

Positioning challenges during Statoil's Hywind Scotland Pilot Park

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iSURVEY

MCEDD
DEEPWATER DEVELOPMENT

Agenda

Introduction

Background - Hywind Scotland Pilot Park

Project Preparation

Vertical Tow

Mooring Chain Pre-Installation

Hook-up of FWT's

Positioning Challenges

Lessons Learned

Introduction

Hywind Scotland

The world's first commercial floating wind farm

Rotor diameter: 154 metres

Blades: Length 75 metres

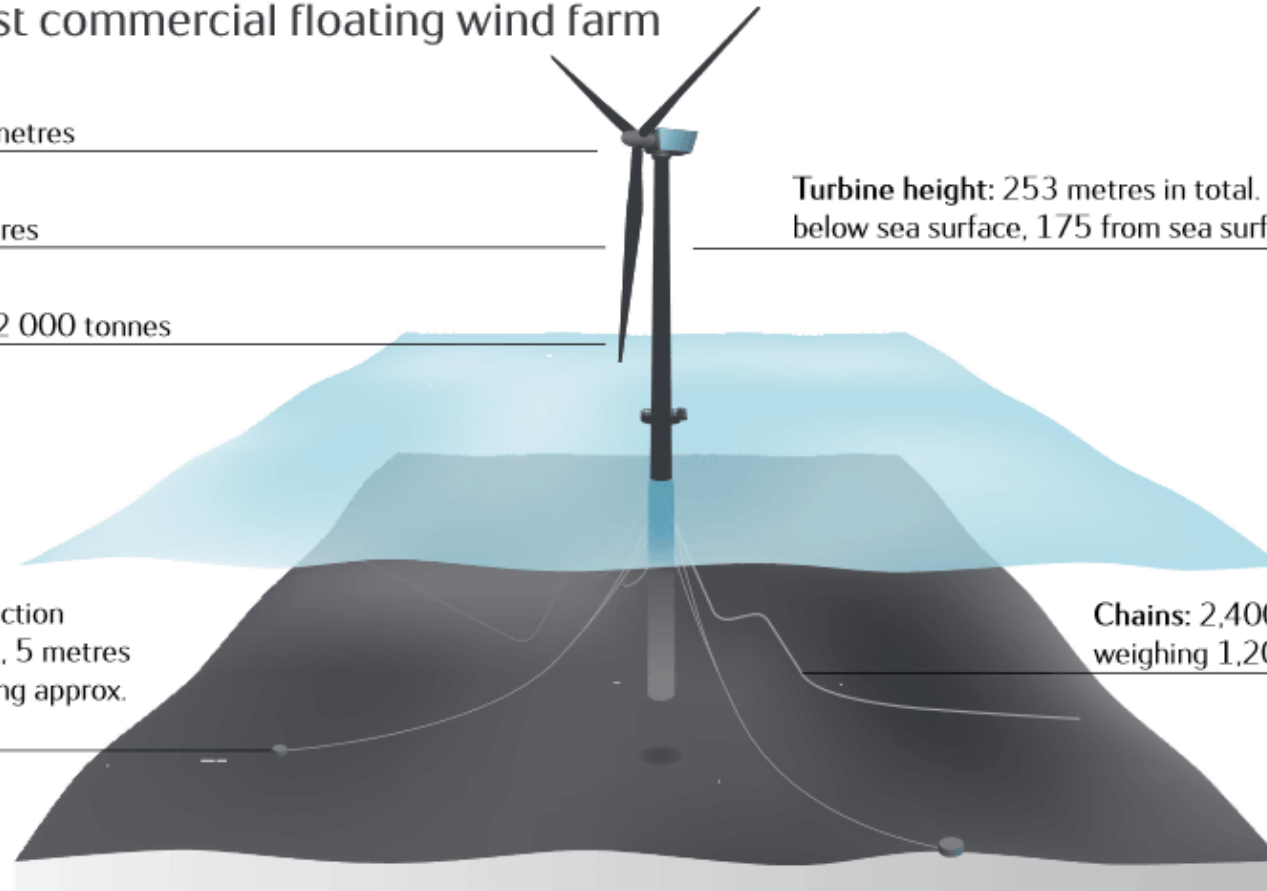
Each turbine weighs 12 000 tonnes

Turbine height: 253 metres in total. 78 metres below sea surface, 175 from sea surface to wingtip

Suction anchors: 15 suction anchors, 16 metres tall, 5 metres in diameter and weighing approx. 300 tonnes each.

Chains: 2,400 metres long, weighing 1,200 tonnes

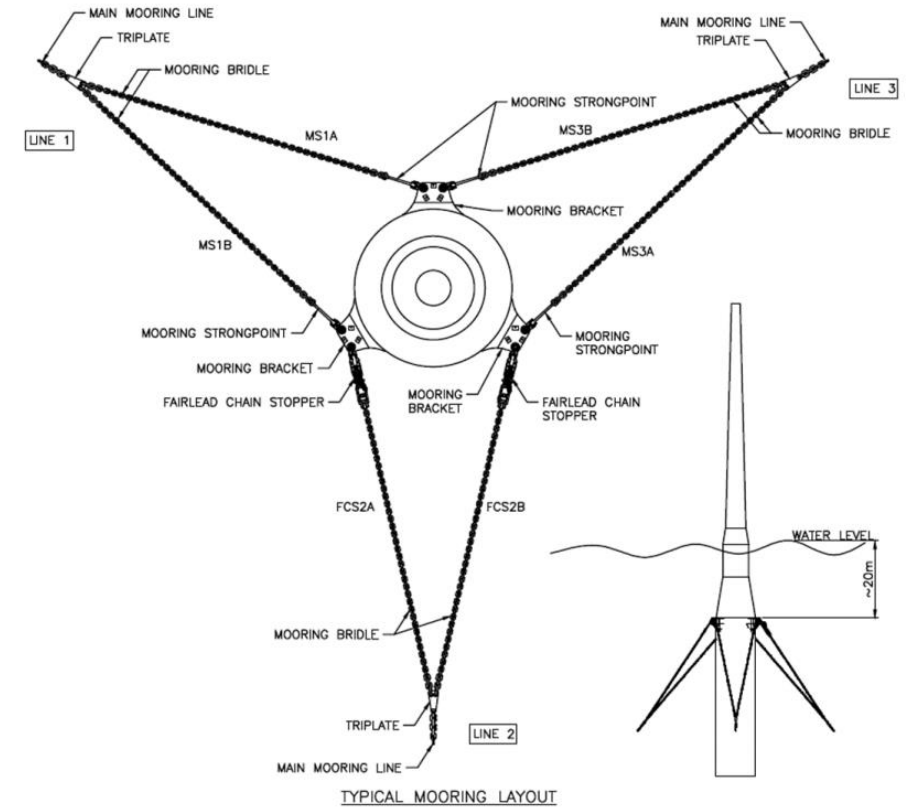
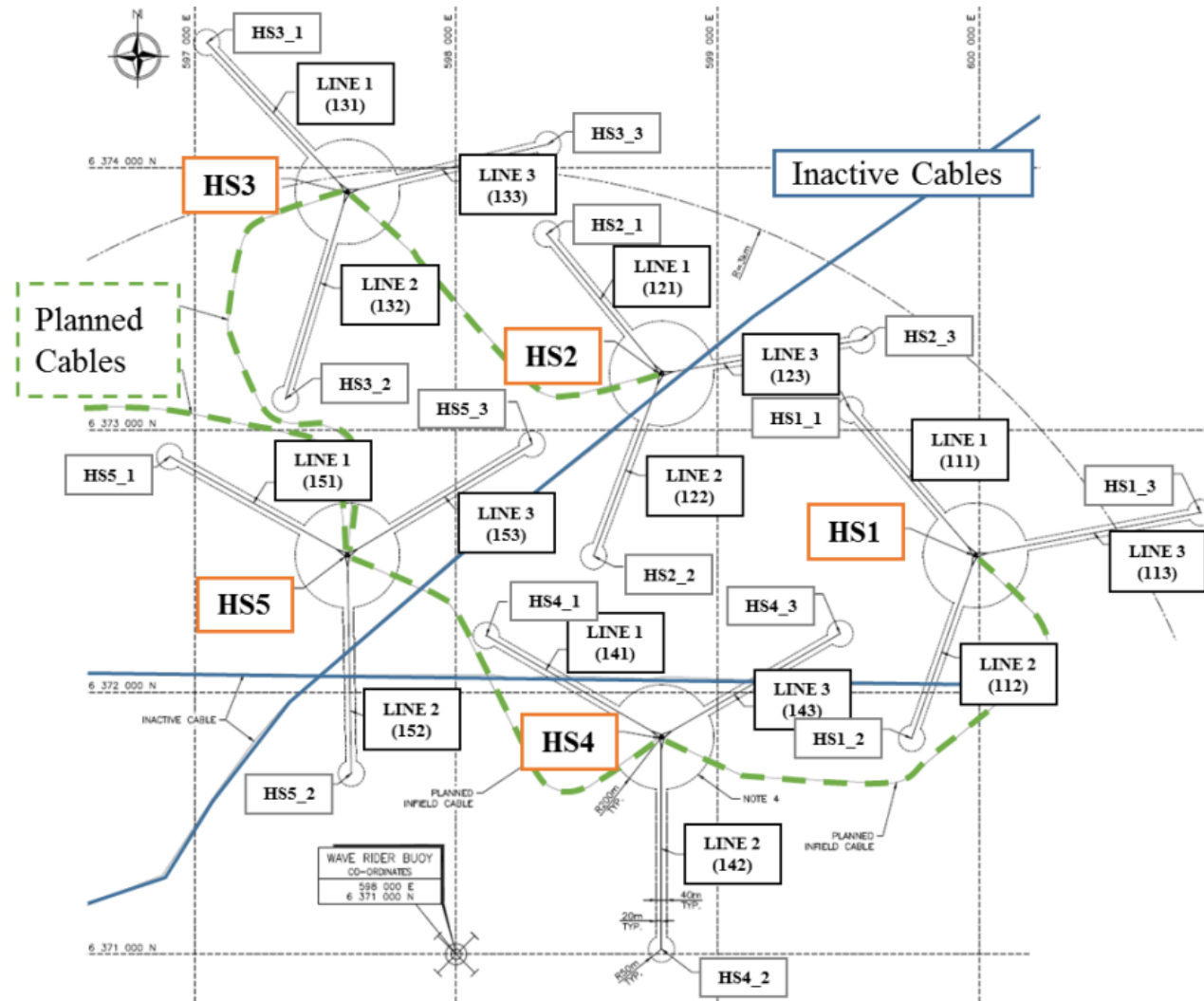
Hywind Scotland consist of 5 turbines, 6 mw each -> 30 MW
Will supply with renewable energy 20 000 UK households



Masdar
A MUBADALA COMPANY

Statoil

Offshore Field Layout



Project Description

iSURVEY scope of work – High level

- Positioning during Mooring-Chain Pre-installation
- Assist with positioning services during hook-up of FWTs
- Positioning during vertical Tow of FWTs

Project Preparation

- Project Planning
- Equipment Requirement
- Mobilisation
- Project execution
- Demobilisation
- Deliverables
- Project Feedback



Mobilisation

- Lead Vessel
- Tugs
- Floating Turbine
- Equipment
- Personnel
- Logistics



Equipment



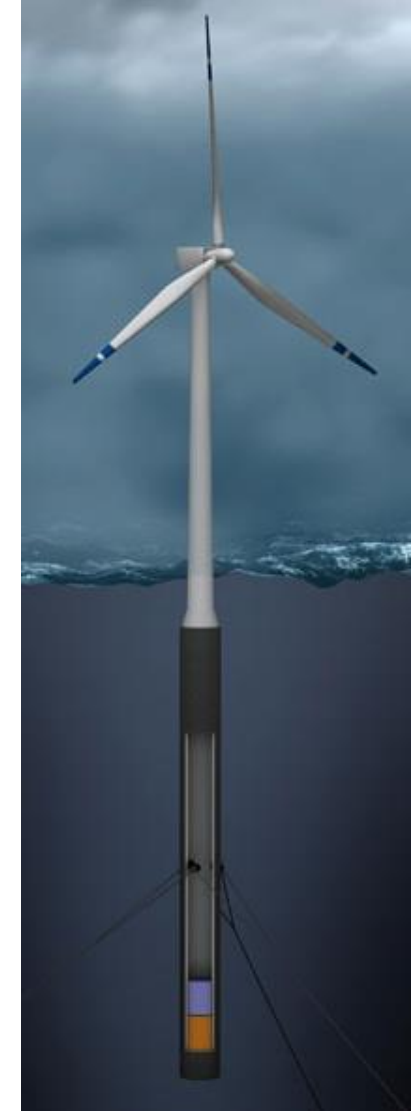
- iNav Navigation Spread
- Vessel Gyro
- Motion Sensor
- Hi-PAP 500
- SV Probe
- Helsen Displays
- Telemetry System
- WiFi Mesh Antenna

- iNAV Navigation Spread
- Mesh WiFi Antenna

- iNAV Navigation Spread
- Mesh WiFi Antenna

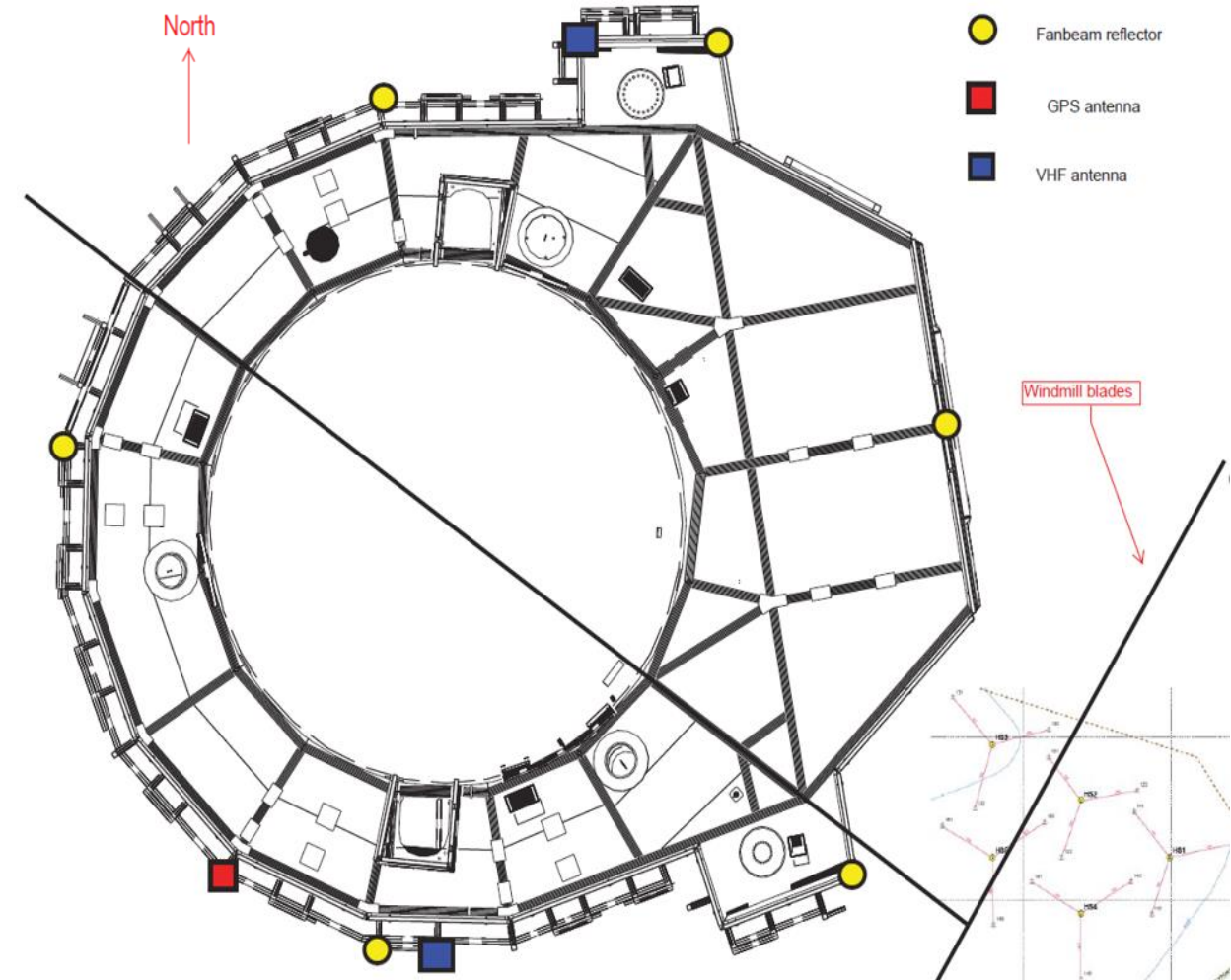
- iSAFE TMS
- Mesh Wifi Antenna

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- Mesh Wifi Antenna



- iSAFE
- GPS Gyro
- Fanbeam Prisms
- Mesh WiFi Antenna

Towing Operation

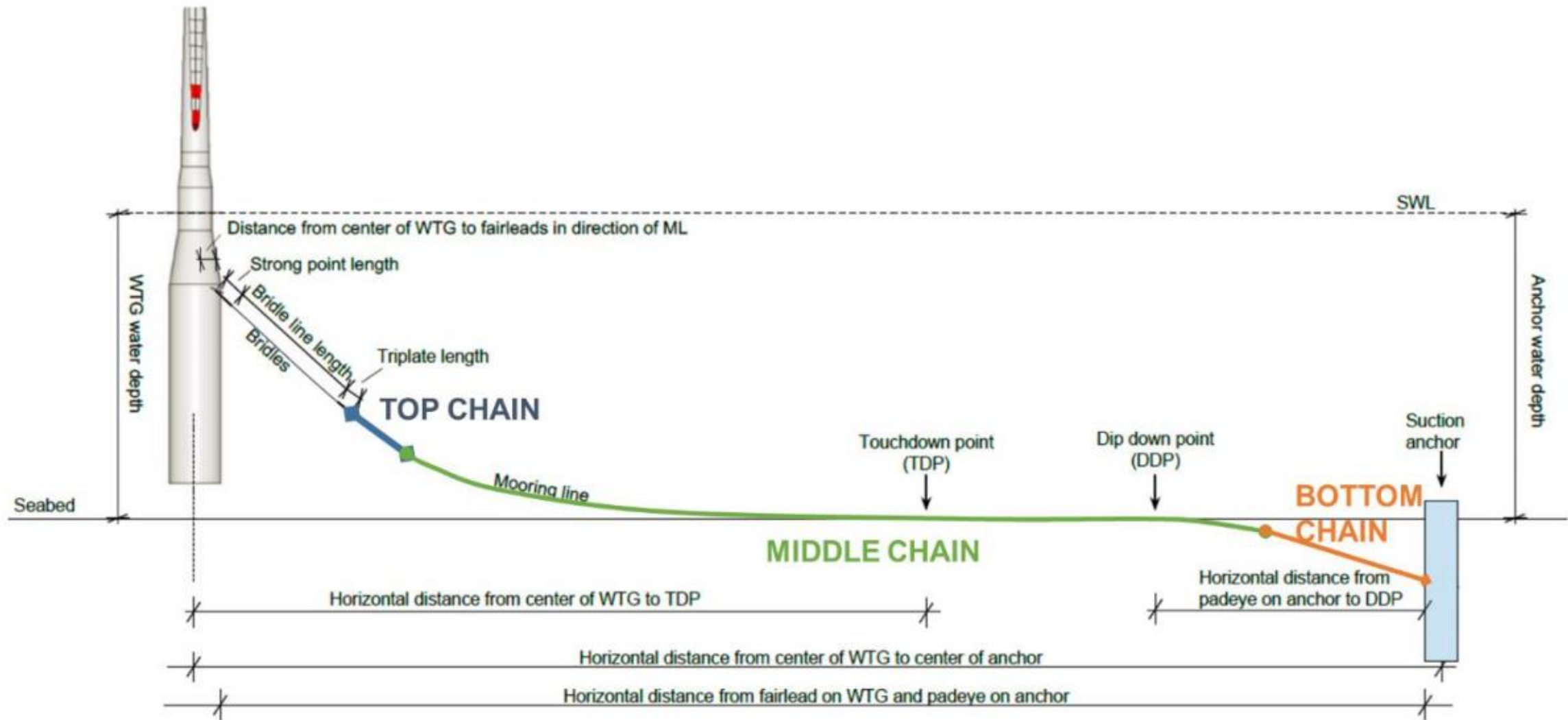


Mooring Chain Pre-Installation

- Pre-installation survey/As-found survey conducted as a GVI.
- Monitoring of the FWTs
- Monitoring of the 4 tugs
- Produce field reports as required
- Demobilisation



Hook-Up of FWT's



Position challenges and solutions

- New software – Virtual Serial Port
- Heading, Pitch & Roll and SOR
- Coupler issues
- Revised equipment requirements
- Precious cargo



Lessons Learned

