Wind Turbine Installation Vessels

How to select the correct Installation vessel
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AWEA Offshore Wind Baltimore,
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Overview

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- Keep it Simple and What is New?
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- Installation vessel requirements

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GustoMSC in the WTI market

TECHNOLOGY CREATING VALUE

- Consultancy

- Proprietary Designs
  (Vessels + Jack-Ups etc.)

- Custom Designs

- Equipment Design & Supply
  (Jacking systems & Cranes)

Photo courtesy BARD
We are OFFSHORE DESIGNERS

SEASHELL - 1959

SHELL BUOY - 1959

PELICAN - 1969

VIKING PIPER - 1975
Future Outlook

European Offshore Wind Market:
• Prolonged strong growth of number WTI-Jack-Ups
• Consequently, continuous demand for more WTI vessels
• 20 New Installation Units by 2020.
• Main focus on increased efficiency and safety awareness

US Market:
• Initial scattered development, on basis of existing equipment
• Use of own knowledge from Construction and Offshore Oil & Gas market
• Development of new installation methods and equipment

Last year my colleague ended with “Keep It Simple”
Wind Turbine Installation market

In 1973, the Stevin 73

In 2008, the Sea Worker

Photo courtesy A2SEA
Our Working Environment

Operability, Safety and Survival are the key words
Components to be Installation

Delicate components to be installed

Photo courtesy MPI
Wind Installation to date in Europe

Existing equipment being used is not tailor made

Photos courtesy of the Contractors A2SEA, GEOSEA, Jack Up Barge, Ballast Nedam, Seajacks and Seaway Heavy Lifting
New Tools in the market today

BARD, Wind Lift 1, 2009

RWE unit, end 2011

GEOSEA Neptune, 2011

MPI Adventure, 2011

Hochtief, Thor, 2010
Future Wind Installation in Europe

Equipment under construction

Fred Olsen Windcarrier Bold Tern
Seajacks Zaratán
Workfox, Seafox 5
Fred Olsen Windcarrier Brave Tern
A2SEA, Sea Installer
Van Oord unit
Swire Blue Ocean, Ospery & Orca
Hochtief GeoSea Offshore
Future Wind Installation in Europe

What is the Trend?

- More Foundations are being installed by large floating crane vessels from the Offshore Oil & Gas Contractors successfully.

- Topsides (Tower, Turbine & Blades) are and will be installed only by Jack-Ups.

- Only Jack-Up Vessels and Barges are under construction!

- All major Offshore Wind Contractors are investing in Jack-Ups!

Can we conclude that Jack-Ups must be the correct vessels to choose?
Future Equipment Requirement USA

Case Study US Offshore Wind

54 GW target Offshore Wind in USA by 2030

Let us assume 8 MW per turbine average:

6,750 offshore wind turbines
to be installed in 18 years (2012-2030)
Per year: 375 Foundations & 375 Turbines to be installed
Assume average 100 installations per installation vessel per year:

7.5 (3.75 + 3.75) Installation vessels required in the USA

(if you could start installing in early 2012!)
Wind Installation Equipment in the US

Existing equipment on the East Coast? A quick internet search.

Weeks Marine, WEEKS 751

DONJON Sheerleg Chesapeake 1000 sht

McLean Contracting

Centennial 250 sht

Titan Salvage, 275 mt

Weeks Marine
Different Jack-Up types

Typical US-Liftboats:
- Self-propelled
- Typical 3 legs
- Speed 4 – 6 knots
- Deck load carrying capacity 75 – 750t
- Crane capacity 50 – 500 sht with short boom
- Wind Turbine carrying capacity 1 or 2 pcs. 3.6 MW sets

Pro’s
- Relatively cheap to build
- Majority not Classed
- Primary market Oil & Gas

Con’s
- Not Stable
- Too less carrying capacity (payload)
- Too small crane in capacity and reach
- No jacked up survival capability (hit & run)
- Low productivity (sailing/preloading/installation)
**Different Jack-Up types**

**Typical Construction Jack-Up:**
- Non-propelled
- Typical 4 legs for fast preloading
- Speed 6 – 8 knots (towed)
- Deck load carrying capacity 1,100 – 2,250 mt
- Crane capacity 300 – 800 mt with long boom
- Wind Turbine carrying capacity 2-5 pcs. 3,6 MW
- Survival capability at specified water depth

**Pro’s**
- Reasonable carrying capacity (payload)
- Crane capacity and reach
- Jacked up survival capability
- Investment relatively low
- Primary market Civil Construction

**Con’s**
- Requirement of Anchor-handling Tugs
- Productivity not optimum
- Presently one Large units under construction
Different Jack-Up types

Typical WTI Jack-Up Vessel:
- Self-propelled
- Typical 4 legs for fast preloading
- Speed 10 – 12 knots
- Deck load carrying capacity 2,600 – 6,600 mt
- Crane capacity 500 – 1,500 mt with long boom
- Wind Turbine carrying capacity ±10 pcs. 3,6 MW sets
- Survival capability at specified water depth

Pro’s
- Self-Propelled DP-2 (no other vessels needed)
- Sufficient carrying capacity (payload)
- Large Crane capacity and reach
- Jacked up survival capability
- Secondary market
- Fully Classed (ABS, DNV, GL, etc.)

Con’s
- Investment relatively high
- No’s Ports to enter
Different Jack-Up types

MPI Adventure Largest operating WTI-Jack-Up vessel to date!
- 1,000 mt crane
- 7,000 mt payload
- 11 knots speed
- DP-2
Installation Vessel requirements

How to select a Wind Turbine Installation Vessel?

- Safe & Stable platform to work from - Survival at sea is a must!
- Reasonably fast sailing and fast positioning – One turbine per day!
- Able to lift delicate & heavy components on high heights - Special cranes.
- Have sufficient deck space and carrying capacity – 4 to 10 turbine sets.
- Proven design, simple and straightforward – Reducing Risks.

Don’ts!

- Don’t reinvent what is already out there.
- No Prototypes - Somebody is learning on your costs.
- Conversions don’t pay off - History shows it is costly.

Do’s

- Cooperate with an experienced designer, Naval Architect (they make ships).
- Find an experienced Shipyard – Offshore structure experience.
- Learn from the Offshore Oil & Gas industry.
Rule # 1 on WTI-Jack-Ups

A table is not a vessel . . . . . . . . . . . . . . . . . .
Rule # 2 on WTI-Jack-Ups

a vessel is not a table
Rule # 3 on WTI-Jack-Ups

And for a vessel with legs you need to go to GustoMSC!
Although others do try . . . . . . . . . . . . . . . . . . . . . . ?

Reduce Riks.
Keep it simple and Safe!
Thank you for your attention.