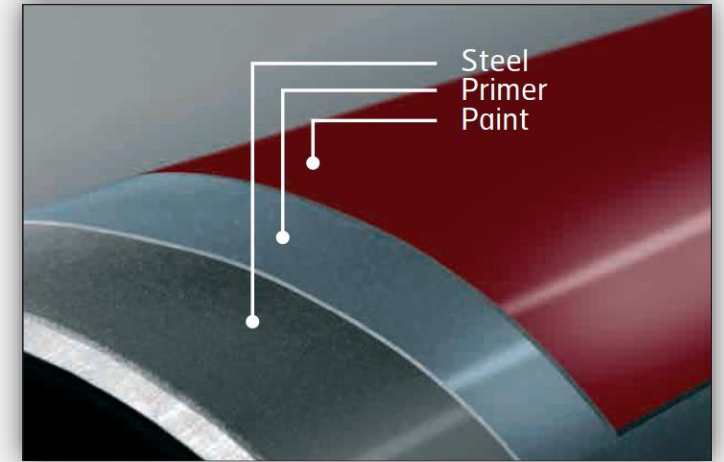
## Shoe types of large diameter RR piles



- ▶ Rock shoe with structural steel dowel
- ▶ Rock shoe with hardened steel dowel
- ▶ Rock shoe with hollow dowel
- ▶ Toe reinforcement

## Painting

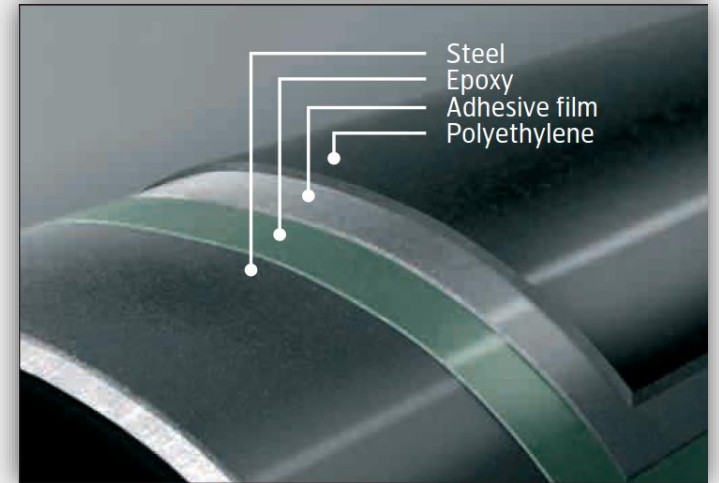
- ▶ Available for RR/RD400...RR/RD1200 large diameter piles
- ▶ Painting is possible also for RD pile walls and Combi walls (including sheet piles)





## Polyethylene coating

- ▶ Can be applied to 10...18 m long piles
  - Longer pipes are splice welded, and the joint is protected with joint coating
- ▶ PE coating is not possible for RD pile walls and Combi walls

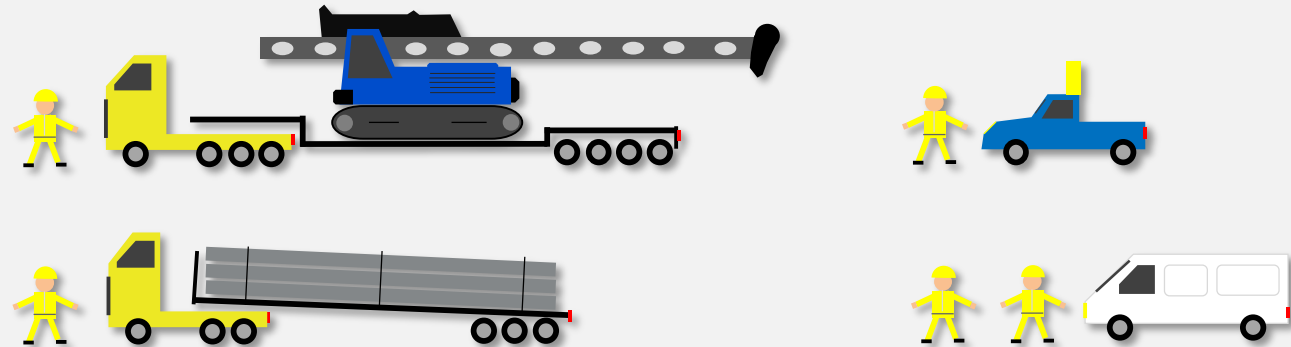


# Installation equipment for driven piles

▶ RR75 → RR140 (RR170)



▶ RR140 → RR1200



If needed:

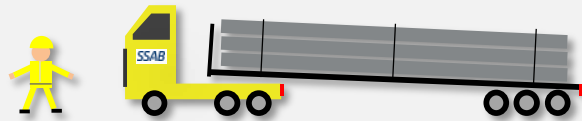
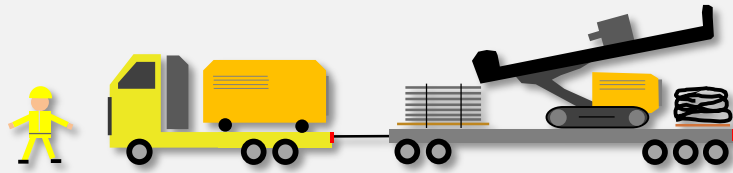


# Installation equipment for driven piles



# Installation equipment for drilled piles

▶ RD90 → RD140

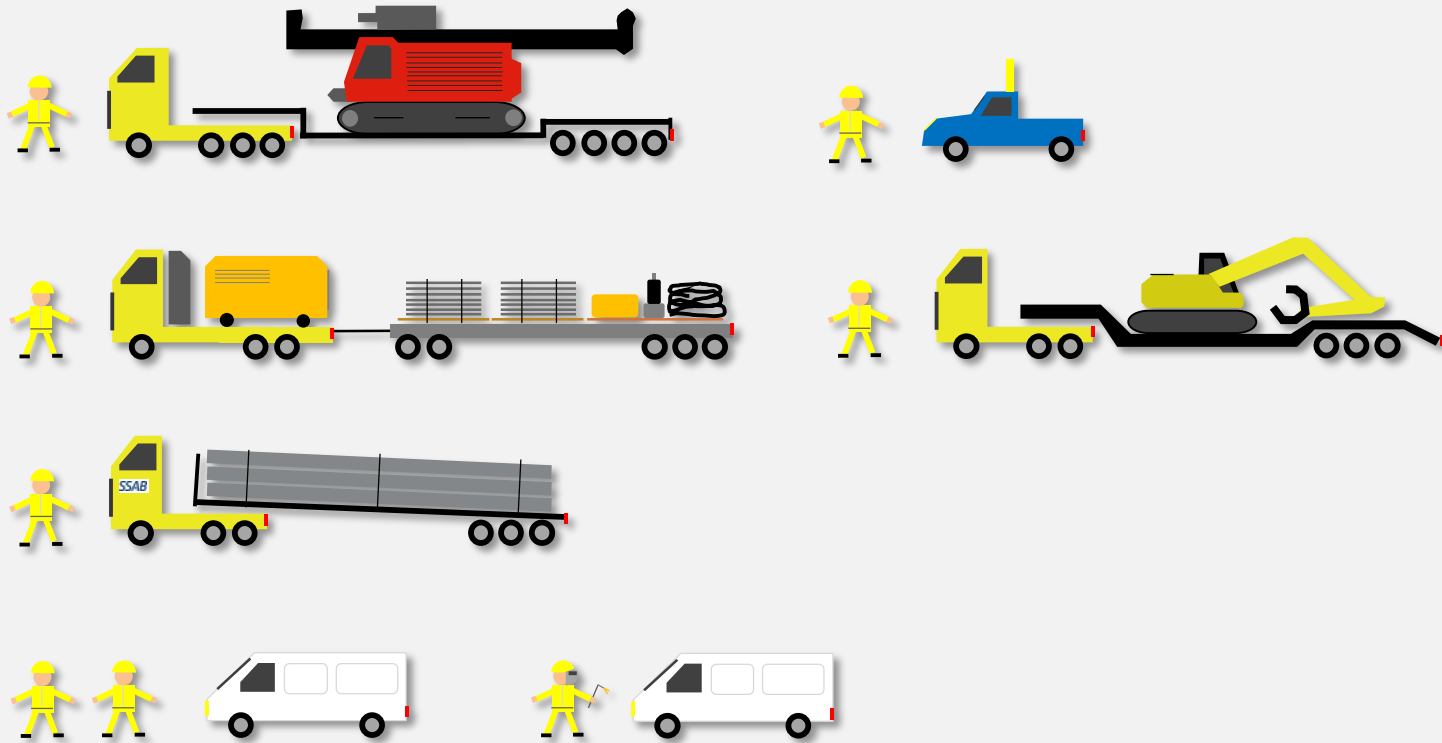


# Installation equipment for drilled piles

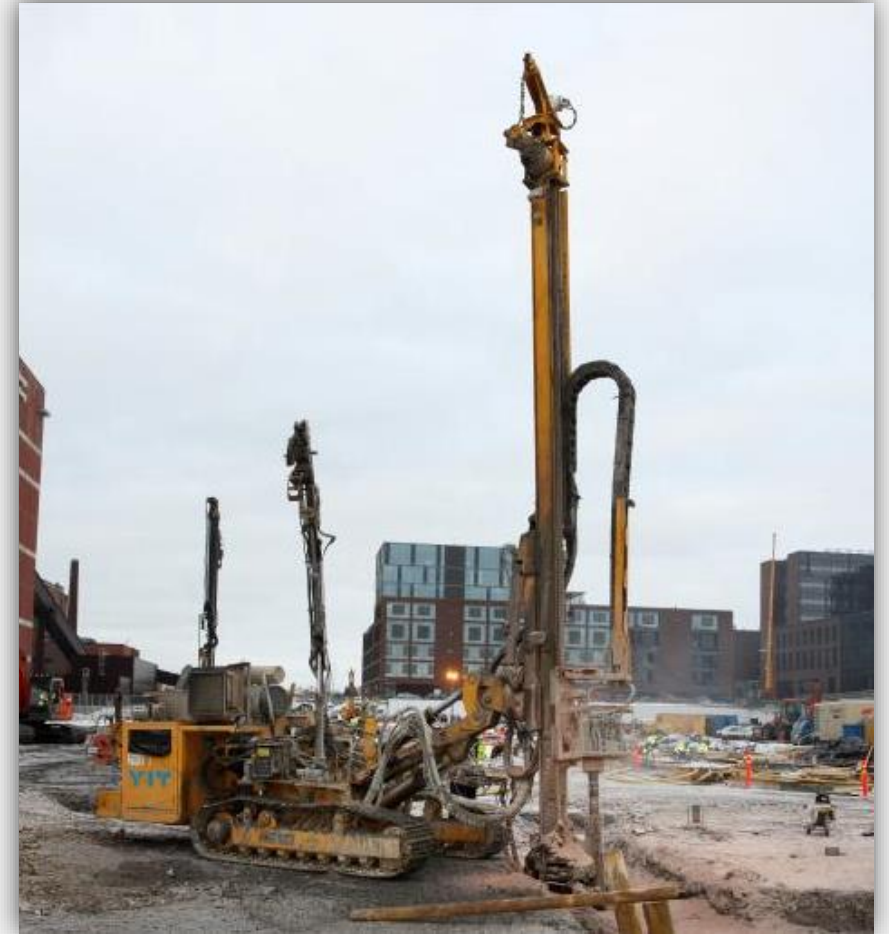


# Installation equipment for drilled piles

▶ RD170 → RD400 (RD500)



# Installation equipment for drilled piles



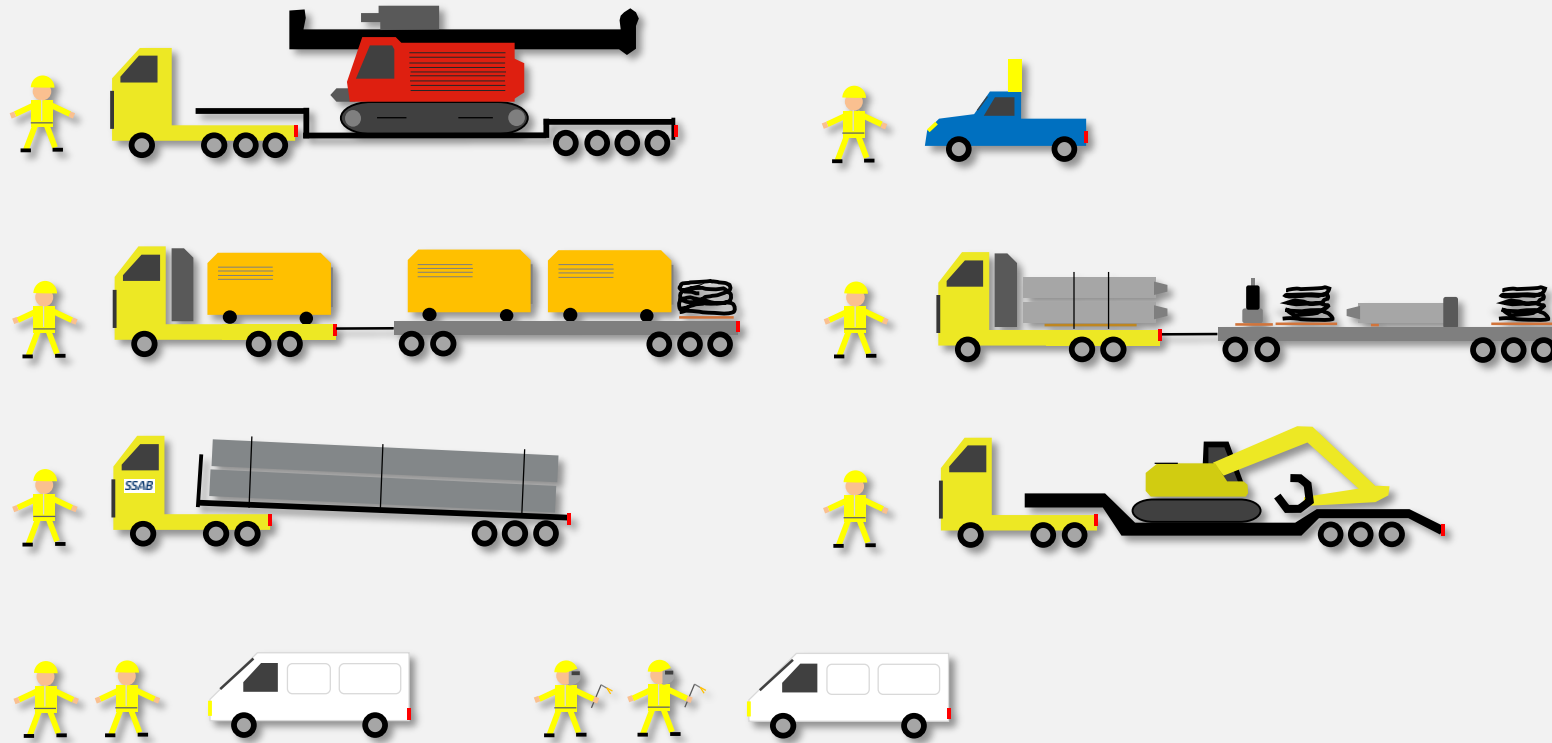




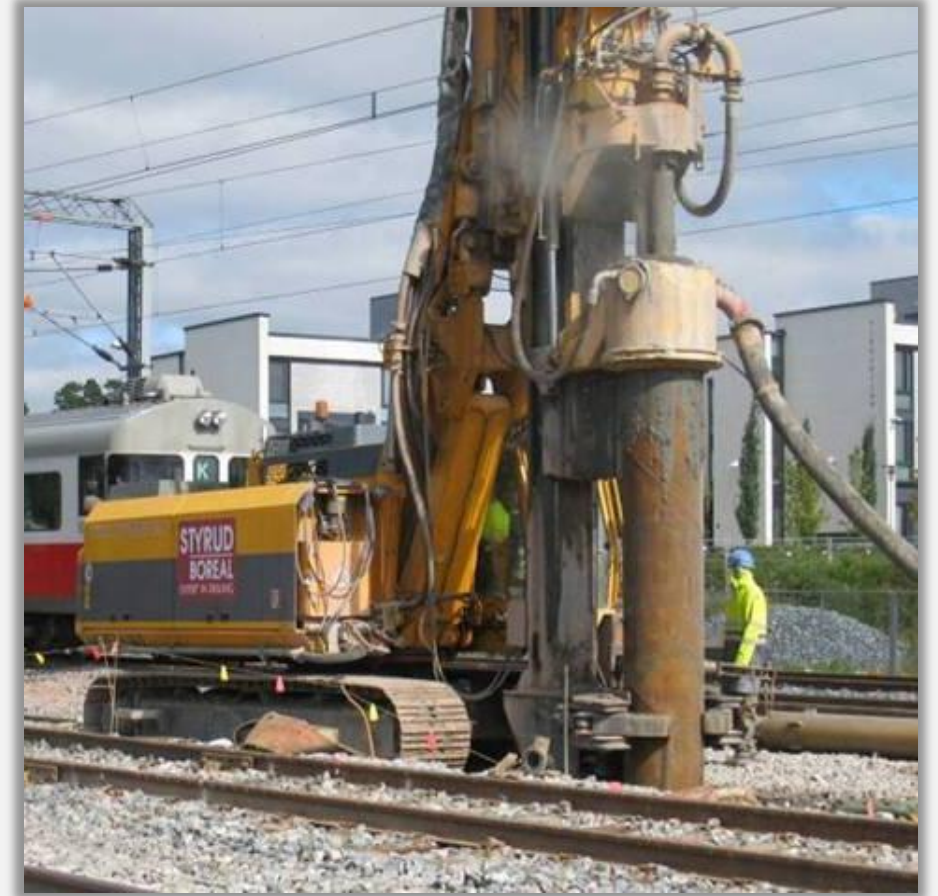


# Installation equipment for drilled piles

▶ RD500 → RD1200



# Installation equipment for drilled piles





**Longyearbyen, Svalbard – RD micro piles (S550J2H)**



**Karenlyst Allé, Oslo – RD micro piles (underpinning)**



**Grillstad Marina, Trondheim – Pipe in pile with PE-coating**



**Åstfjorden, Trøndelag – LDP, RR piles**



**Rotterdam, Netherland – LDP, RR piles w/ PE-coating**

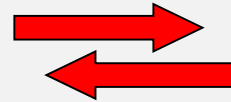




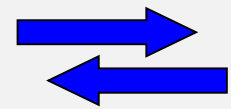
**Marine installation in Stockholm – RD micro piles** *SSAB*

## Energy Piles

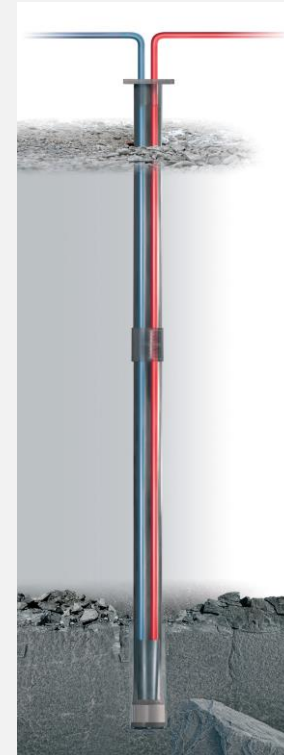
- ▶ Steel pipe piles makes it possible to combined both foundation structure and energy harwest



Energy stored in the soil during the summer

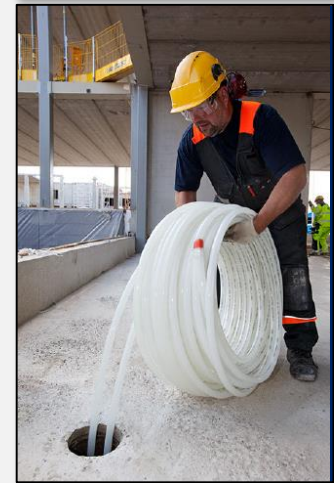
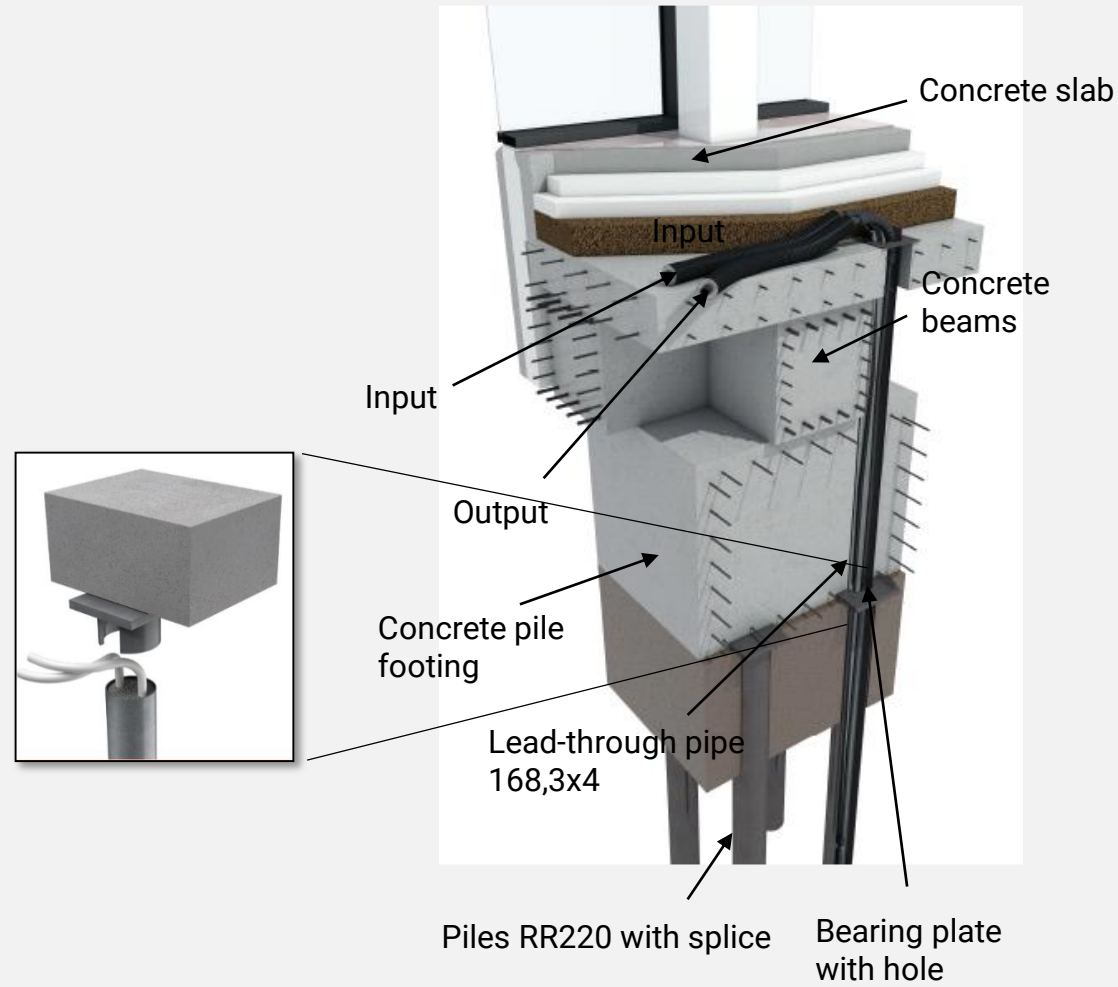


The low temperature in the soil is used as cooling



- ▶ Dimensions for energy piles:
  - RR-piles (RR90-RR1200)
  - RD-piles (RD90-RD1200)

# Larger buildings



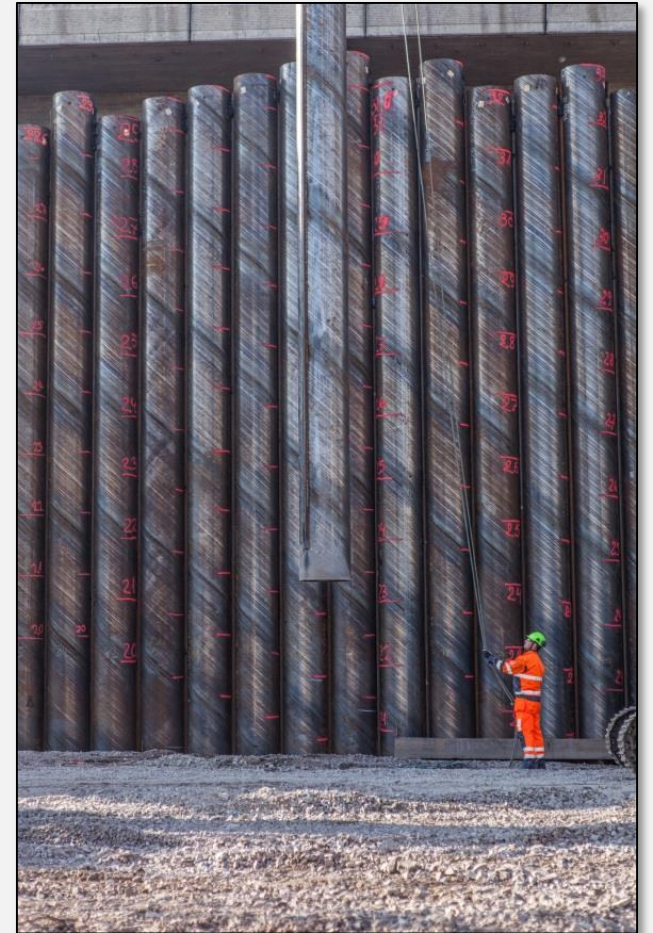
## Smaller buildings

- ▶ Cooling-energy
  - 10 - 15 W/m
- ▶ Heat-energy
  - 35 W/m
- ▶ Suitable soil thickness
  - > 7 m



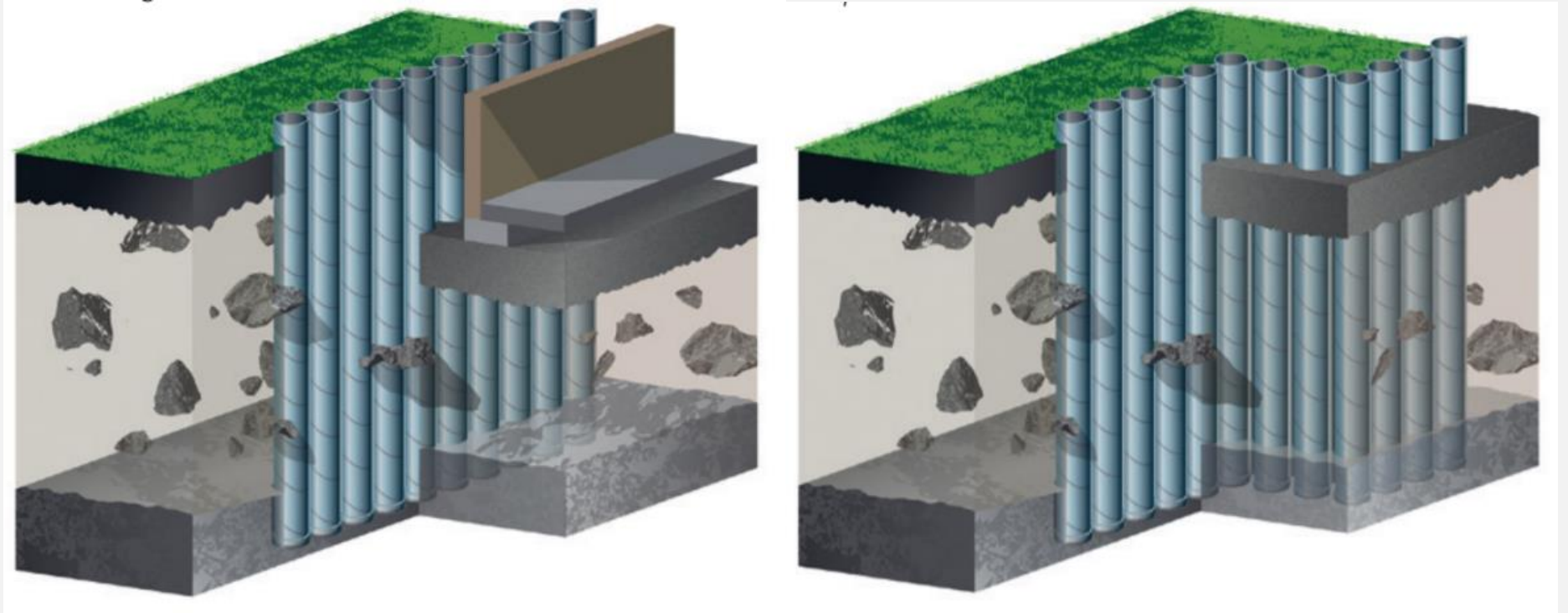
## RD<sup>®</sup> pile wall

- ▶ Reliable retaining wall and foundation solution based on drilled RD piles
- ▶ Especially for demanding conditions
- ▶ A foundation solution which combines separate horizontally loaded and vertically loaded structures to one entity
- ▶ Watertight solution
- ▶ Withstands large moment forces

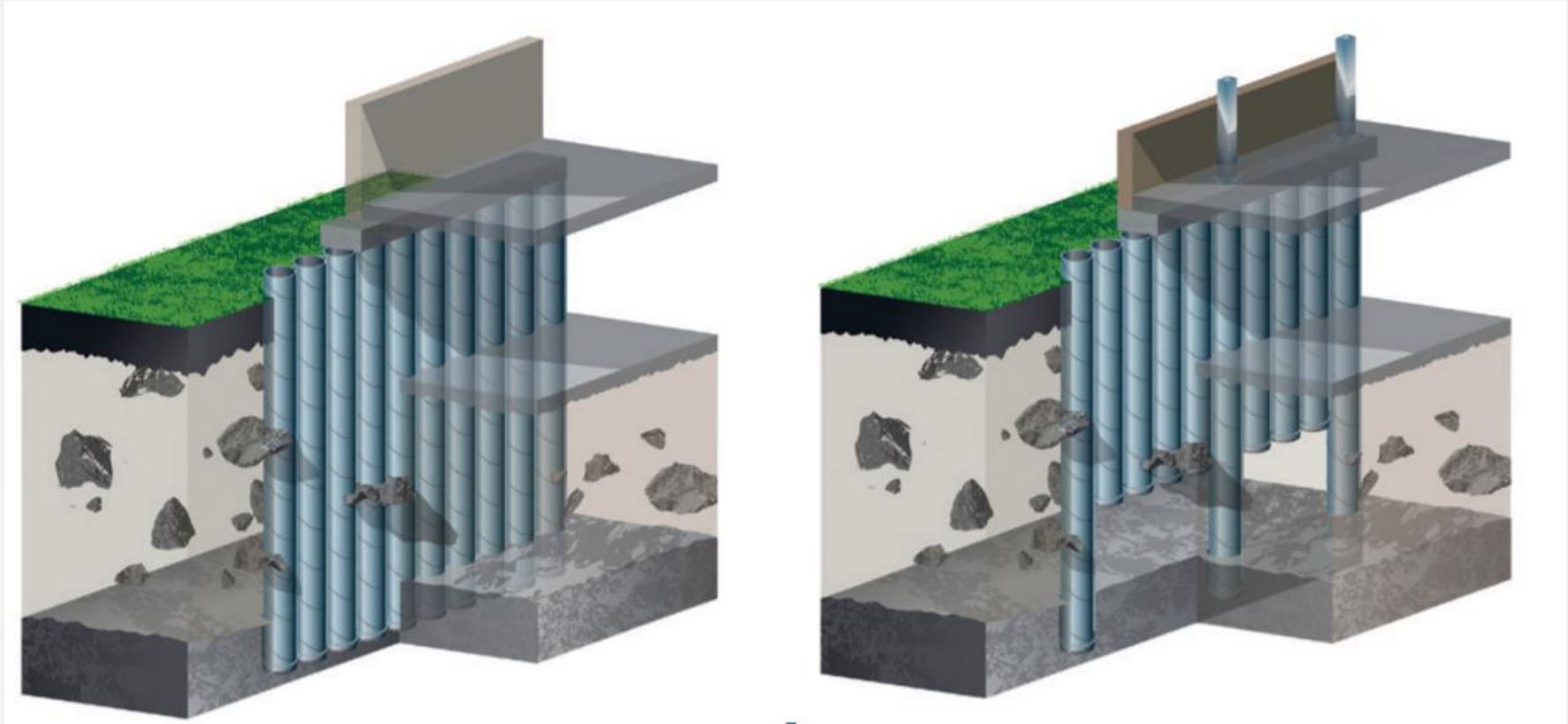




# RD<sup>®</sup> pile wall as support structure

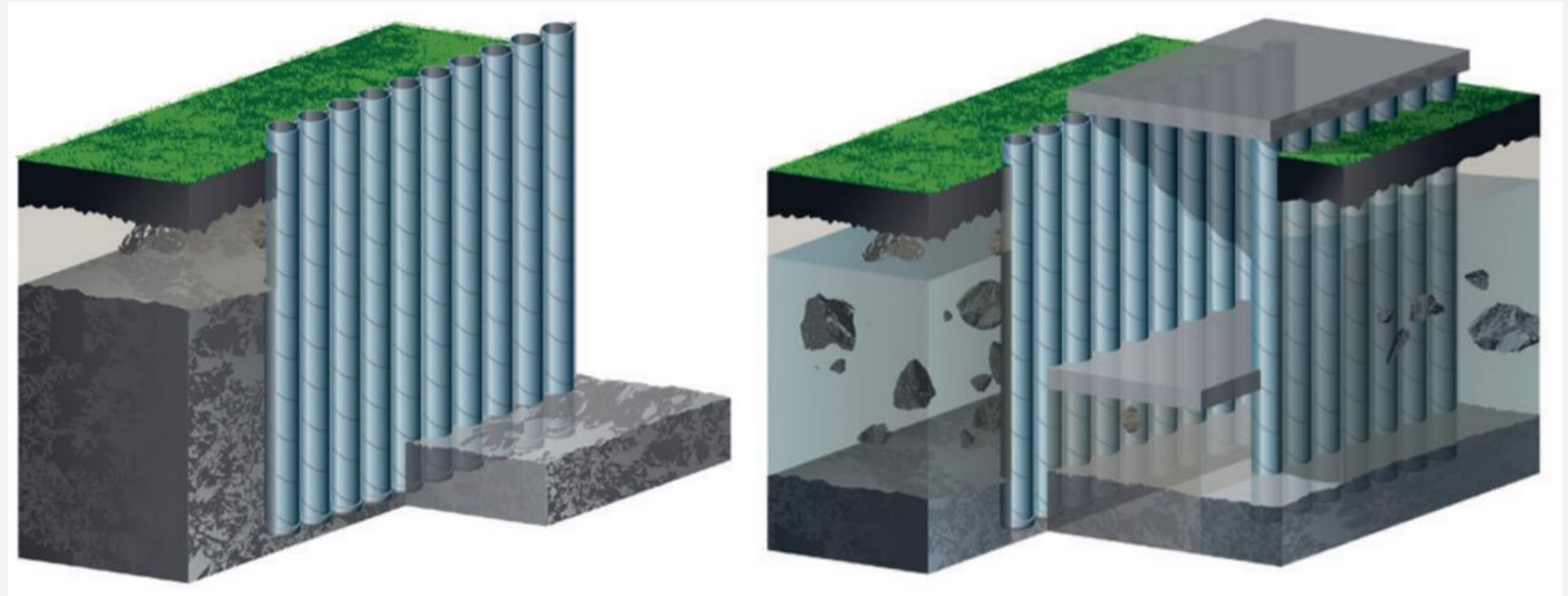


# RD<sup>®</sup> pile wall as support and vertical loaded structure

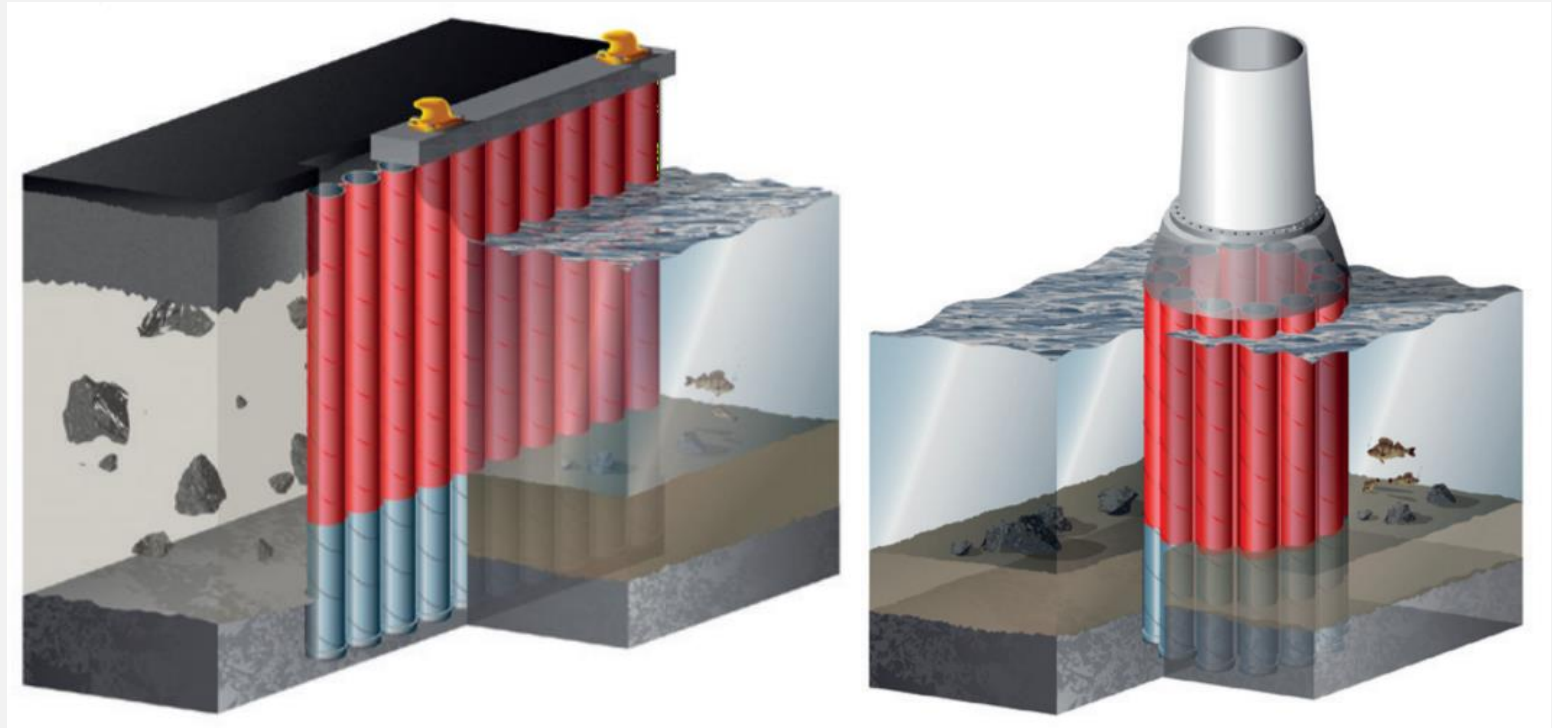




# RD<sup>®</sup> pile wall as support structure in rock and soil

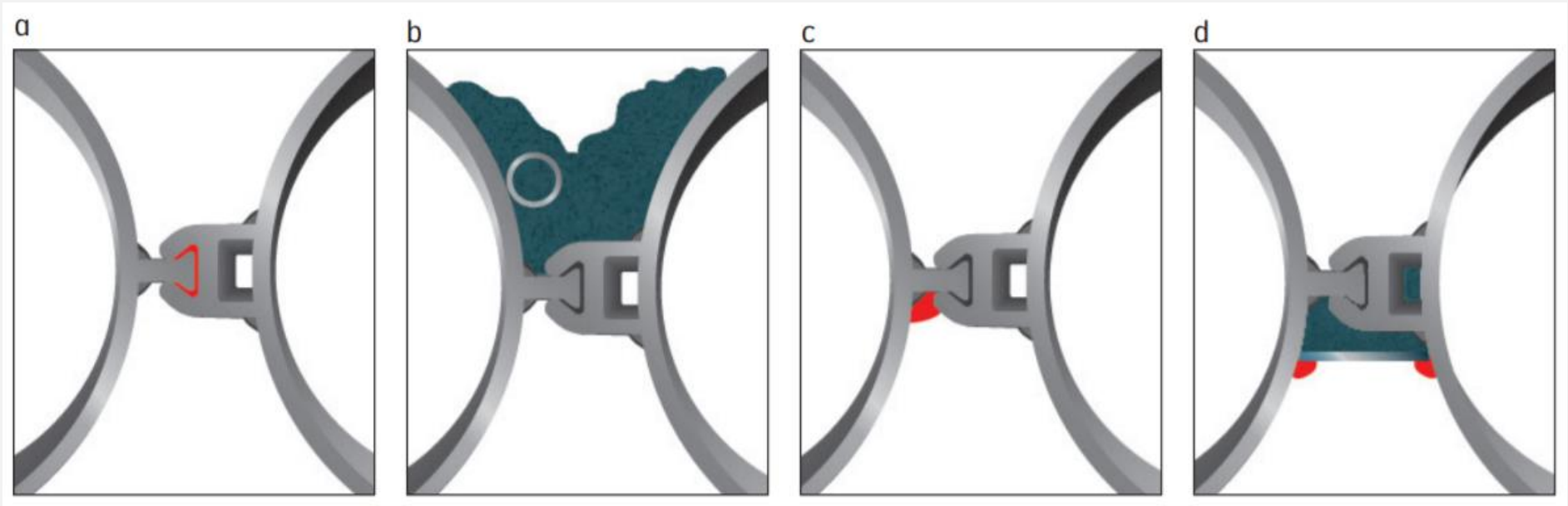


# RD<sup>®</sup> pile wall as water structures



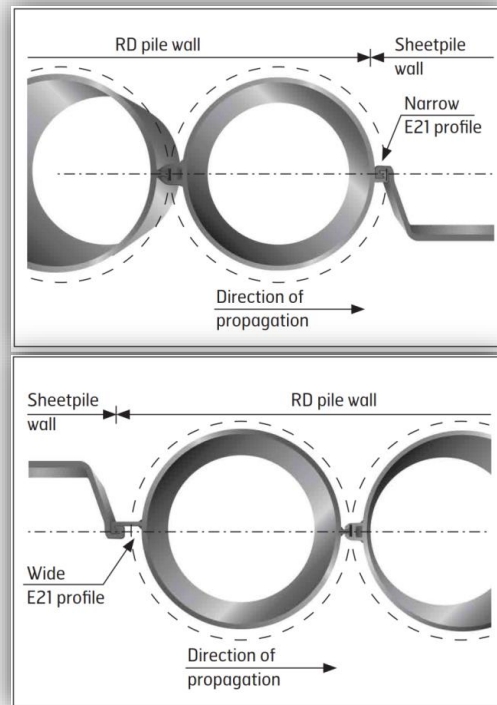
## Other water tightness solutions

- ▶ a – sealing applicants in the lock
- ▶ b – grouting behind the RM/RF låsene
- ▶ c and d – welding of lock or steel plate in front of lock



# Connecting RD pile wall with sheet pile wall

- ▶ RD pile wall can be joined to a sheet pile wall
- ▶ With RM/RF interlock or conventional E21 sheet wall interlock





**Rotterdam, Netherland – Combi Wall w/painting**



**Helsinki, Finland – circular RD pile wall**



**Peter Head, Scotland – RD Pile Wall, water front**







**Polluted ground, Bergen Norway – RD Pile Wall**



**City Tram, Bergen Norway – RD Pile Wall**



**Pasila Tripla, Helsinki Finland – RD pile wall**



**Splicing at site – RD Pile Wall**

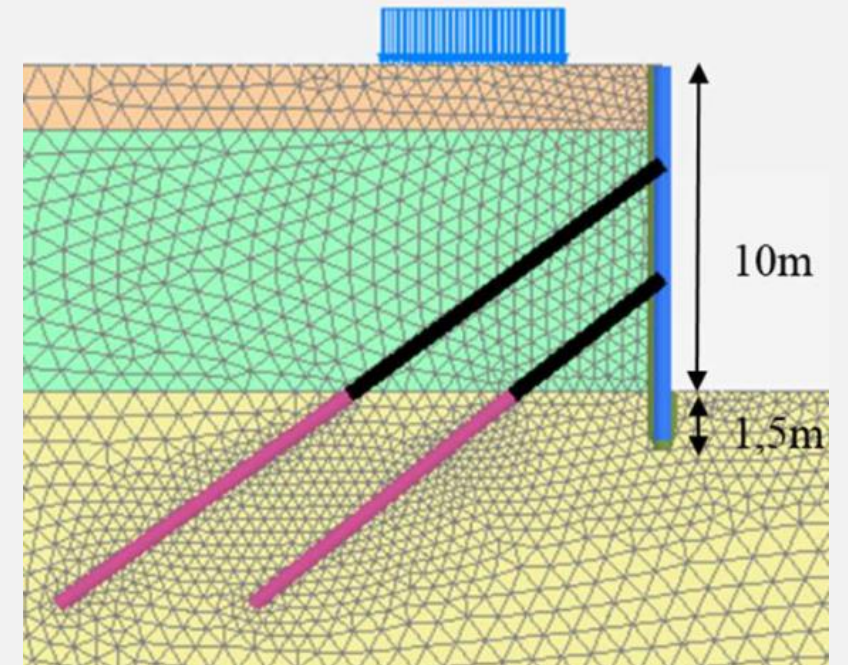
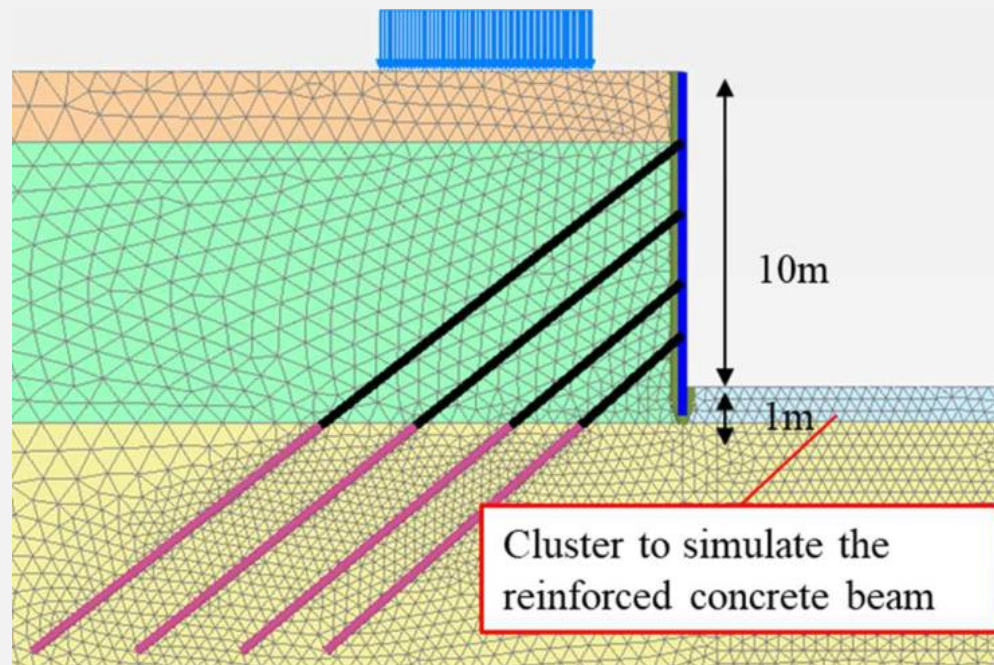


**Template – RD Pile Wall**

# RD pile wall vs. sheet pile wall



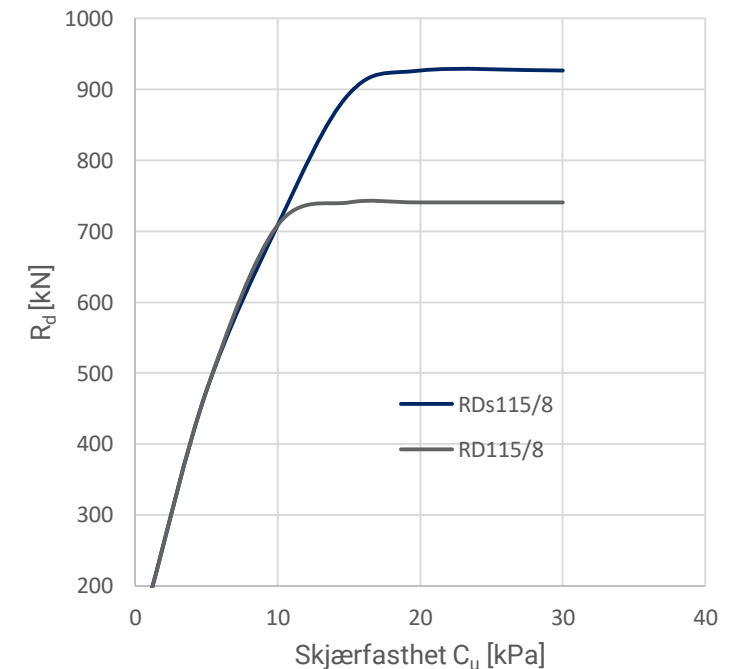
- ▶ Sheet pile wall – 1950cm<sup>3</sup>/m
- ▶ RD400/10



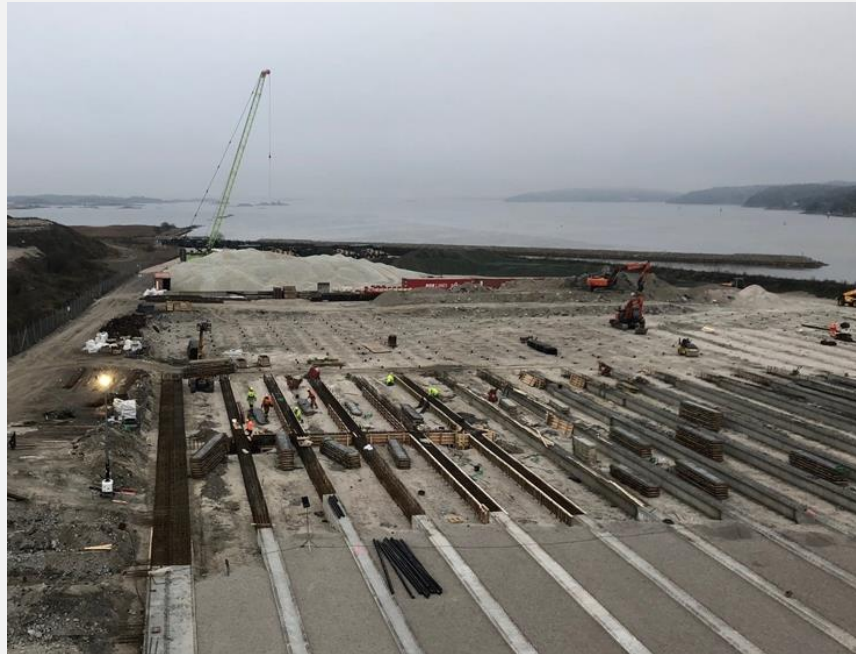
## SSAB RRs<sup>®</sup>/RDs<sup>®</sup>- Piles (S550J2H)

- ▶ Cost efficient?
- ▶ Up to 25% higher capacity than traditional steel qualities
- ▶ What does this mean?
  - Less consumption of steel to ensure same capacity
  - Less transport due to lower weight and volume
  - Less external disturbances and logistics at the working site
  - Collectively does this provide a lower CO<sub>2</sub> emission

Corrosion; 2+0mm,  
Initial buckling;  $L_k/600$   
Permanent load part; 85%



# Eksampel: Norways biggest RR<sup>®</sup> pile project



*Have not taken into account the timeuse and logistics on site*

*Scrap and waste!*

*Steel is 100% recyclable!*

Dimension	Capacity (kN)
RRs170/10	1450
RR170/12,5	1549
P270MA	1532

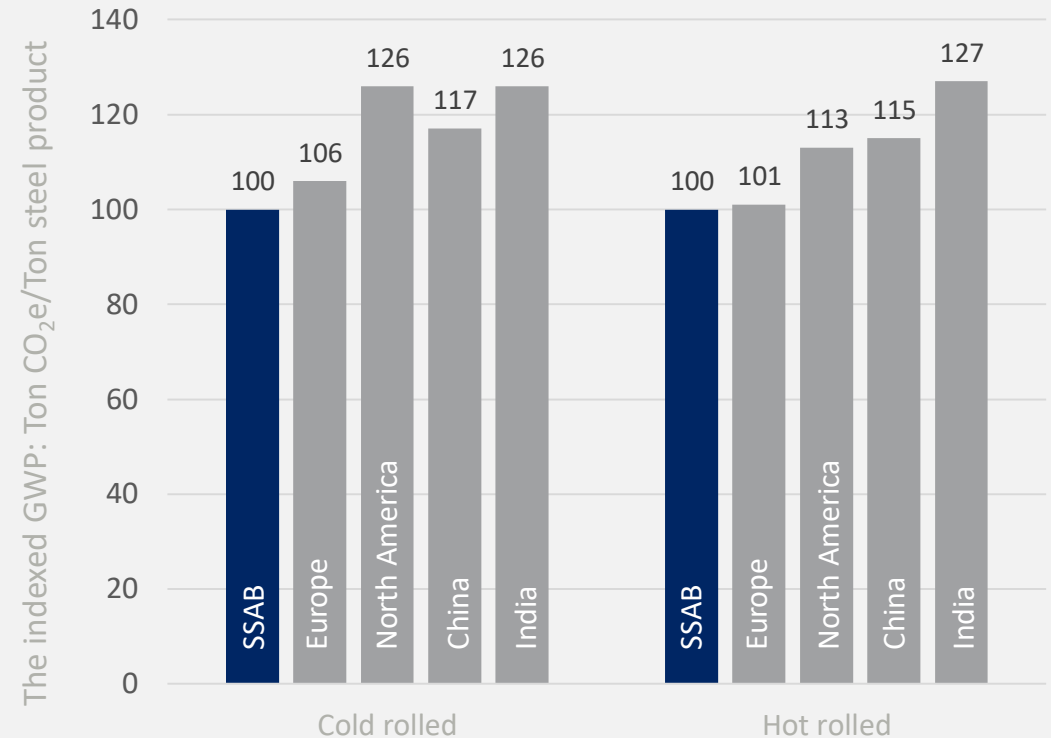
Savings 550 vs. 440	
Steel	320 ton
Trucks	11 pcs.

Savings 550 vs. concrete	
Weight	5375 ton
Trucks	192 pcs.



# SSAB is already today at the forefront

- ▶ SSAB's blast furnace-based production is among the most CO<sub>2</sub> efficient in the world.
- ▶ Compared to Chinese steel mills, SSAB steel saves on average **1 600 000 tonnes** of CO<sub>2</sub> every year
- ▶ This means a saving in CO<sub>2</sub> emissions up to **21%**



Source: thinkstep, BF GWP benchmarking, 2019, and SSAB EPD data



# SSAB's new offering

- SSAB produces steel based on both iron ore and recycled steel
- With the two steels; SSAB Fossil-free steel and SSAB Zero, we will have a comprehensive offering with zero-emission steel!



The world's first steel made without carbon emissions, from mine to steel product

## SSAB Fossil-free™ steel

A unique steel covering the entire value chain based on the HYBRIT® technology



Steelmaking with zero carbon emissions, from recycled raw material

## SSAB Zero™

Fossil carbon emission-free steel based on recycled steel and produced using fossil-free energy.

# Traditional versus HYBRIT technology

BLAST FURNACE

HYBRIT – Joint venture with Vattenfall and LKAB

PRODUCTION INTENSITY  
PER TONNE OF CRUDE STEEL

PRODUCTION INTENSITY  
PER TONNE OF CRUDE STEEL

Global average

SSAB

HYBRIT

2,000  
kg CO<sub>2</sub>

1,600  
kg CO<sub>2</sub>

25  
kg CO<sub>2</sub>

81  
kWh Oil

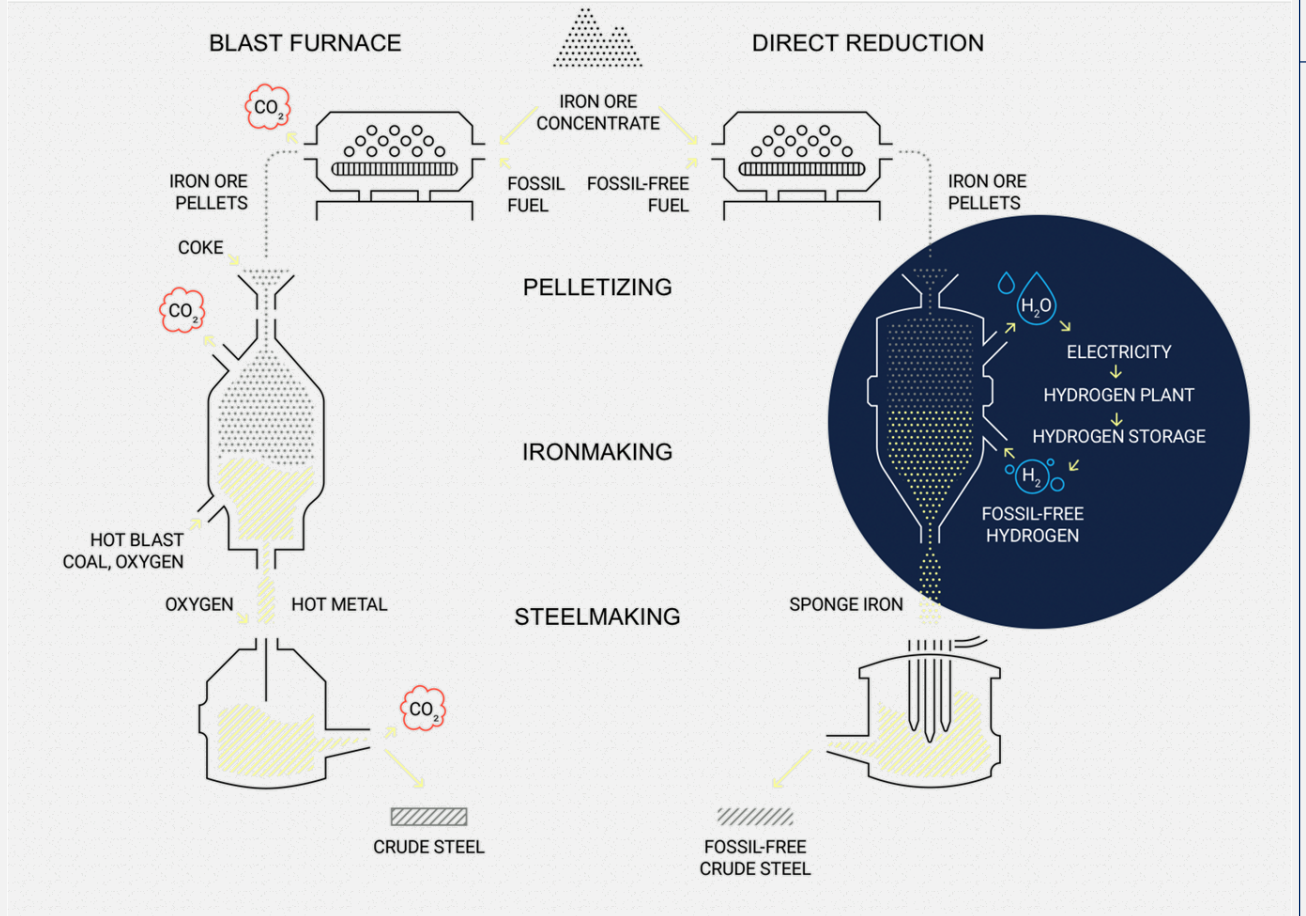
42  
kWh Graphite

5,150  
kWh Coal

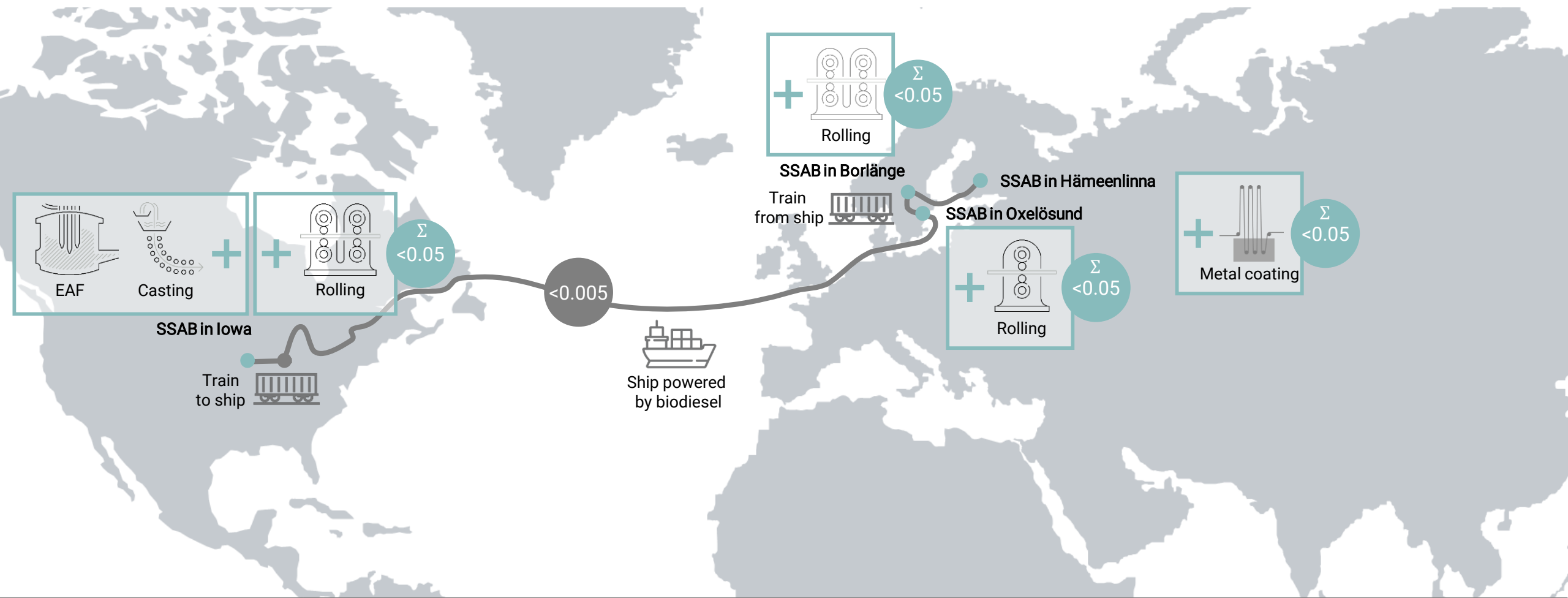
560  
kWh Bio

235  
kWh Electricity

3,488  
kWh Electricity



# SSAB Zero™ Production in 2023



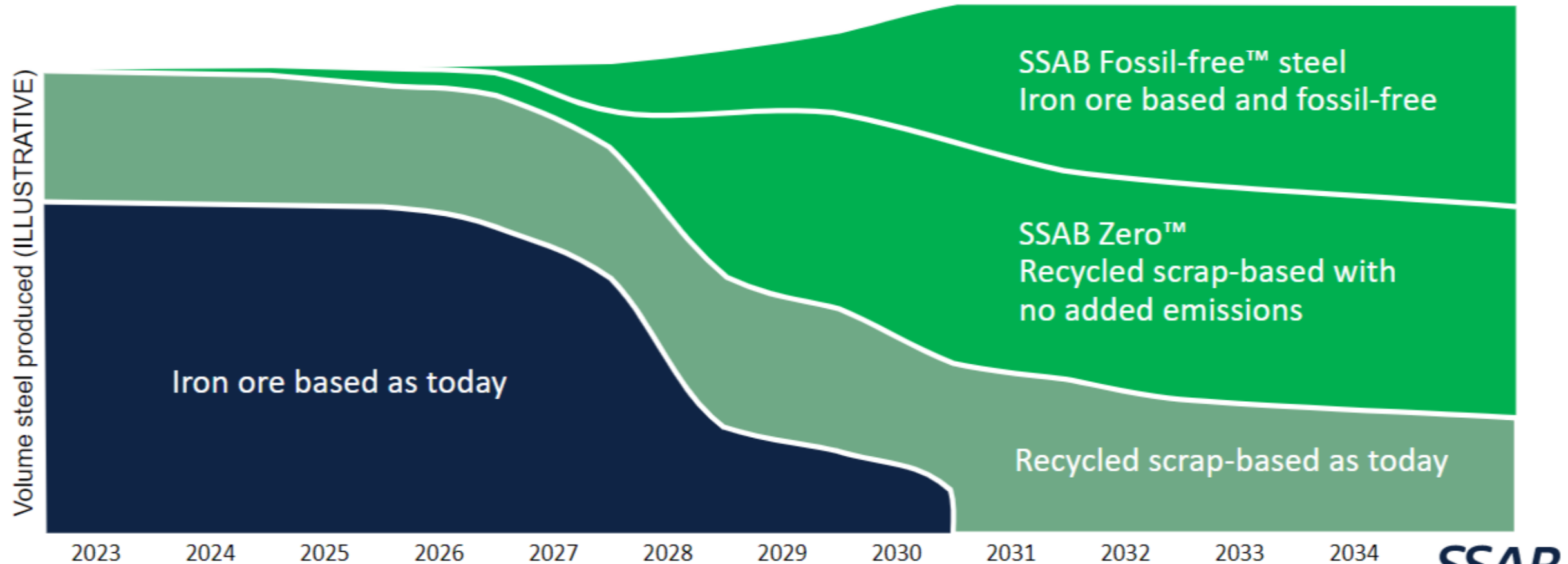
Total accumulated product carbon dioxide emissions in Scope 1 and 2 (tonne CO<sub>2</sub>e per tonne steel product incl. transportation, target)



Total transportation carbon dioxide emissions (tonne CO<sub>2</sub>e per tonne steel product, target)

# Targeting a fully sustainable steel portfolio

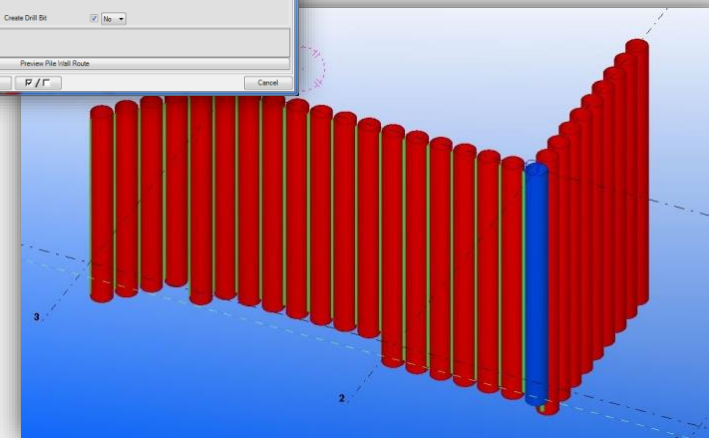
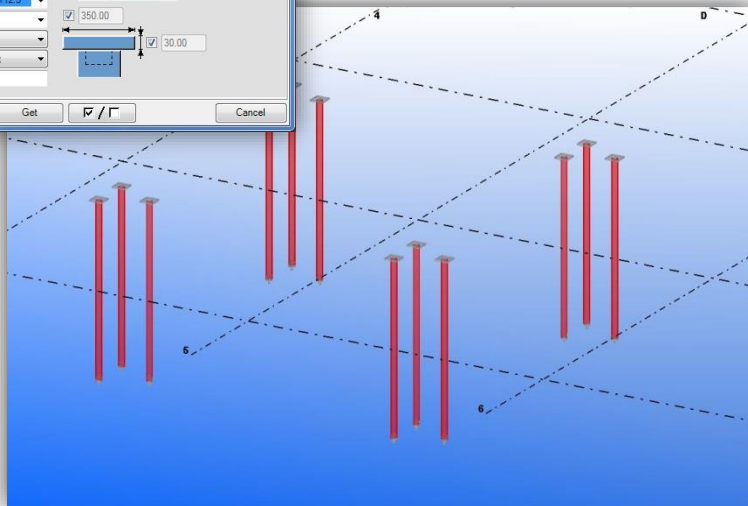
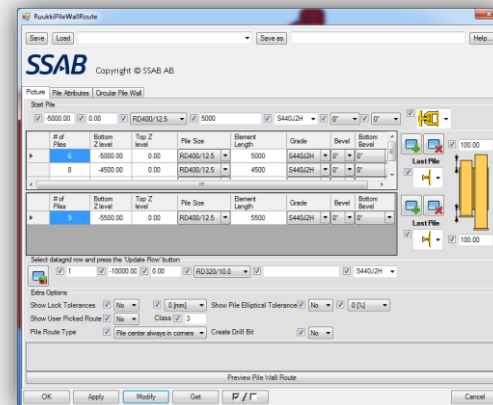
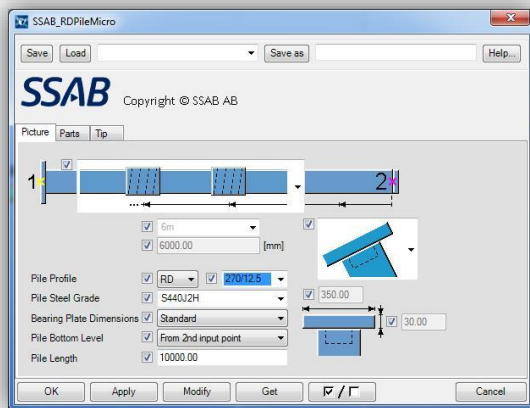
- Introduced in 2023 the available volumes and steel grades of SSAB Zero™ will increase over time



## Tekla and Revit components

### ► Premade components

- Micro piles and large diameter piles
- RD pile wall

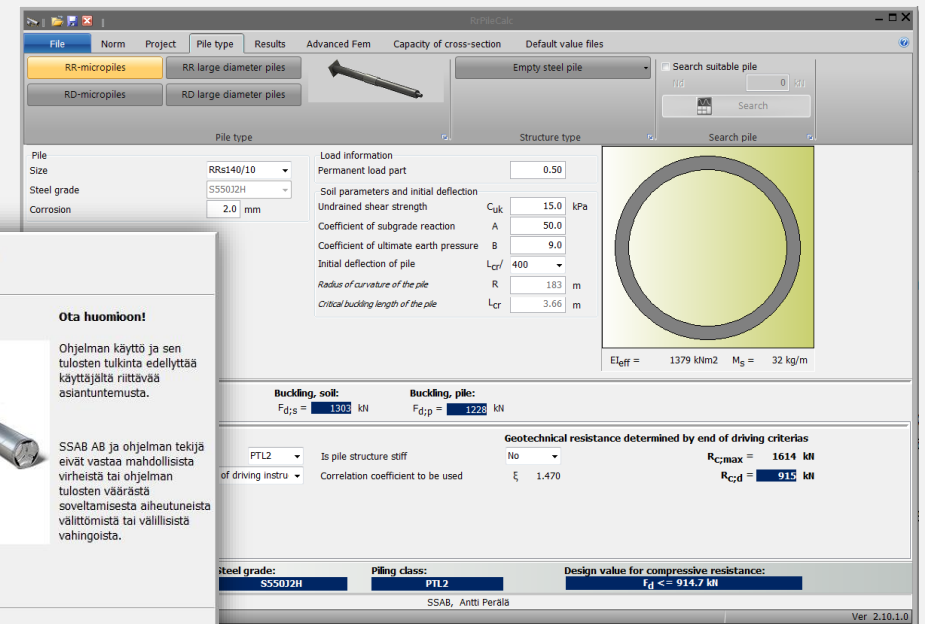


- Free down loading at:  
[warehouse.tekla.com](http://warehouse.tekla.com)  
[www.ssab.com/infra](http://www.ssab.com/infra)

## RRPileCalc

- ▶ Design software for end bearing piles
- ▶ Based on Eurocodes and national annexes and regulations

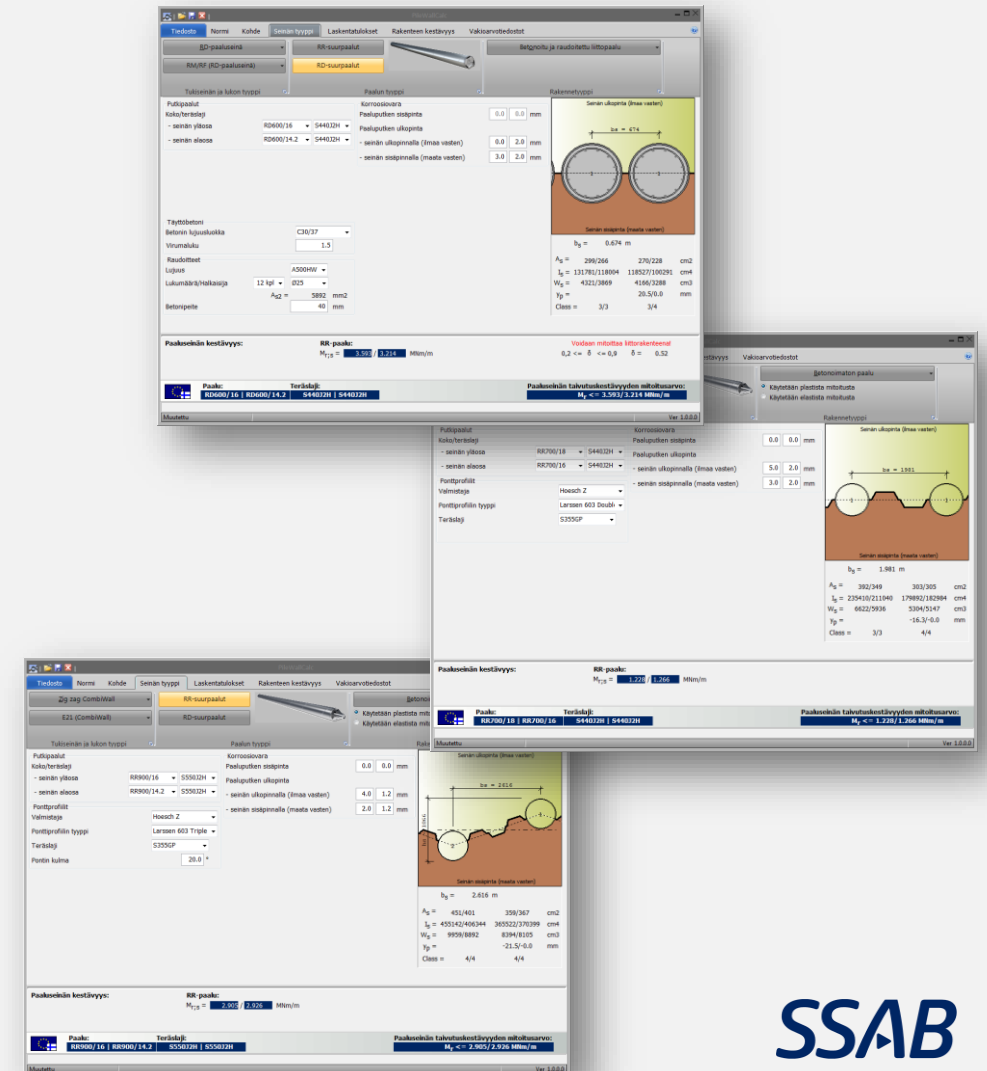
- EN 1992
- EN 1993
- EN 1994
- EN 1997
- PO-2016
- PV2019



- ▶ Dagens versjon 3.4.1.0

## PileWallCalc

- ▶ Design software
  - RD pile wall
  - Combi wall
  - Zig-Zag combi wall
  
- ▶ Calculates bending resistance
  - Elastisk / Plastisk
  - Steel structures / Composit structures
  - With reinforcement / Inner pipe
  
- ▶ According to
  - EN standard and national annexes





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