FirstSubsea

Fixed and Floating Offshore Wind

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Cable Protection Solutions

11th April 2024

DeepWind Cables Subgroup Workshop

Jonny Barnett, MBA, BEng (Hons)

Head of Sales and Business Development

FirstSubsea

- Established in 1994 and part of a privately owned group, First Tech
- Over 25 years supplying class leading products to the offshore oil, gas and renewable industries
- Design, engineering and analysis | Project Management | Assembly | Testing | Delivery

1ST INTEGRATED LIFTING | INSPECTION | RENTALS

- Equipment Rental
- Lifting Equipment Manufacturer

FMS FIRST MARINE SOLUTIONS

- Mooring Solutions
- Offshore Equipment Rental/Sales

NSC NORTH SEA COMPACTORS

- Offshore Waste Compactors
- Offshore Balers

FirstCompetence

- Safety Products and Programs
- Training Assessments and VR

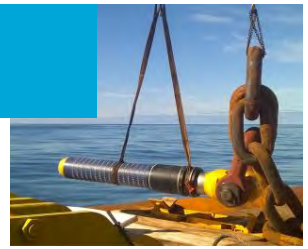
MOORING SYSTEMS

- Tri-Catenary Mooring Systems
- Spooler Rental

Product Overview

First Subsea

- Mooring



- SURF and Cables

- Lifting

- Cable Protection

First Subsea has designed and supplied products and systems globally including:

450+
Subsea Mooring Connectors

350+
Quick Connect Lifting Tools

2000+
Cable Protection Systems

25+
Platform Mooring Connectors

50+
Bend Stiffener Connectors

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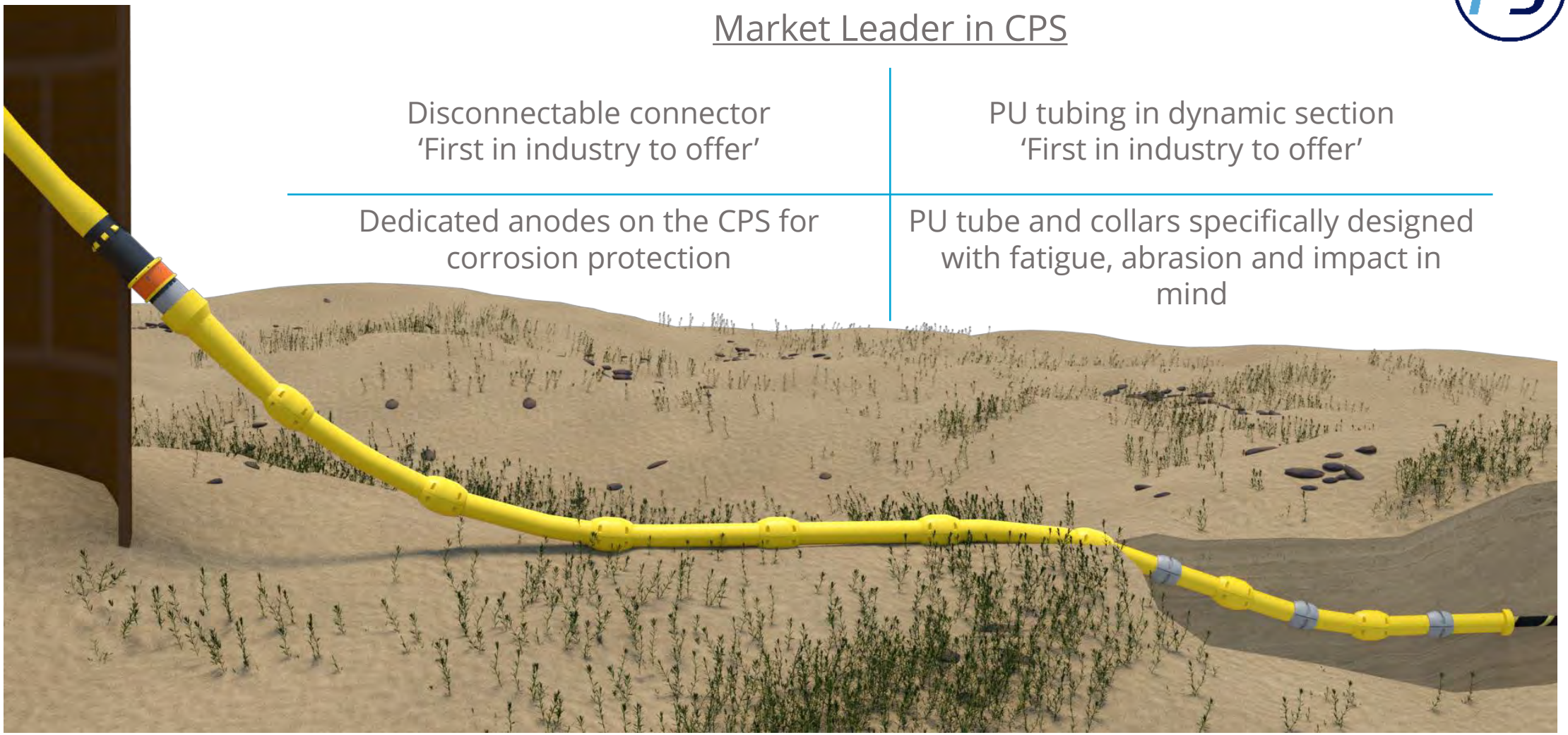
Fixed Offshore Wind – CPS

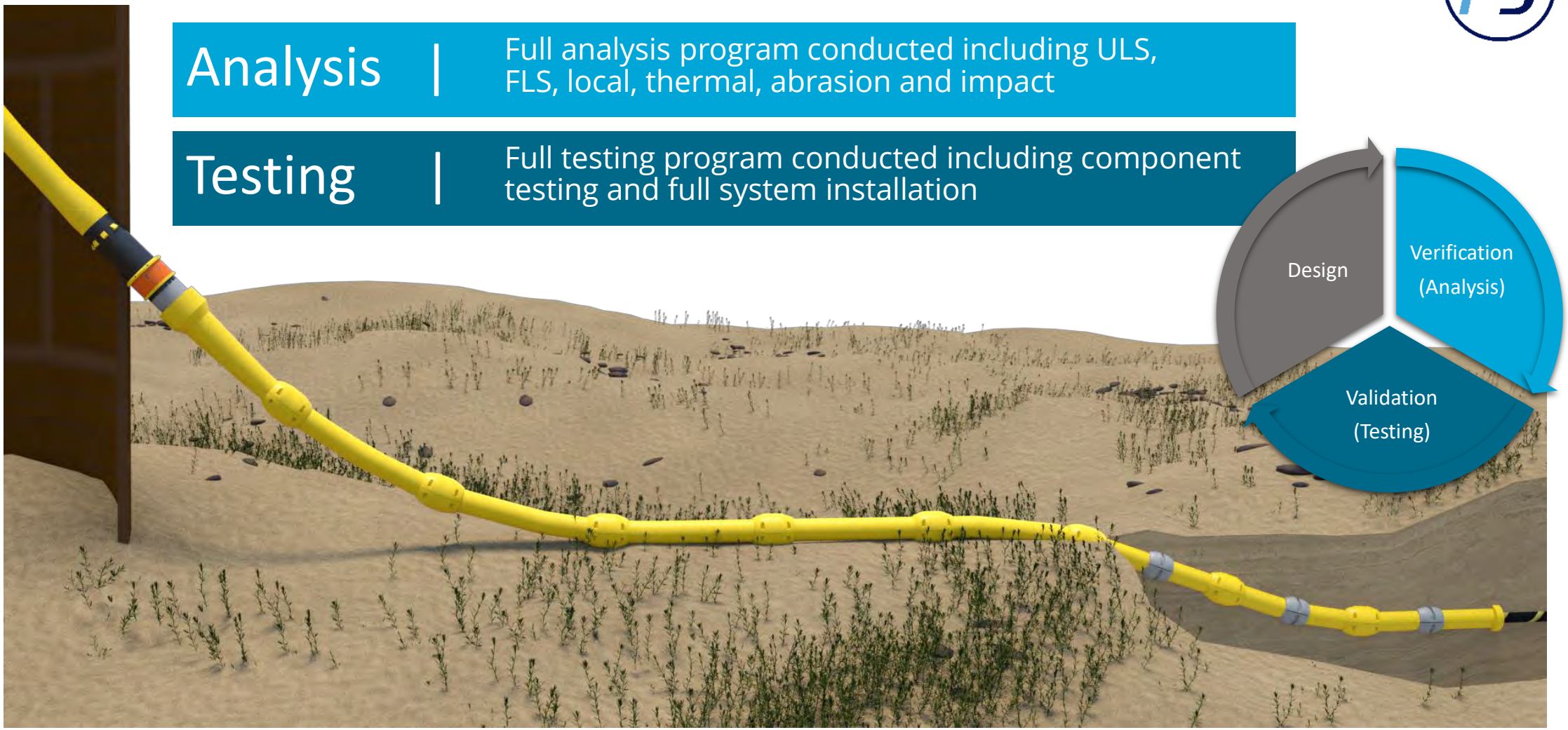
Market Leader in CPS

Disconnectable connector 'First in industry to offer'	PU tubing in dynamic section 'First in industry to offer'
Dedicated anodes on the CPS for corrosion protection	PU tube and collars specifically designed with fatigue, abrasion and impact in mind



Fixed Offshore Wind – CPS

Analysis	Full analysis program conducted including ULS, FLS, local, thermal, abrasion and impact
Testing	Full testing program conducted including component testing and full system installation



Floating Offshore Wind – BSC

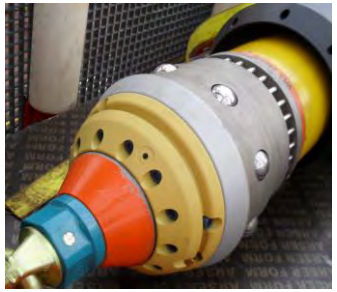
- The current solution for FOW dynamic cable protection is a BSC and dynamic bend stiffener

- Bend Stiffener Connector (BSC)
  - *Latch Connector*
  - *Receptacle*
  - *Release under load Pull Head*
  - *Hydraulic Release Tool*

- Dynamic Bend Stiffener
- Cable Hang-off
- Touchdown Protection







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Floating Offshore Wind – Considerations

Current
'State of the Art'
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BSC and Dynamic Bend Stiffener

RCD

Routine Cable Disconnection

The ease of both installation and disconnection of the cable from the floater is a high priority

ED

Emergency Disconnection

In the case of a mooring line failure, the dynamic cable may take loading beyond design parameters

PTC

Pre-Terminated Cables

Cables cut to length and terminated onshore prior to installation can save significant time offshore

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Floating Offshore Wind – Considerations

Current
'State of the Art'
~
BSC and Dynamic
Bend Stiffener

Routine Cable Disconnection

Emergency Disconnection

Pre-Terminated Cables

Bend Stiffener System (pat. pend.)
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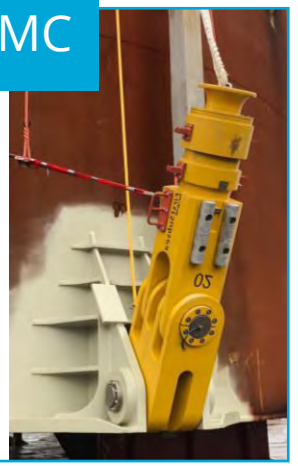
- Utilises existing cable protection system (CPS) and BSC technology
- Removes the mechanical connector at the bottom of the I-tube
- Diver-less and ROV-less installation and disconnection

O&G SMC

FOW SMC



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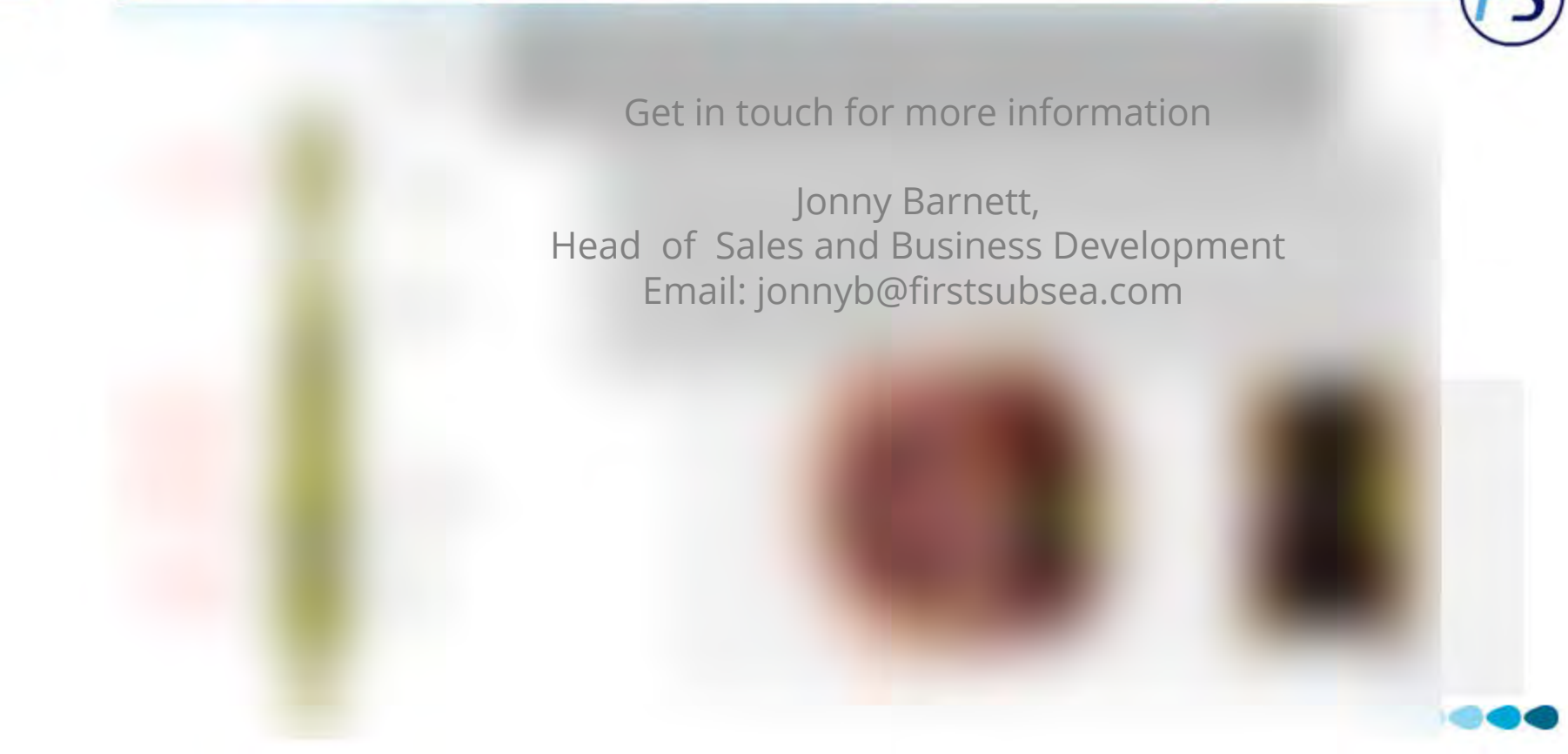
Bend Stiffener System – Overview

Get in touch for more information

Jonny Barnett,
Head of Sales and Business Development
Email: jonnyb@firstsubsea.com



Bend Stiffener System – Overview

Benefits – Floater Design

- No bellmouth required due to there being no subsea connector
  - No limitations on floater manufacture – allows shallow dock fabrication
  - Removes any concerns regarding tow out and draft considerations
- All load transfer is to the base of the floater – the strongest part of the structure

Benefits – Installation

- Allows a flexible installation methodology, with one mechanical connection at the hang-off deck – no subsea mechanical connection
- No ROV or diver intervention required
- Allows the laydown of cable on the seabed prior to structure float out

Benefits – Disconnection

- Allows a flexible disconnection methodology, with one mechanical disconnection at the hang-off deck – no subsea mechanical disconnection
- No ROV or diver intervention required
- Allows the laydown of cable on the seabed post disconnection
- Emergency disconnection ready – easy to incorporate at the cable hang-off

Bend Stiffener System – Summary

Bend Stiffener System
(Patent pending)

Routine Cable Disconnection

Emergency Disconnection

Pre-Terminated Cables

- Only one mechanical connection of the cable at the hang-off deck. Can be automated if required
- No subsea connector, so no ROV or diver required for installation/disconnection
- Allows flexible installation methodology e.g., pre-laying of cables on the seabed
- System can be assembled to the back of any cable termination head
- Uses components and materials pre-qualified from similar applications

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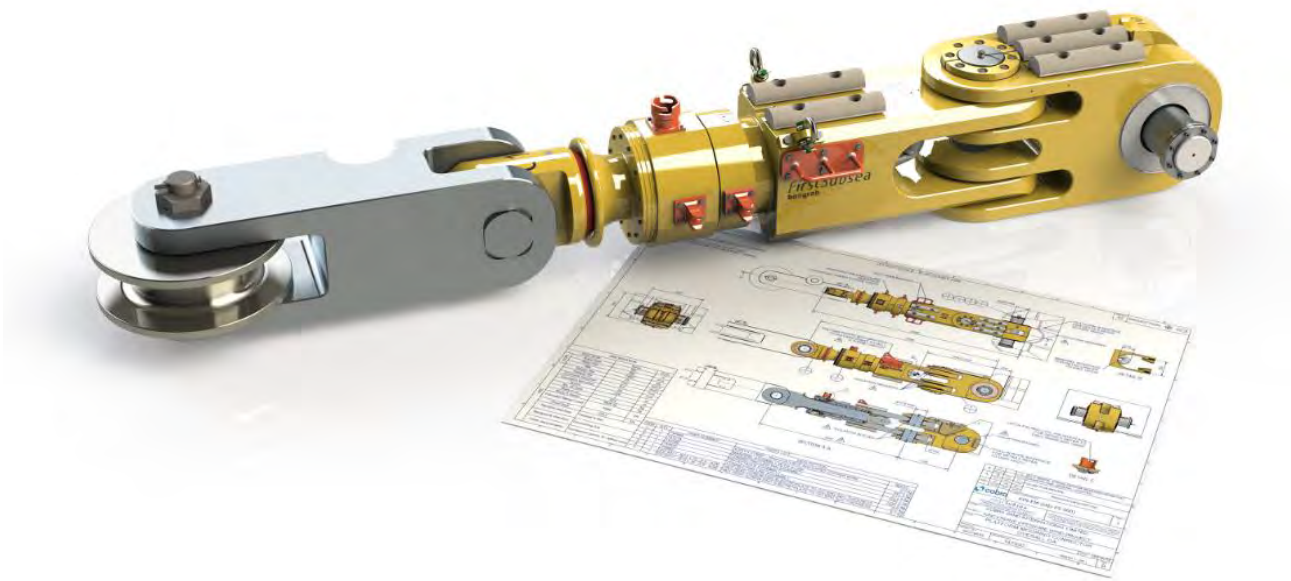

Jonny Barnett, MBA, BEng (Hons)

Head of Sales and Business Development

Email: jonnyb@firstsubsea.com
Tel: +44 (0)1524 387 777

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