Engineering solutions

Pacific Ocean Energy Trust Northwest Offshore Wind

Offshore Floating Wind Mooring Concepts and Installation Practices and Implications

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Agenda

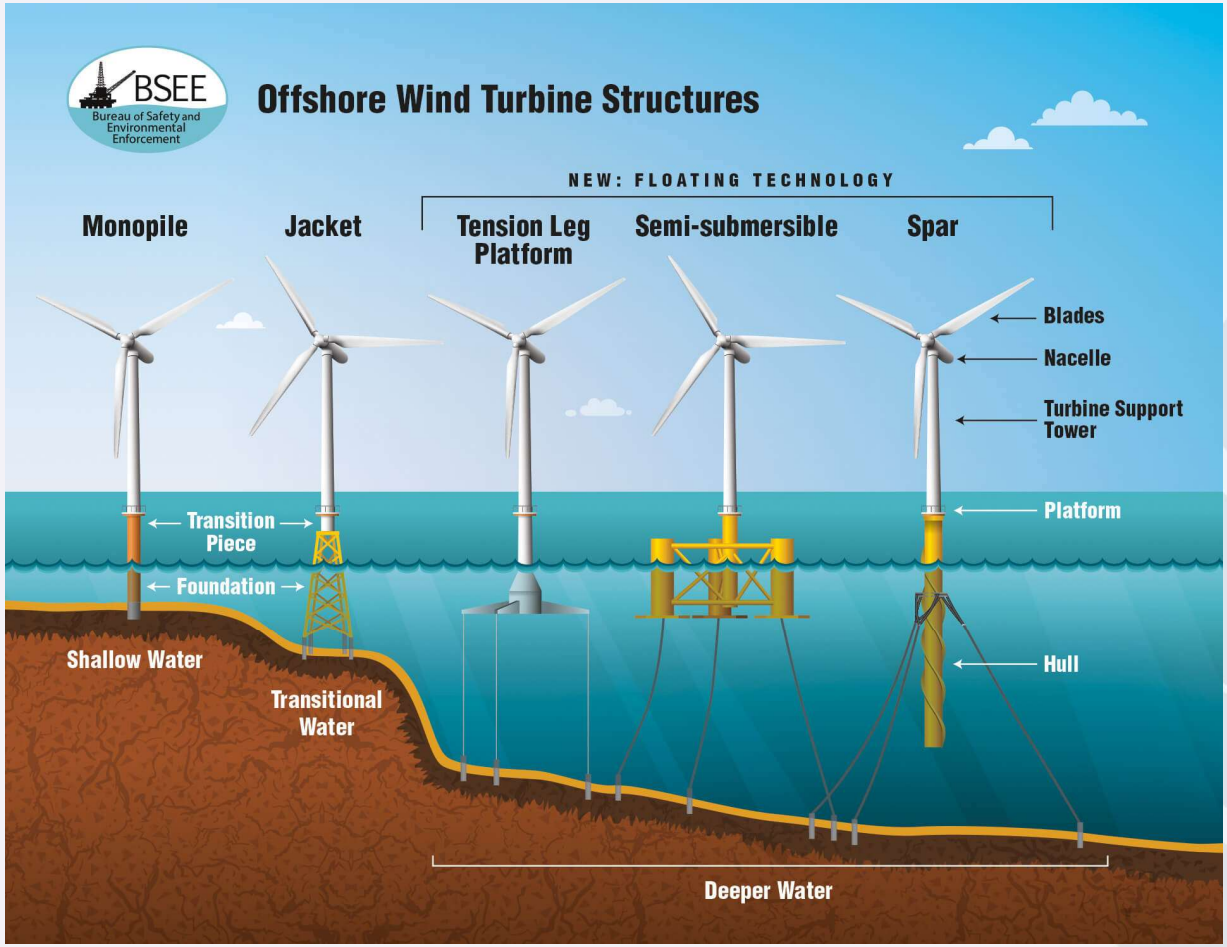
- AMOG, who are we and what do we do
- Offshore Mooring Systems in floating Wind, a brief overview
- How are Mooring systems installed
- What are the key challengers of a mooring installation

Who are AMOG and What do we do

AMOG
EAST SUSSEX
HOUSTON
PERTH
MELBOURNE
AMOG

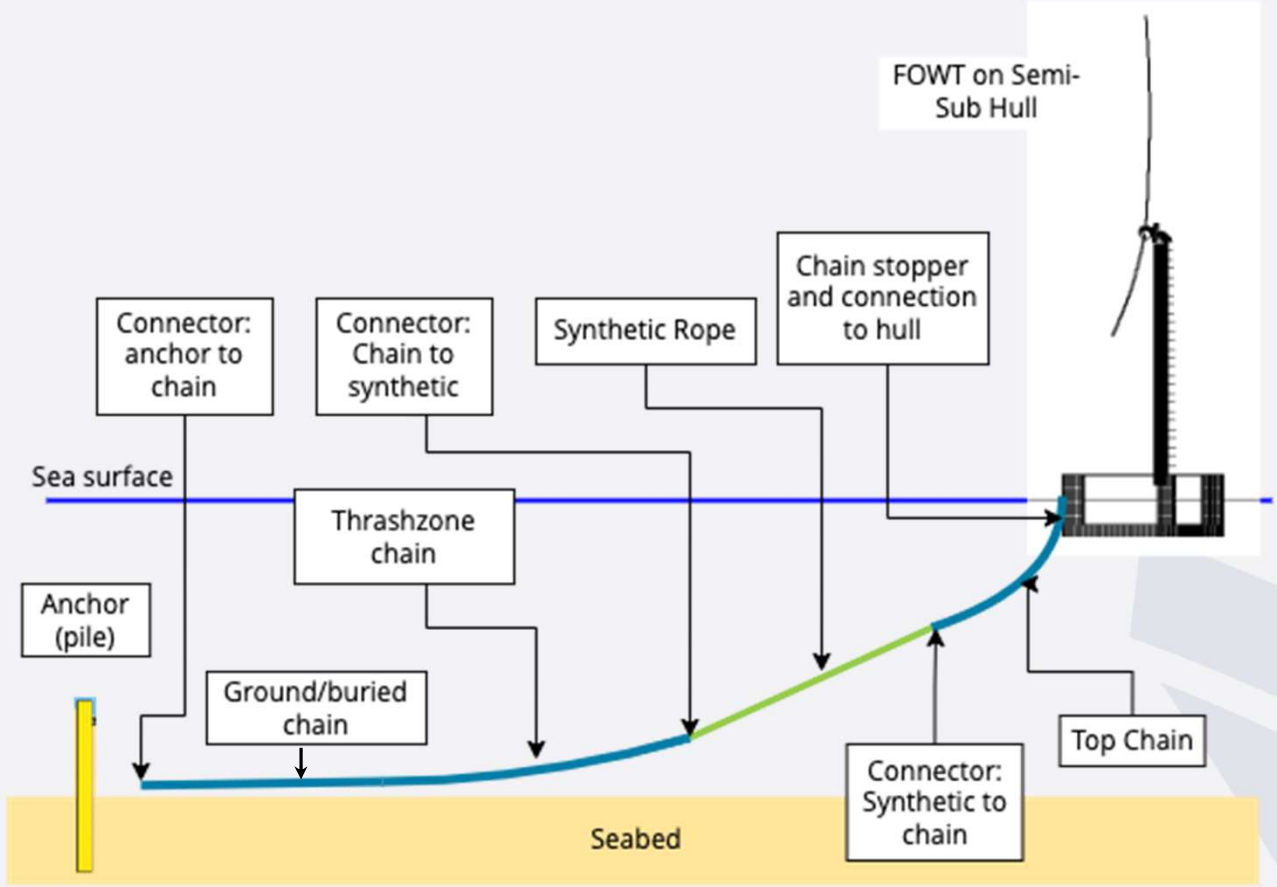
Mooring Systems in Offshore Wind, a brief overview

Moorings an Overview (1)



Referencehttps:www.windpowerengineering.com/

Moorings an Overview (2)



> The ROPE

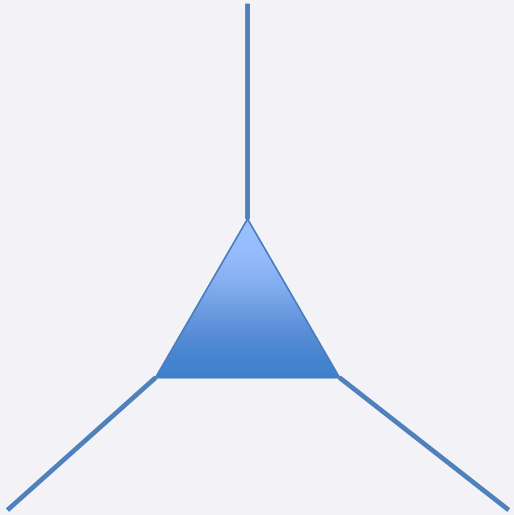
- Wire

- Synthetic

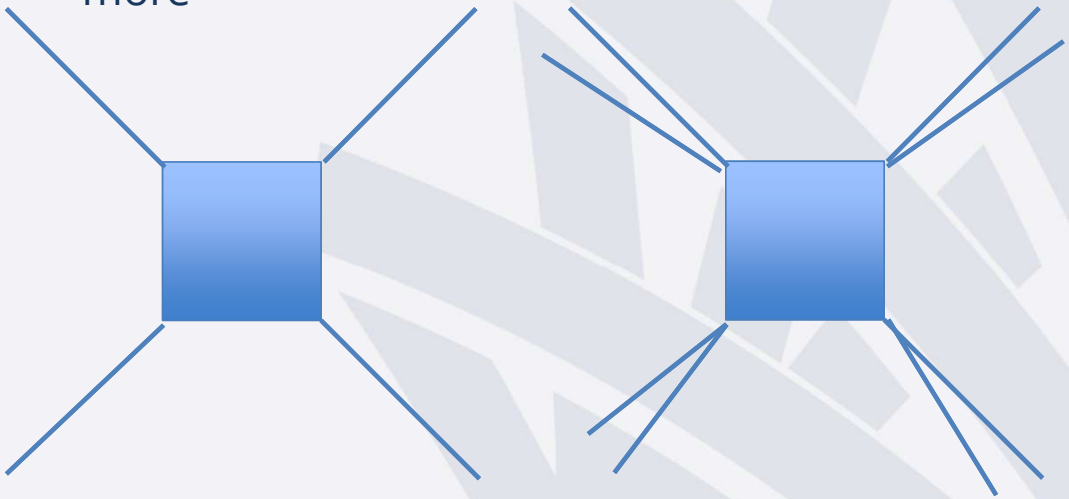
Moorings on the Seabed - Anchors

Reference:. B.3 Mooring system | Guide to a floating offshore wind farm (guidetofloatingoffshorewind.com)

Layout and Numbers



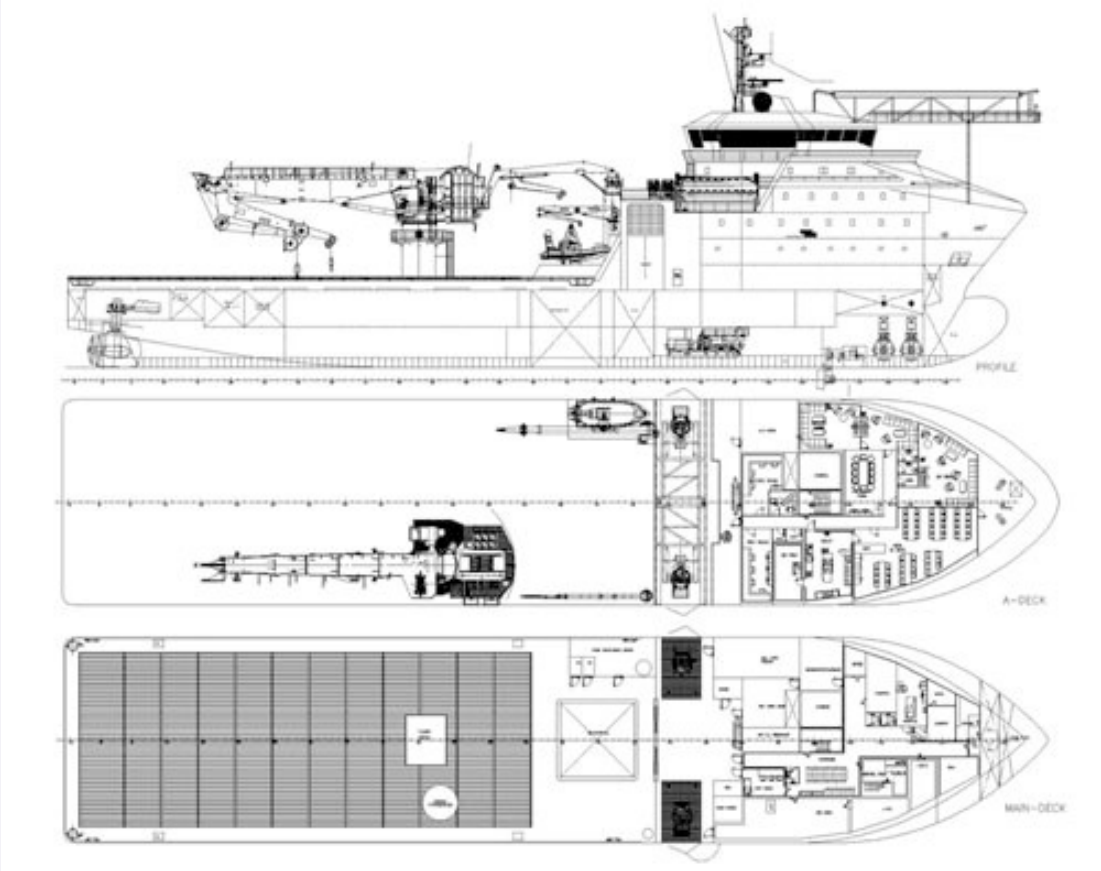
- Tri-leg arrangement, 3 mooring legs
- Farm of 50 turbines
  - 150 mooring legs
- What happens if you need more



Mooring Systems and how do we install them

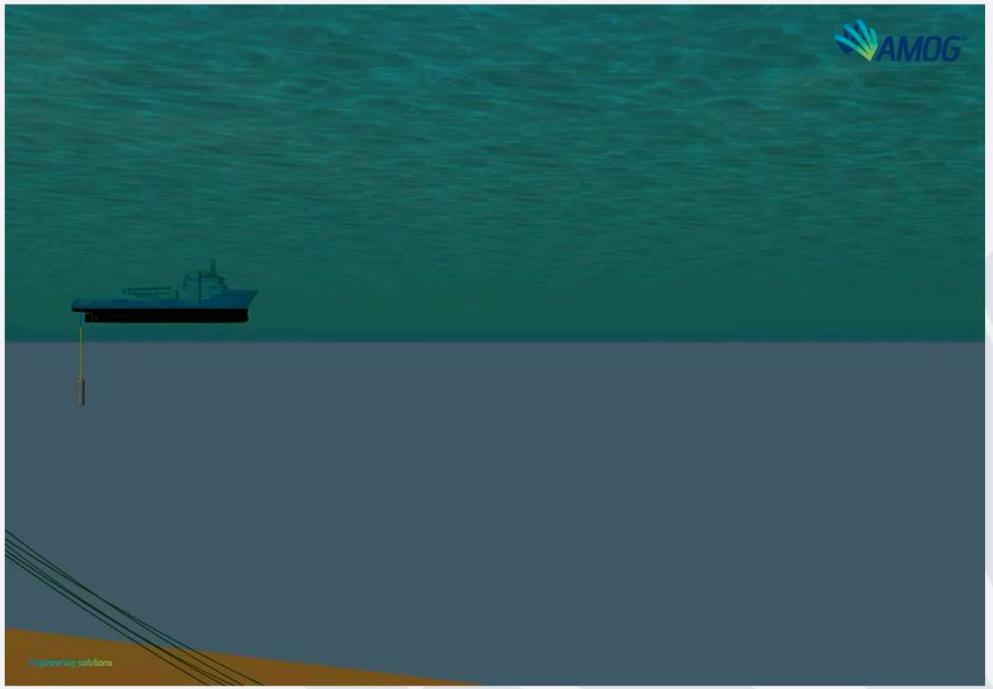
We Start Onshore

- Load out of equipment and hardware on to the installation vessels
- At port all chain, wire, anchors, equipment, machinery is all deployed onto the vessel
- Weight distribution and evolution is critical



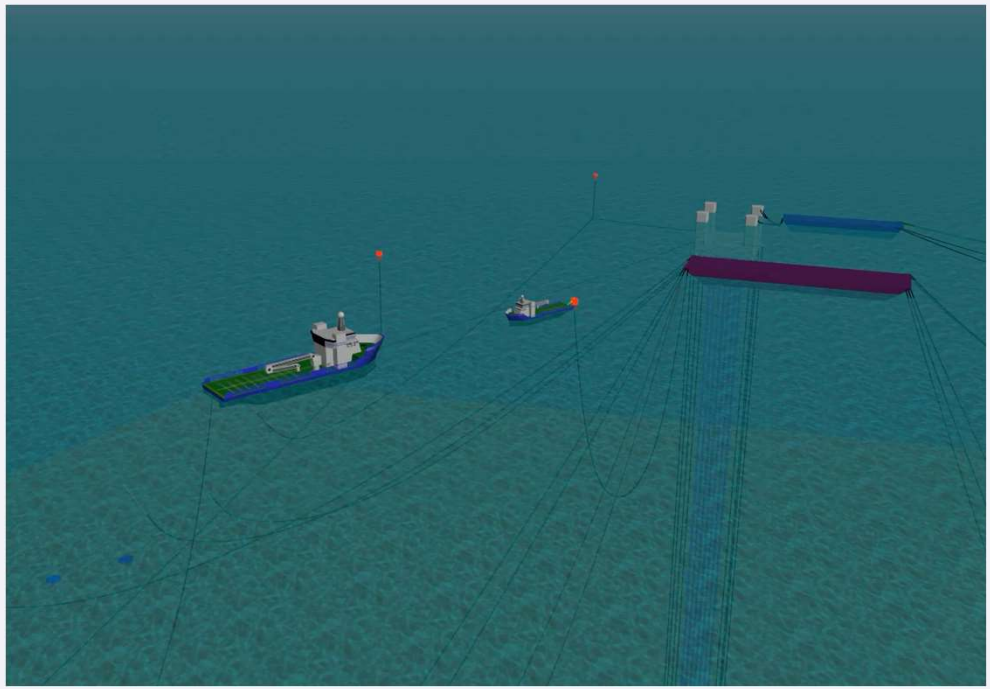
Subsea Infrastructure First

- Anchors and Ground Chain
- All three anchors need very different installation requirements
- The installation vessel(s)
  - Main Vessel (right)
  - Tugs
  - ROVs
- ROV's to connect subsea



Deploying and connecting Water Column Moorings

- Chain / Rope etc.



Reference Jumbo Corporate Website

Hook up to your floater

Mooring System Installation Challengers and Key Takeaways

Time

- Offshore Installation is time consuming and costs significant amounts of money

- Delays
  - Weather
  - Incidences
  - Personnel time offshore

- **Time Mitigations**
  - Good reliable weather forecasting (multiple sources)
  - Don’t re-invent wheels if you don’t have to
  - Can you have anchors support multiple legs

Installation Vessel Availability and Local Content

- Only so many installation vessels can do this
- New offshore industry for the region
  - Requirements for minimum % on board
  - Training
- Jones Act Requirements

- **Supply Mitigations**
  - Have a clear and agreed installation plan as early as possible
  - Get in the queue for things early

Noise

- Installation operations make noise
- This is a joint industry area
- Known marine life
- This may dictate the design and construction elements for certain areas

- **Noise Mitigations**
  - Understand the rules/regulations
  - Talk to the noise experts from different industries

Thank You and are there any questions

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