

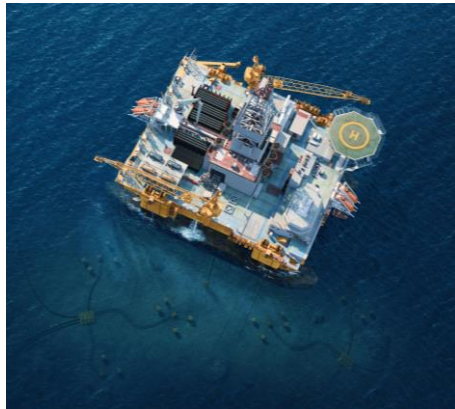
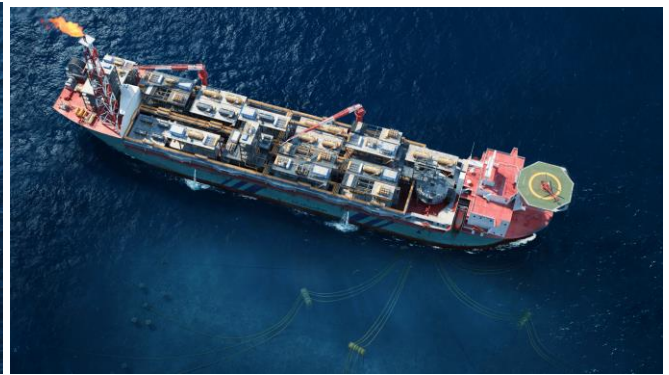
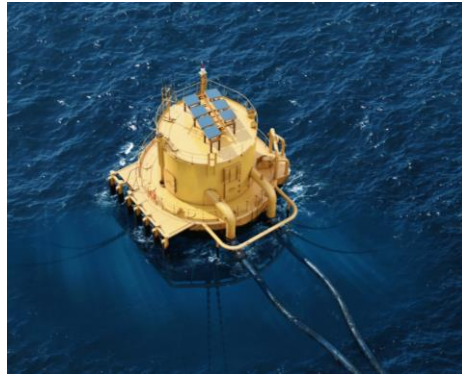


VRVHOF

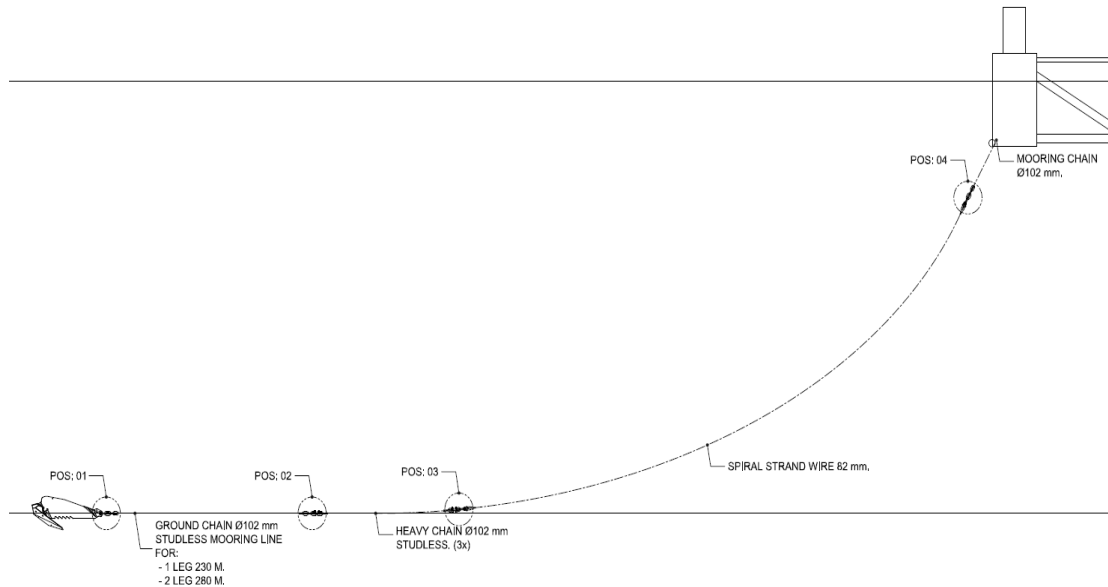
FLOATING WIND | FOUNDATIONS



Floating/moored structures are common



Typical Mooring Line configurations

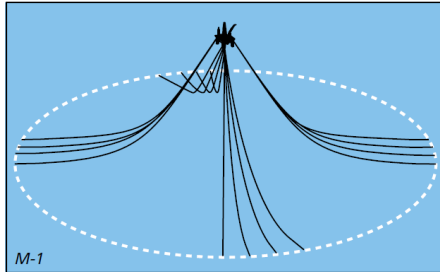


Typical Elements:

- Winches and fairlead
 - or underwater adjuster
- Top Chain
- Main Mooring line
- Bottom Chain
- Additional Clump weights
- Connectors
- Anchor

Moorings Design

Catenary



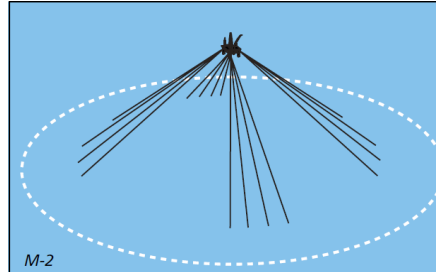
Restoring forces: weight

- + Easier installation
- + Damping effect: lower loads
- + Lower cost
- Significant spread/footprint
- Significant excursion

Moorings Line Composition

- chain
- wire rope
- drag embedment anchor

Taut and semi-taut leg

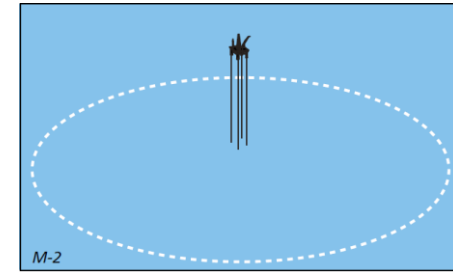


Restoring forces: elasticity

- + Higher loads in line
- + Larger units can be moored
- + Reduced excursion
- Limited to deepwater
- Medium footprint

- synthetic rope
- wire rope
- vertical loaded anchor (VLA)

Tension leg platform (TLP)

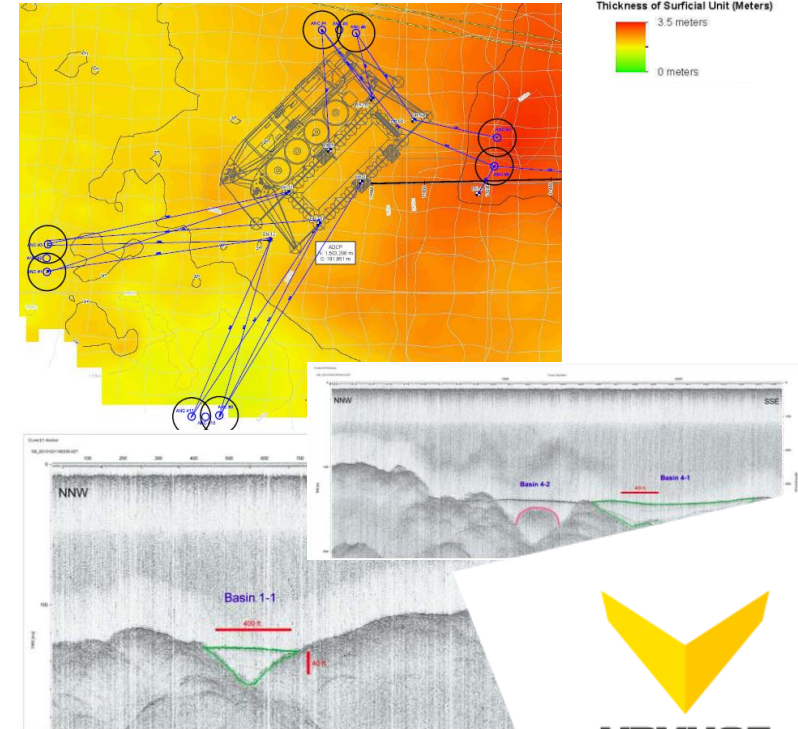
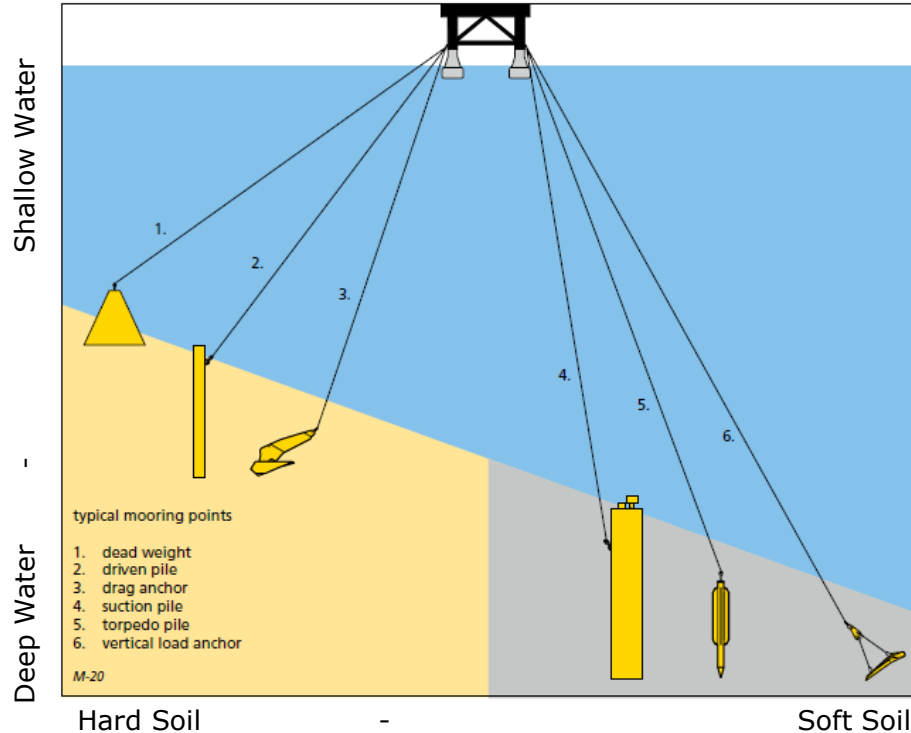


Restoring forces: floating reaction/tension in tendons

- + Minimal footprint
- + Minimal excursion
- Foundation challenges
- Highest cost

- Tendons
- Piles

Foundation Design





VRYHOF

Mooring Design Challenges

Challenges

- Mooring Line Cost and Complexity
- Anchor Cost and Complexity
- Onsite Installation Simplicity
- Decommissioning and Maintainability

Recommendation

- consider standard equipment
- include installation cost on analysis
- plan local facilities capabilities
- it will happen, design for it

- Water Depth Independence
- Reduced Sensitivity to Soil Conditions
- Minimum Footprint vs cost

- over design vs. mass customization
- over design vs. mass customization
- reduced life vs. cost



Mooring Installation cost is mostly driven by Foundations and Local Facilities





Questions?

