AARSLEFF

# AAU/Den Danske Maritime Fond
# Gå-hjem meeting
# 17th March 2015
# The role of EPC companies within offshore wind shipping and logistics
# Past, present and future

# Topics:

- AARSLEFF and our offshore Wind journey 2001 – 2014 (past)
- Where are we now (present)
- Trends in the market (future)

# Aarsleff WIND is a division of Aarsleff

## One of Denmark's leading civil engineering contractors

Per Aarsleff A/S was founded in Denmark in 1947 by Per Aarsleff. Today, we have activities worldwide.

One of Denmark's leading civil engineering contractors, specialist in marine construction, pipelines, foundation engineering, offshore wind farms and trenchless pipe renewal.

| | |
|---|---|
| Annual revenue in Denmark approx. | EUR 657 million |
| Annual revenue abroad approx. | EUR 333 million |
| Total | EUR 990 million |

Has around 4,000 employees.

We are known for being a company in steady growth with a strong financial position.

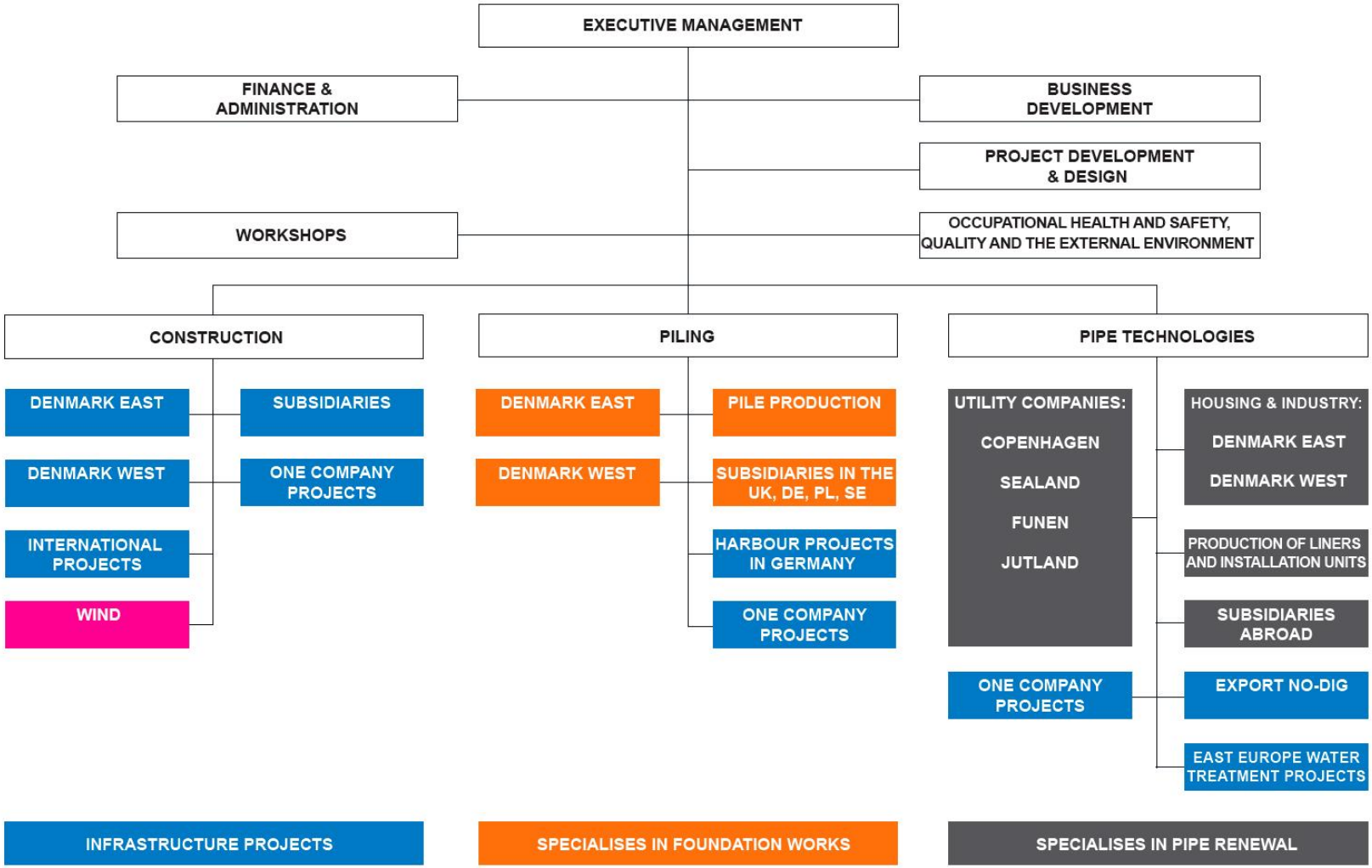
# Key competencies in the Aarsleff Group

- Civil engineering contractor in a wide sense.
- Focus on industrialisation in the fields of e.g.:

  Railway work
  Cable work
  Construction pits
  Pipe renewal
  Pile foundation
  Pipelines
  Harbours
  Offshore wind farms.

- Synergy between specialist areas.

# The Aarsleff Group



# Key competencies in Aarsleff WIND

Aarsleff WIND provides intelligent foundation solutions to the offshore wind market within the following areas:

- Design
- Engineering
- Manufacture
- Transport
- Installation
- Management

We design and fabricate our own installation equipment such as:

- Pile gripper
- Lifting tools
- Upending tools
- Skidding system
- Diving equipment
- Gravel bed screeding frame

# Aarsleff WIND

## Design

- In-house design and development provides innovative solutions including the Aarsleff concrete platform for monopile (MP) and transition piece (TP) foundations. The concrete platform reduces operation and maintenance costs, and with 247 concrete platforms successfully installed, this Aarsleff design is now being used on other projects as well.
- Long-term working relationship with experienced design companies as subcontractors paves the way for an efficient design process.
- Effective solutions for the grouted connection between monopile and transition piece. We are the only company in the market with certified solutions for both conical and shear keys connections.
- Proven track record for certification of detailed design by multiple certification bodies in Denmark, the UK and Germany.
- In-house sea fastening design and sea state calculations for transport of foundations.

# Aarsleff WIND

## Fabrication

- Own production of gravity-based foundations (GBF) and concrete platforms.
- With 171 foundations and 247 concrete platforms fabricated at our production yard in Swinoujscie in Poland, we have developed an industrialised fabrication process that can be applied to other (local) fabrication sites.
- Extensive experience in management of steel fabrication subcontracts for both primary and secondary steel.
- Proven track record with 250 monopiles and transition pieces fabricated at various suppliers such as Bladt, Sif and EEW.
- Quality management system tailor-made for steel fabrication subcontracts. Our steel experts follow the production from the procurement of raw steel to the delivery of the finished product on the quayside.
- Solutions for serial production of jacket foundations developed in collaboration with selected steel suppliers with a proven track record in the offshore wind market.

# Aarsleff WIND

## Transport and installation

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- Strategic partnership with Maersk Broker on logistics planning and execution.
- Online logistics monitoring and control system developed and operated by Maersk Broker.
- Load-out is always planned and executed by Aarsleff personnel.
- Our two Aarsleff North Sea barges enable us to transport any type of foundation to and from any European location.
- Installation methodologies based on best practice and lessons learned. Proven track record from successful installation of 600 foundations.
- Installation executed by Aarsleff engineers, supervisors and installation crew. They have hands-on experience from several different installation vessels, e.g. MPI fleet, Svanen, A2SEA fleet, Eide-5 and Sea Fox 5.

# Aarsleff WIND

## Overview of executed projects

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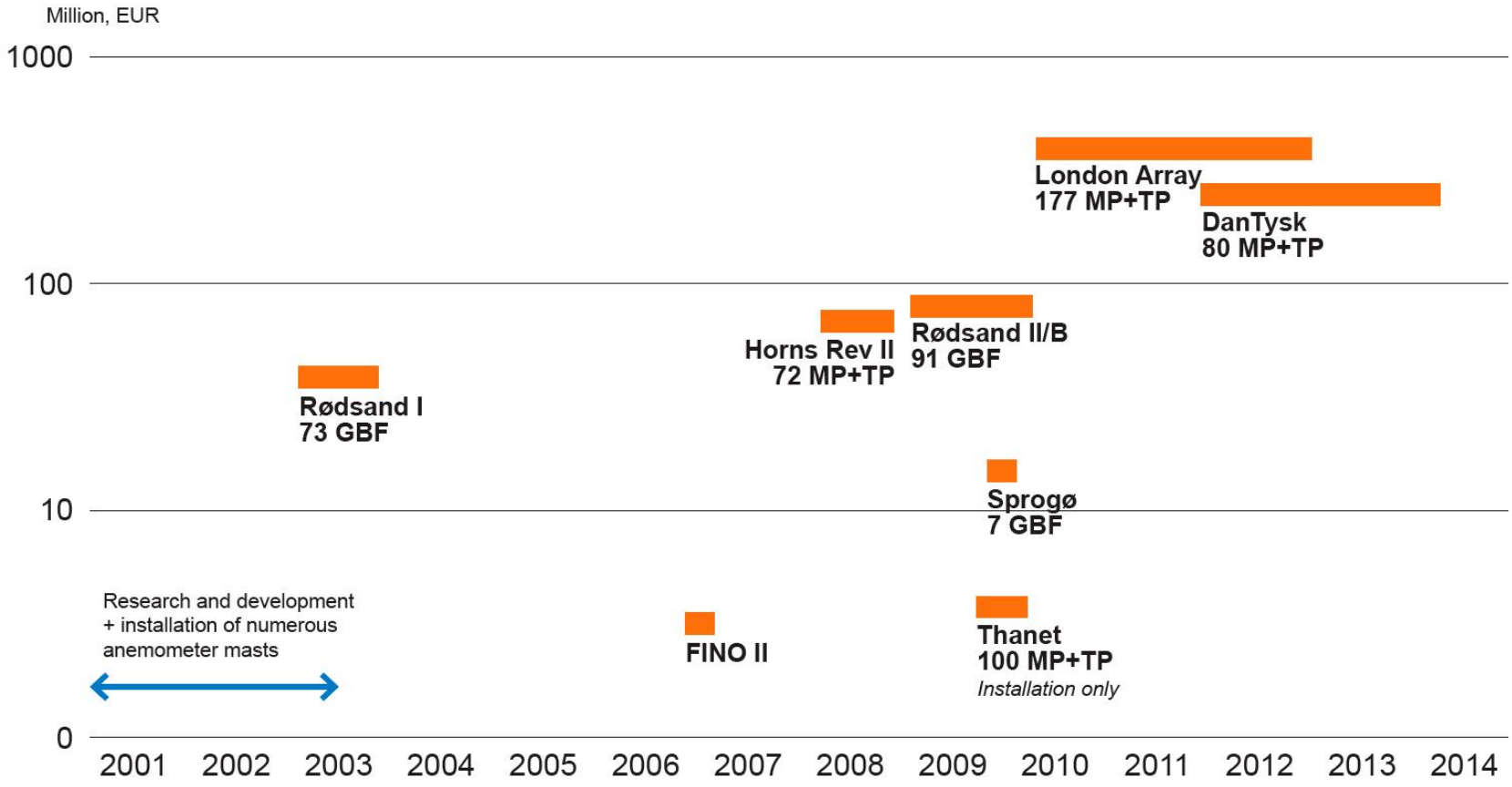
- 600 offshore foundations installed
  - 171 gravity-based foundations
  - 429 monopiles and transition pieces
- 500 offshore foundations fabricated
- 421 offshore foundations designed
- 175 WTG installed
- Offices in Aarhus, Copenhagen and London

# Aarsleff WIND

## Timeline of executed projects



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## Nysted Offshore Wind Farm

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# Aarsleff WIND

## Nysted Offshore Wind Farm

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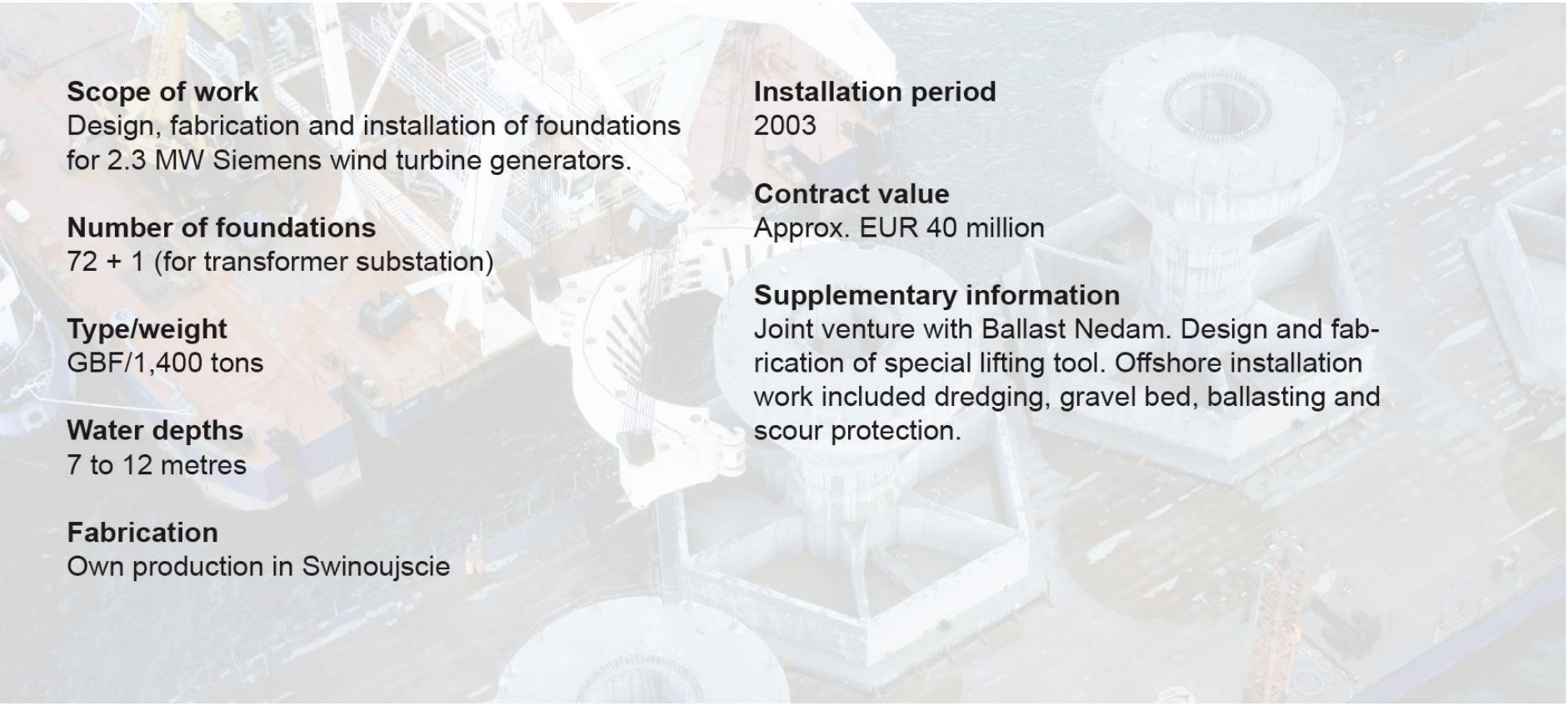

**Scope of work**
Design, fabrication and installation of foundations for 2.3 MW Siemens wind turbine generators.

**Number of foundations**
72 + 1 (for transformer substation)

**Type/weight**
GBF/1,400 tons

**Water depths**
7 to 12 metres

**Fabrication**
Own production in Swinoujscie

**Installation period**
2003

**Contract value**
Approx. EUR 40 million

**Supplementary information**
Joint venture with Ballast Nedam. Design and fabrication of special lifting tool. Offshore installation work included dredging, gravel bed, ballasting and scour protection.

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## Horns Rev 2 Offshore Wind Farm

# Aarsleff WIND

## Horns Rev 2 Offshore Wind Farm

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**Scope of work**
Fabrication and installation of foundations for 2.3 MW Siemens wind turbine generators.

**Number of foundations**
72

**Type/weight**
MP+TP/ 210 + 170 tons

**Diameter/length**
DN3.9 metres/40 + 18 metres

**Water depths**
9 to17 metres

**Fabrication**
Subcontracted to Bladt Industries in Denmark

**Installation period**
May to November 2008

**Contract value**
Approx. EUR 68 million

**Supplementary information**
Joint venture with Bilfinger Berger. Design and fabrication of pile gripper. Offshore installation work included scour protection.

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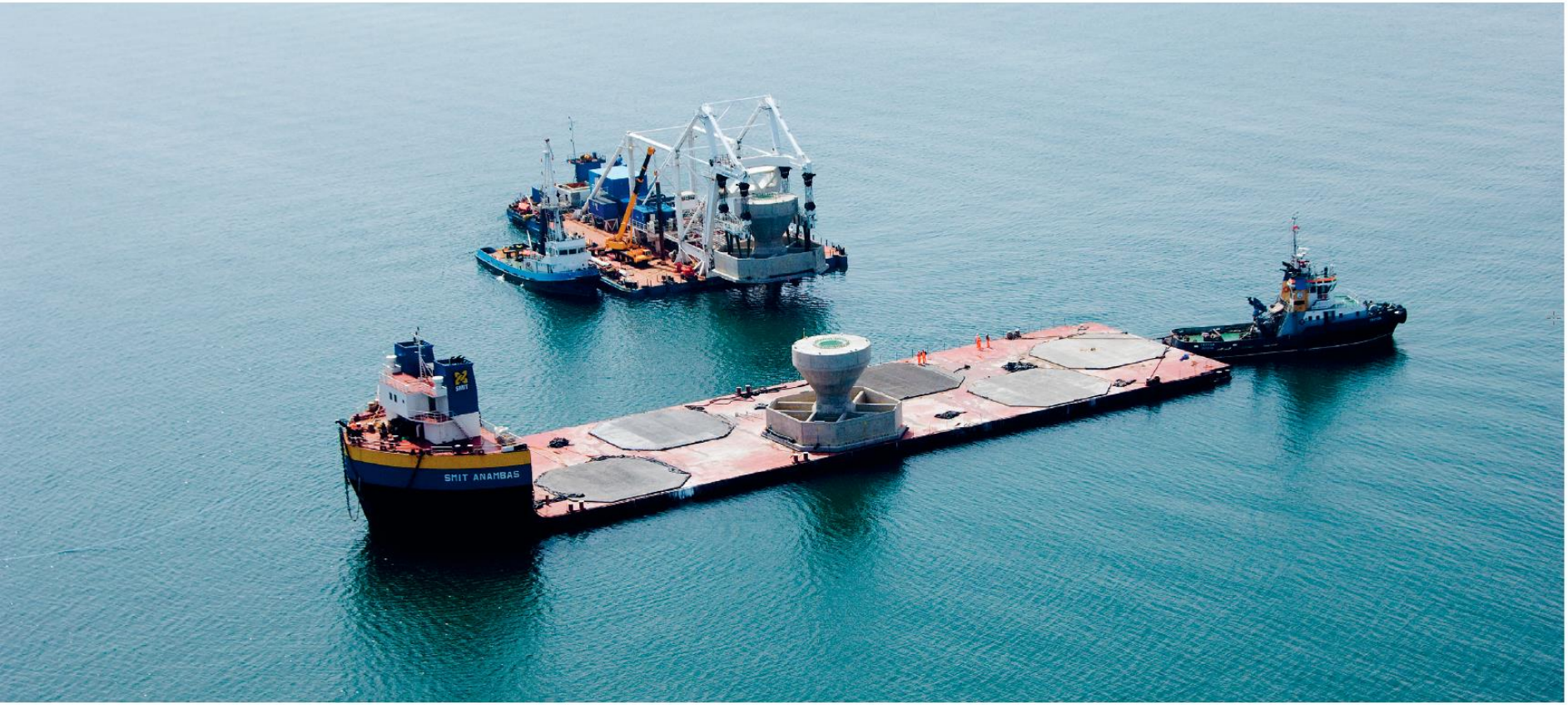
## Rødsand 2 Offshore Wind Farm



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## Rødsand 2 Offshore Wind Farm

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**Scope of work**
Design, fabrication and installation of foundations for 2.3 MW Siemens wind turbine generators.

**Number of foundations**
90

**Type/weight**
GBF/1,400 tons

**Water depths**
6 to13 metres

**Fabrication**
Own production in Swinoujscie

**Installation period**
July 2008 to March 2010

**Contract value**
Approx. EUR 73 million

**Supplementary information**
Joint venture with Bilfinger Berger. Foundations were cast directly on the transport barges. Development of improved gravel bed installation concept. Offshore installation work included dredging, gravel bed, ballasting and scour protection.

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## Sprogø Offshore Wind Farm

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## Sprogø Offshore Wind Farm

**Scope of work**
Fabrication and installation of foundations for 3.0 MW Vestas wind turbine generators.

**Number of foundations**
7

**Type/weight**
GBF/1,800 tons

**Water depths**
7 to 17 metres

**Fabrication**
Own production in Swinoujscie

**Installation period**
August to October 2009

**Contract value**
Approx. EUR 13 million

**Supplementary information**
Joint venture with Bilfinger Berger. Foundations were cast directly on a semi-submersible transport barge. Offshore installation work included dredging, gravel bed, ballasting and scour protection.

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## Thanet Offshore Wind Farm

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# Aarsleff WIND

## Thanet Offshore Wind Farm

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**Scope of work**
Supply of staff, personnel and various equipment (e.g. pile gripper) for the installation of monopile foundations for 3.0 MW Vestas wind turbine generators.

**Number of foundations**
100

**Type/weight**
MP/500 tons

**Diameter/length**
DN4.90 metres/57 metres

**Water depths**
Up to 25 metres

**Installation period**
2009/2010

**Contract value**
Approx. EUR 5 million

**Supplementary information**
Joint venture with Bilfinger Berger.

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## London Array Offshore Wind Farm

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## London Array Offshore Wind Farm

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**Scope of work**
Design, fabrication and installation of foundations plus installation of 3.6 MW Siemens wind turbine generators.

**Number of foundations and wind turbine generators**
175 + 2 foundations for transformer platforms

**Type/weight**
MP+TP/650 + 350 tons

**Diameter/length**
DN6 metres/60 + 27 metres

**Water depths**
5 to 25 metres

**Fabrication**
Subcontracted to Bladt Industries in Denmark

**Installation period**
March 2012 to July 2013

**Contract value**
Approx EUR 400 million

**Supplementary information**
Joint venture with Bilfinger Berger. Design and fabrication of pile gripper for up to DN6500 piles. Design and fabrication of four North Sea barges including sea fastening. Conical-grouted connection.

# Aarsleff WIND

## DanTysk Offshore Wind Farm

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# Aarsleff WIND

## DanTysk Offshore Wind Farm

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**Scope of work**
Design, fabrication and installation of foundations for 3.6 MW Siemens wind turbine generators.

**Number of foundations**
80

**Type/weight**
MP+TP/650 + 300 tons

**Diameter/length**
DN6 metres/60 + 27 metres

**Water depths**
20 to 35 metres

**Fabrication**
Subcontracted to Sif-Smulders JV

**Installation period** November 2012 to December 2013

**Contract value** Approx. EUR 250 million

**Supplementary information**
Joint venture with Bilfinger Berger. Offshore installation work includes scour protection and noise mitigation. Grouted-connection with shear keys.

# Where are we now:

- a market previously dominated by Danish and German contractors
- a market today dominated by Dutch and Belgium contractors
- We (AARSLEFF) have broken with our partner Bilfinger
- Bilfinger is for sale
- Ballast Nedam has been sold
- GeoSea/Hochtief JV has broken
- Hochtief has been sold
- MTH seems to have left the market
- Strabag closed down their offshore Wind division

# Trends in the market:

- a market today dominated by Dutch and Belgium contractors
- No thread of consistency in the contracting strategy
- Fewer bidders – consolidation in the market
- ”closed” tender processes/lack of transparency
- EU regulations not adhered to
- Non balanced risk sharing
- Vessel owners becoming contractors
- More complex contracts and more complex risk profiles

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# Thank you for your attention