

Challenges of Dynamic Cable Development

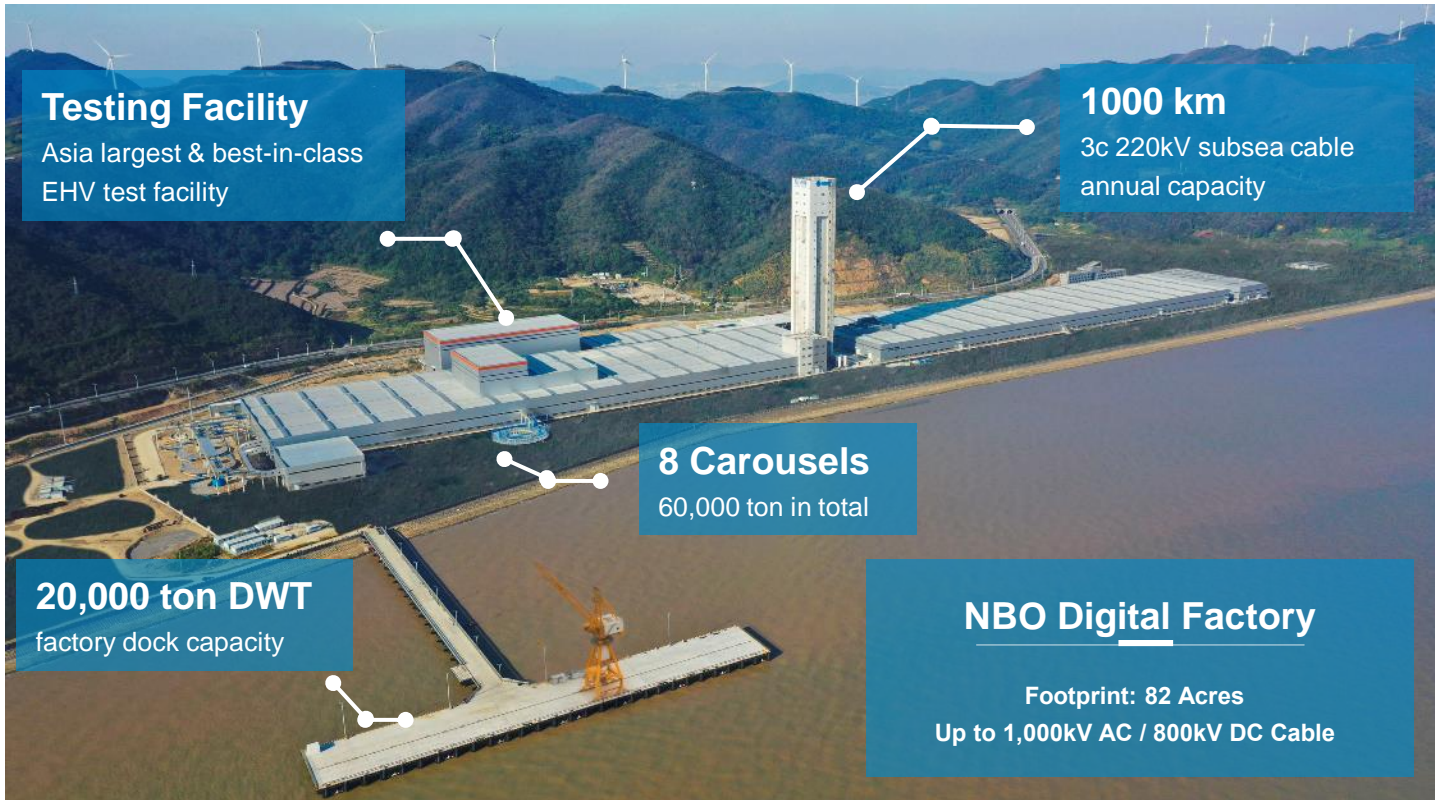
Dr Qi Tang





-
- 01 **Introduction to NBO**

 - 02 **Challenges of Dynamic Cable**



HVAC Subsea Cable
~500kV



HVDC Subsea Cable
±525kV



Land Cable
~500kV/±535kV



Umbilical Dynamic Subsea Cable



20 EPCI Projects



7000+km
Subsea Cable
Track Record



40%+
China Market
Share



Part of the FTSE
Global Equity
Index



Sole Umbilical
Manufacturer
in Asia

Application of Dynamic Cable for FPSO & FOW



2012

- **First Dynamic Cable**
HZ21-1 6kV Dynamic Cable



2019

- **First Deep-water Dynamic Cable**
LH11-1 10kV Dynamic Cable
- **First Overseas Dynamic Cable**
Malaysia AJK 10kV Dynamic Cable

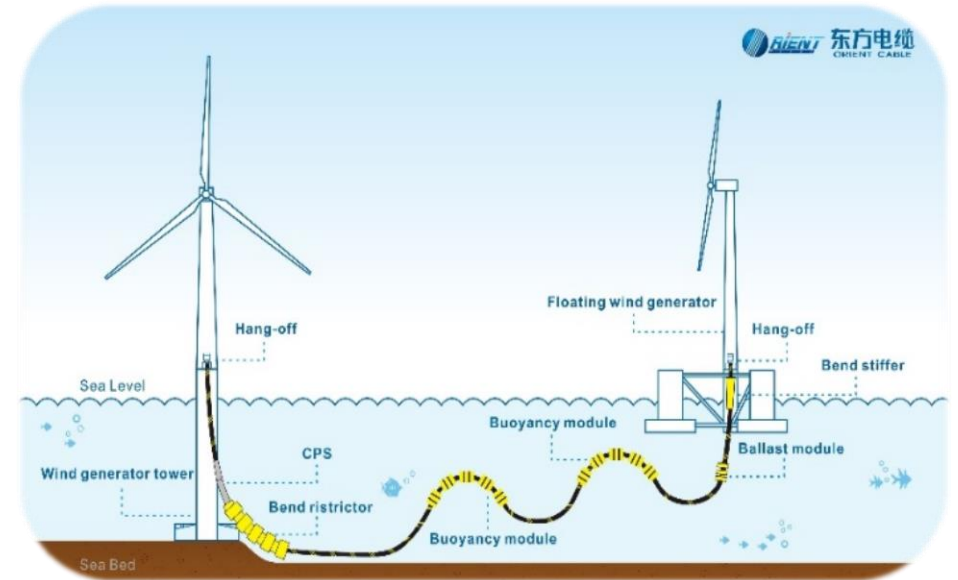


2021

- **China 1st FOWT Pilot Project**
Three Gorges FOW 33kV dynamic cable
- **China 1st FOWT for O&G Electricity Supply**
Wenchang 33kV dynamic cable
- LH11-1/4-1 dynamic cable project
- LF12-3 dynamic cable project
- Panyu piggy-back dynamic cable project
-

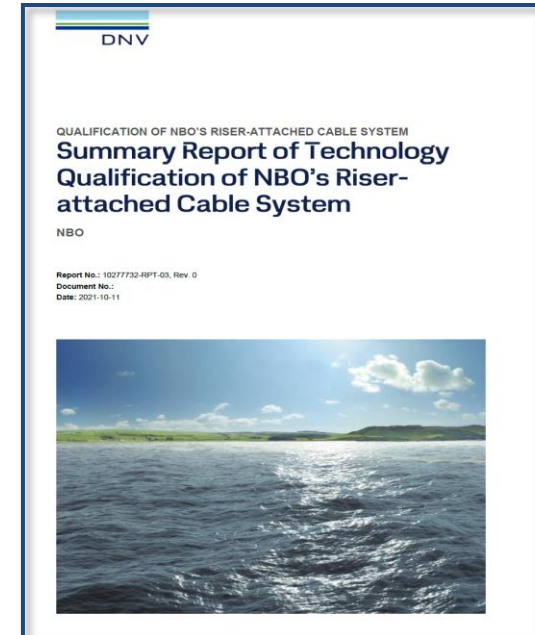
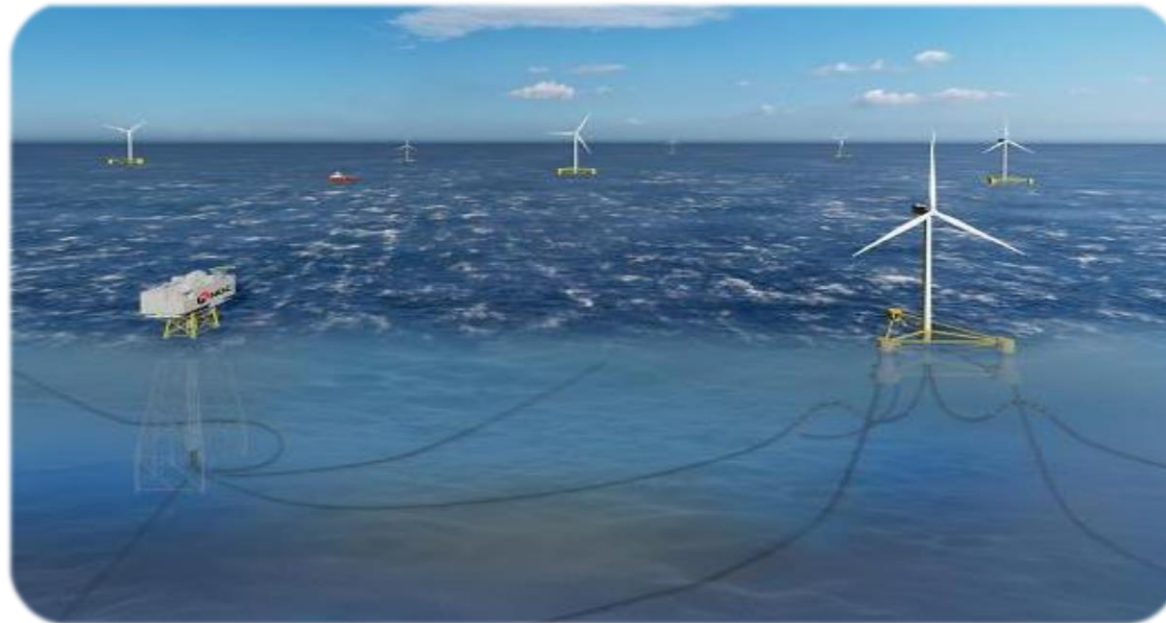
33kV Wet-Design Dynamic Cable

- World's 1st Typhoon Resistant FOWT
- Water Depth **28m**
- Horizontal drift **30m**



33 kV Dynamic Cable

- Offshore Distance **130km**
- Water Depth **114m**
- Dynamic Cable System + Piggy-back dynamic cable system

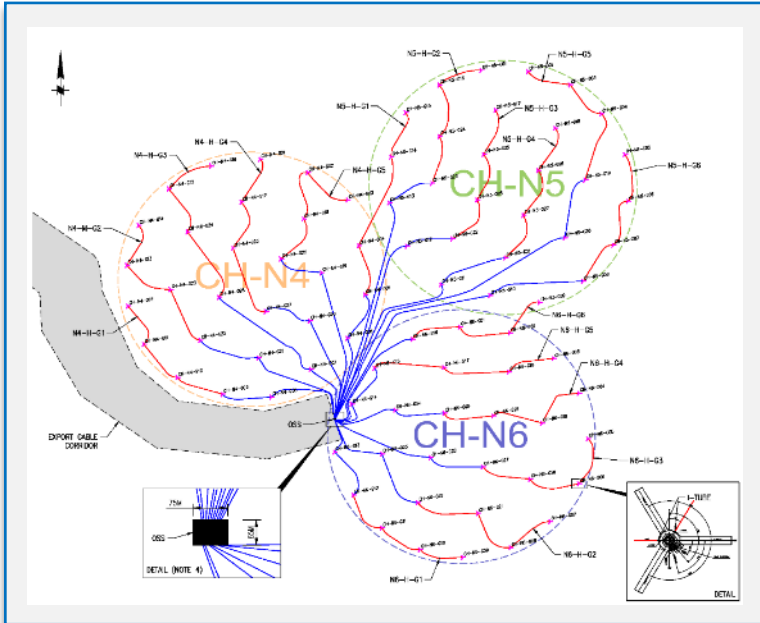


To supply offshore O&G development electricity from FOWT

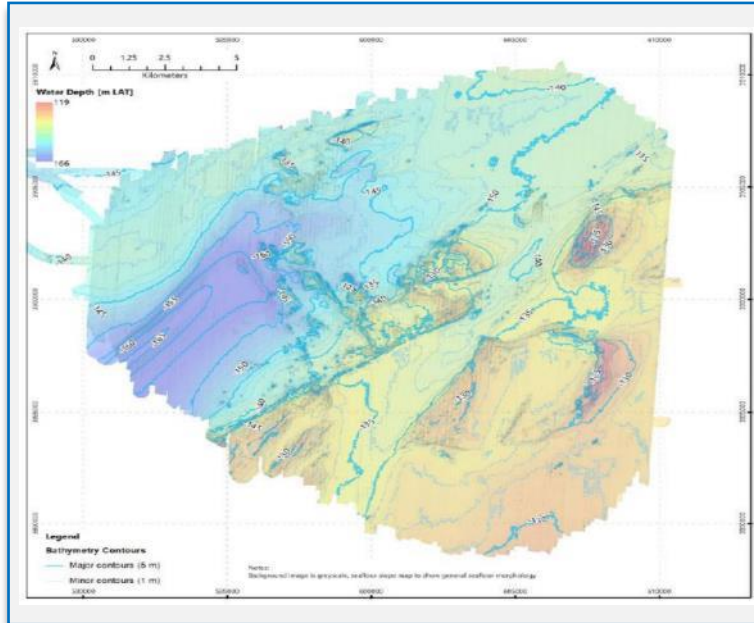


01 Introduction to NBO

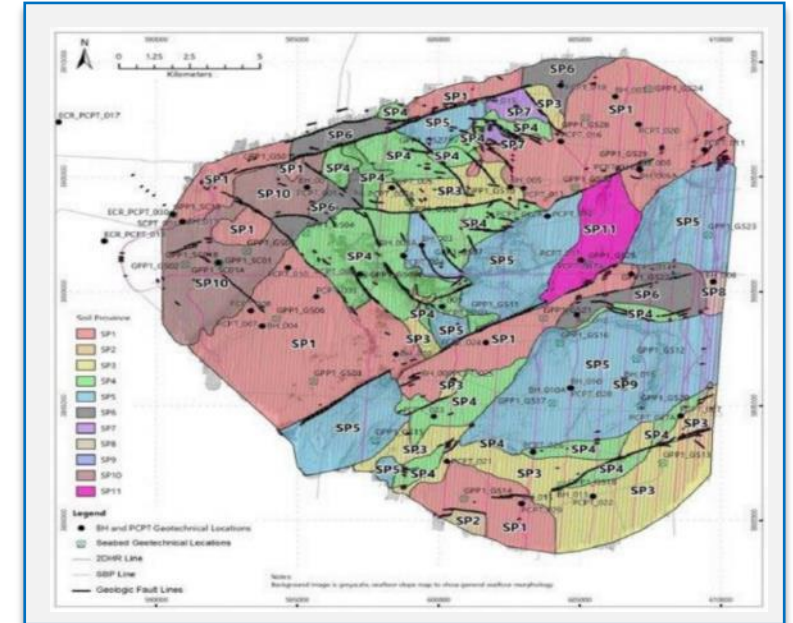
02 Challenges of Dynamic Cable



Larger Scale



Various Water Depths



Complex Seabed Conditions

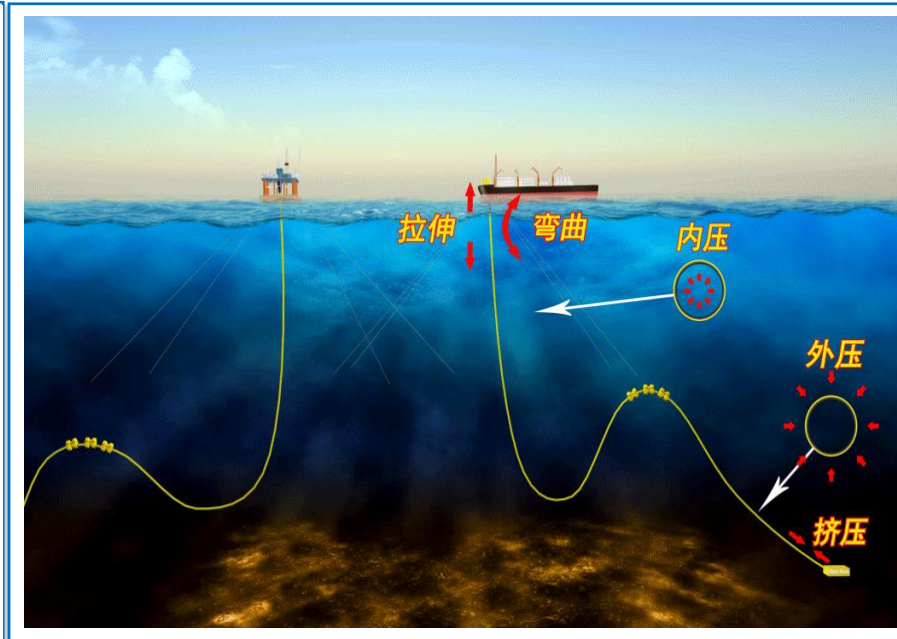
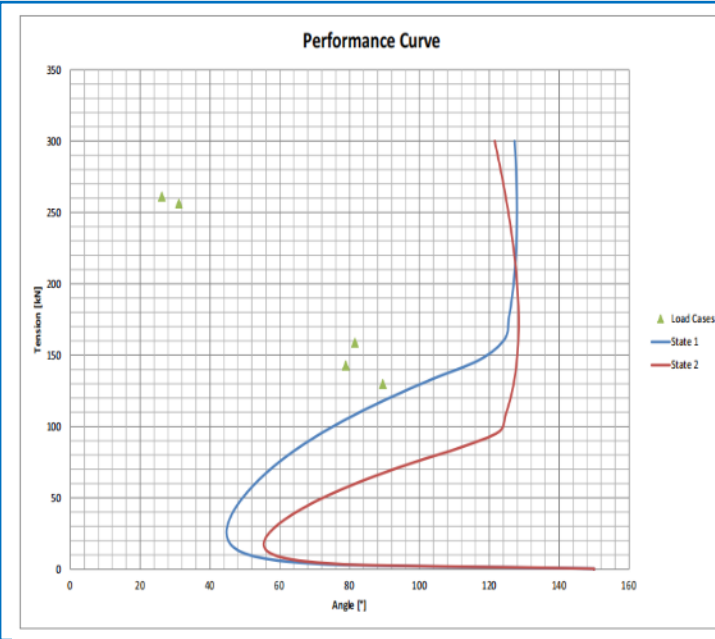
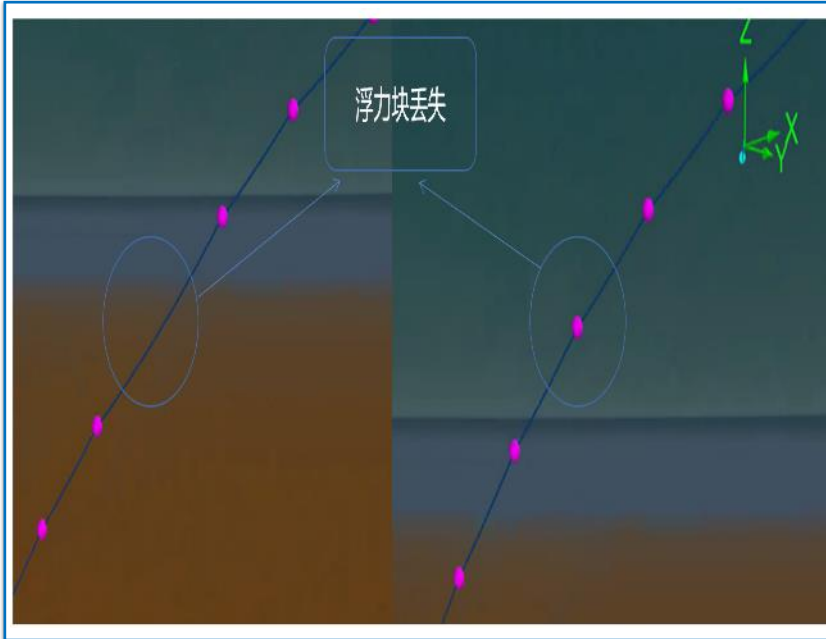
Sensitivity Study
+
Extreme Value Analysis

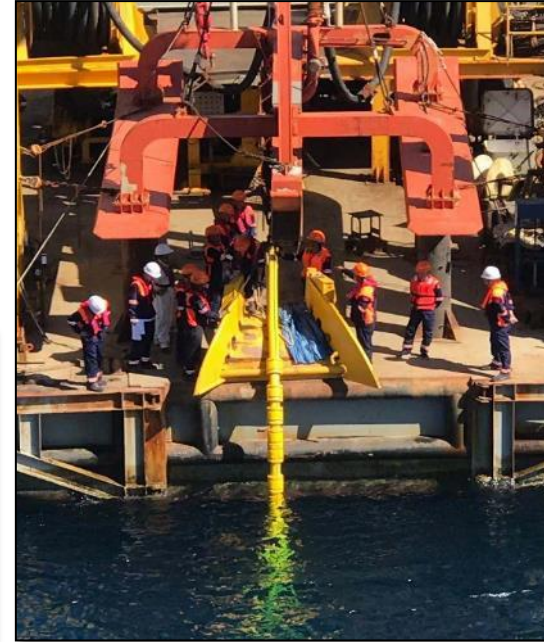
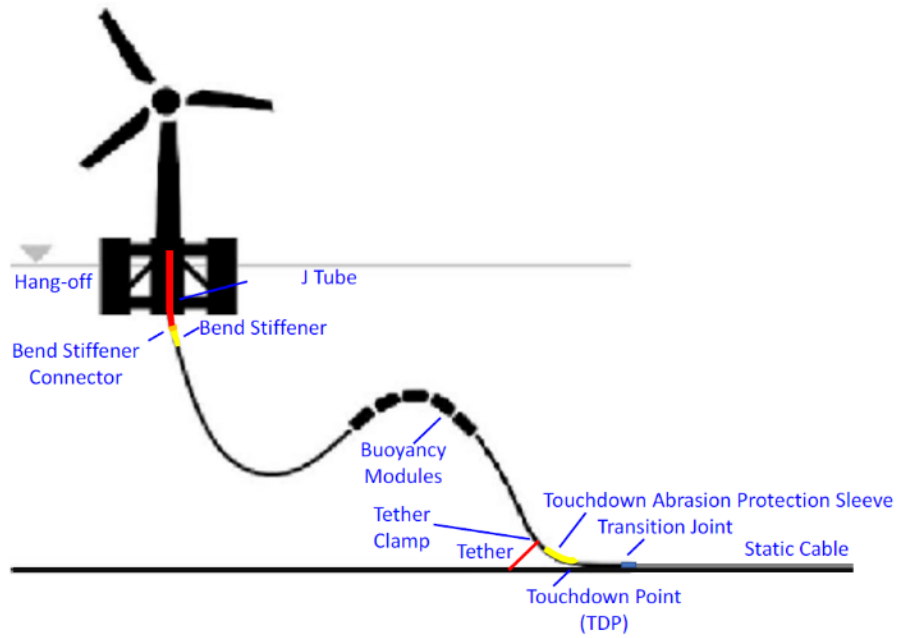


Least numbers of
Configuration for the
whole FOWF

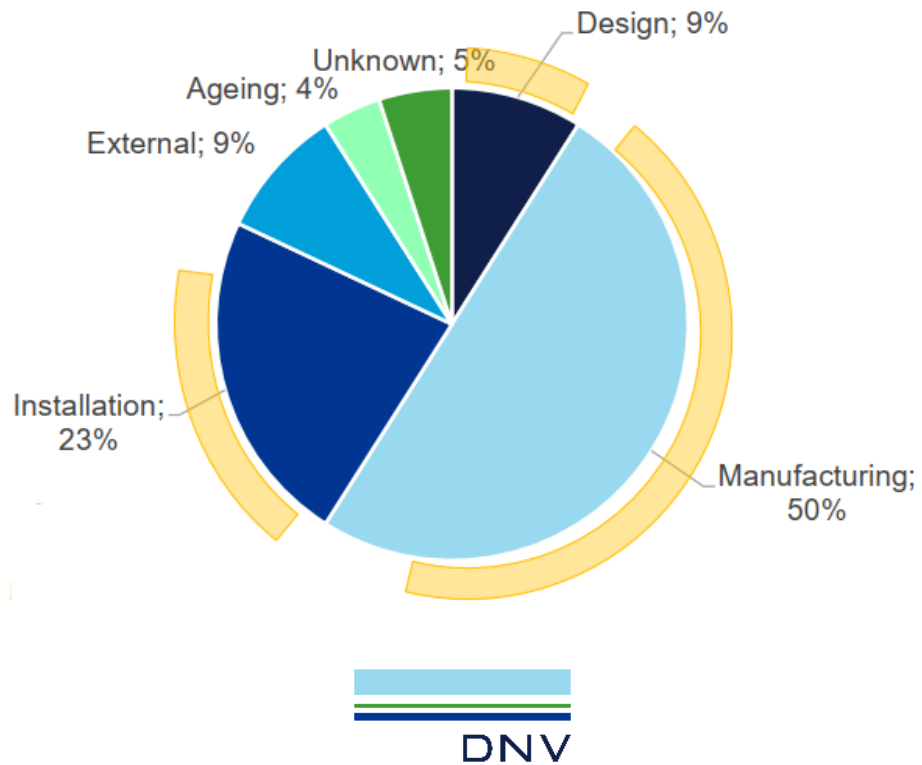


Efficiency
Economics

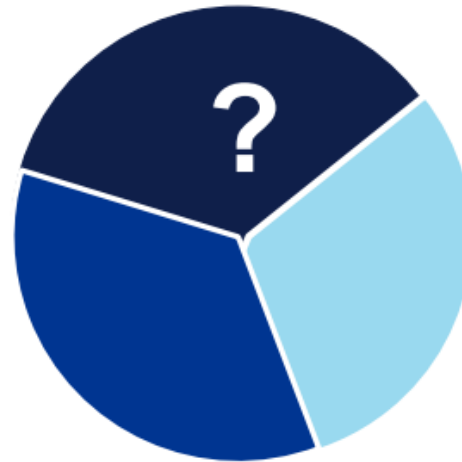




Failure root cause of static subsea cable



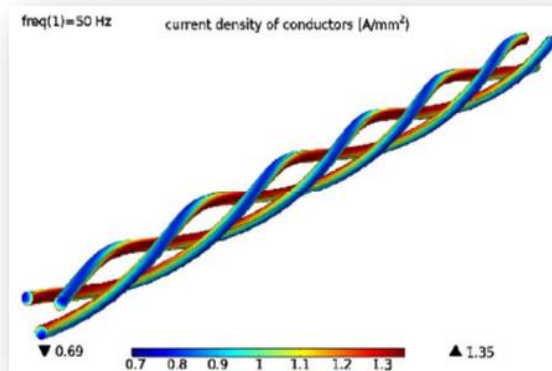
Failure root cause of dynamic cable?



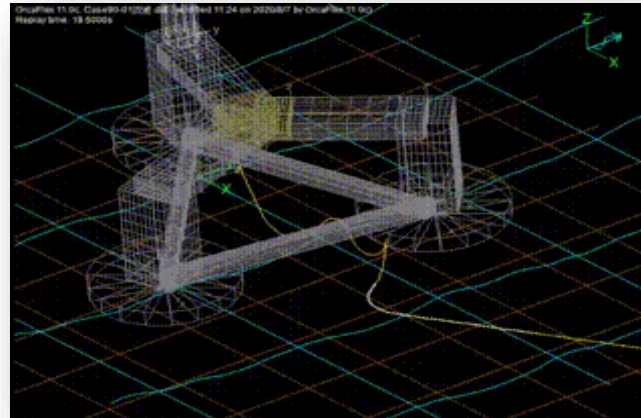
Floating Wind Joint Industry Project: Dynamic Cable Failure Rates and Standards (DCFR)



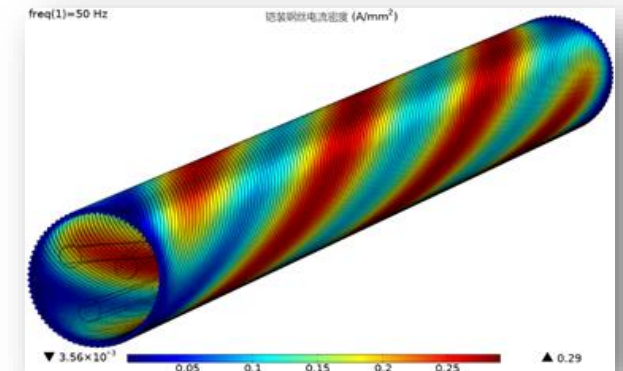
Electrical Stress



Mechanical Stress



Thermal Stress



Coupled Effect?

Lead Sheath → WTR-XLPE

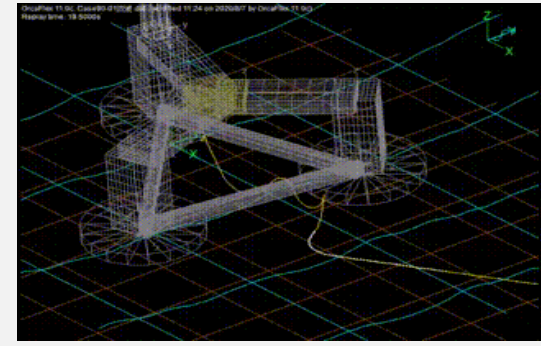
API 17E

IEC63026

**CIGRE TB
623/490/862**



66kV → 132kV



Various Advanced Analysis



**Strong In-house
Engineering**



Complicated Manufacturing



Bespoke Machines



Multiple Failure Modes



Great Test Facilities



System Integration



Innovative SCM



RIENT
PEARL

东方电缆
ORIENT CABLE

Linking the Land and the Sea