



**BARDOT GROUP**

*subsea smart solutions*



# SUBSEA SMART SOLUTIONS

[REQUEST A QUOTE](#)

A recognized expert in polymers & composites solutions dedicated to the Subsea Industry !

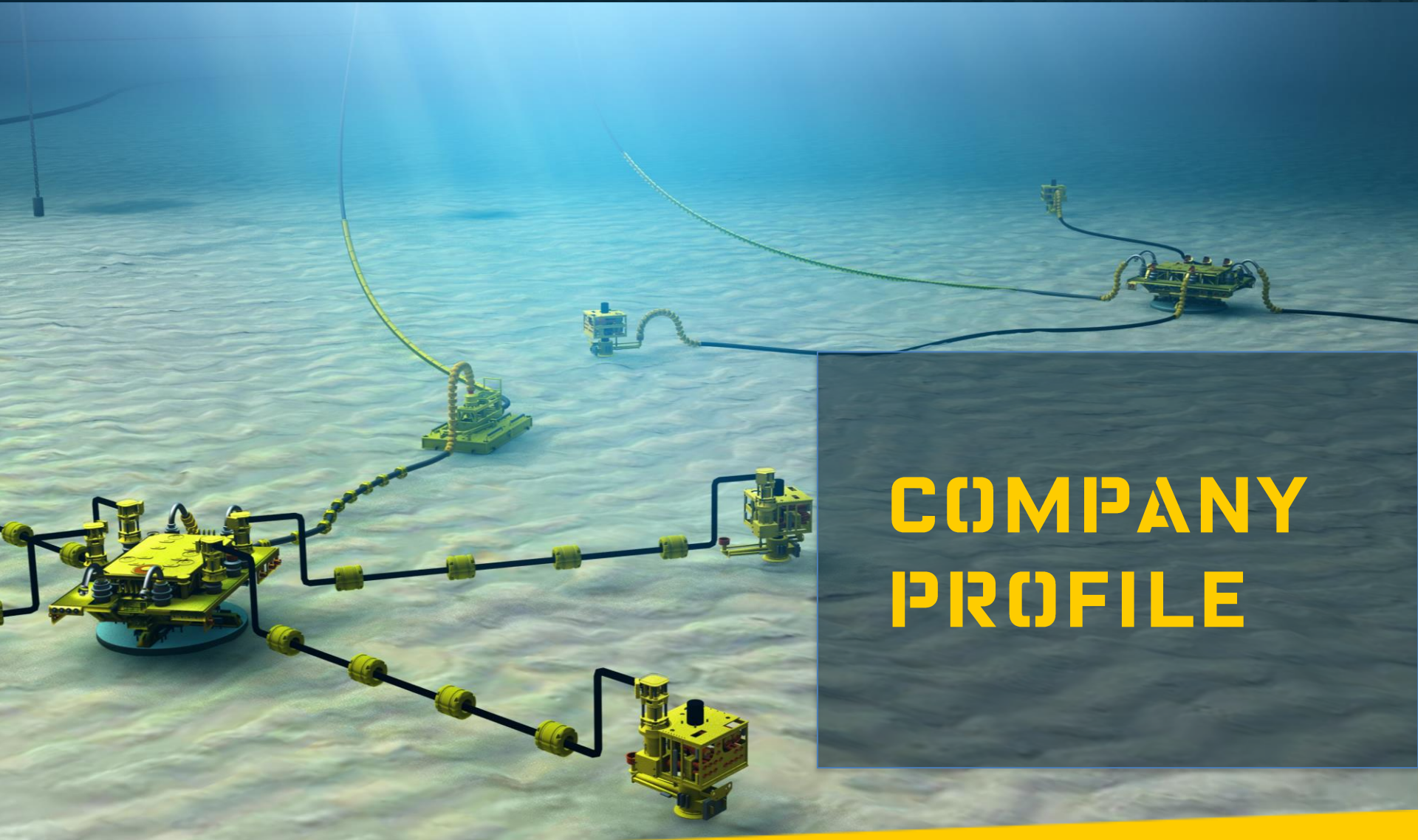


**BARDOT GROUP**  
*subsea smart solutions*

# SUMMARY

- 1 - COMPANY PROFILE
- 2 - SURF FUNCTIONS  
& KEY PROJECTS
- 3 - SURF PACKAGES





# COMPANY PROFILE

## CREATION

November 30th 2004

## HEADQUARTER

La Ciotat, France

## OFFICES

Kuala Lumpur, London, Houston,  
Rio de Janeiro, Abu Dhabi

## ACTIVITY

Subsea Umbilicals, Risers and Flowlines solutions

## WORKFORCE

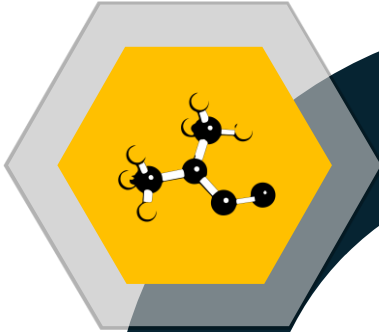
50 employees

## TRACK RECORD

100+ significant Oil & Gas projects Worldwide



**PLASTICS &  
COMPOSITES  
MATERIALS  
PROCESSING**



**HYDRODYNAMIC  
ENGINEERING**



**SUBSEA**

**MECHANICAL  
ENGINEERING**



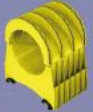
**MANUFACTURING**



Bend Stiffener



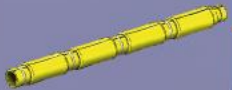
Piggyback



Insulation Cover



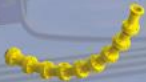
Protector



Crossing Solution



Bend Restrictor



Water Intake Riser



Buoyancy Module



Ballast Module

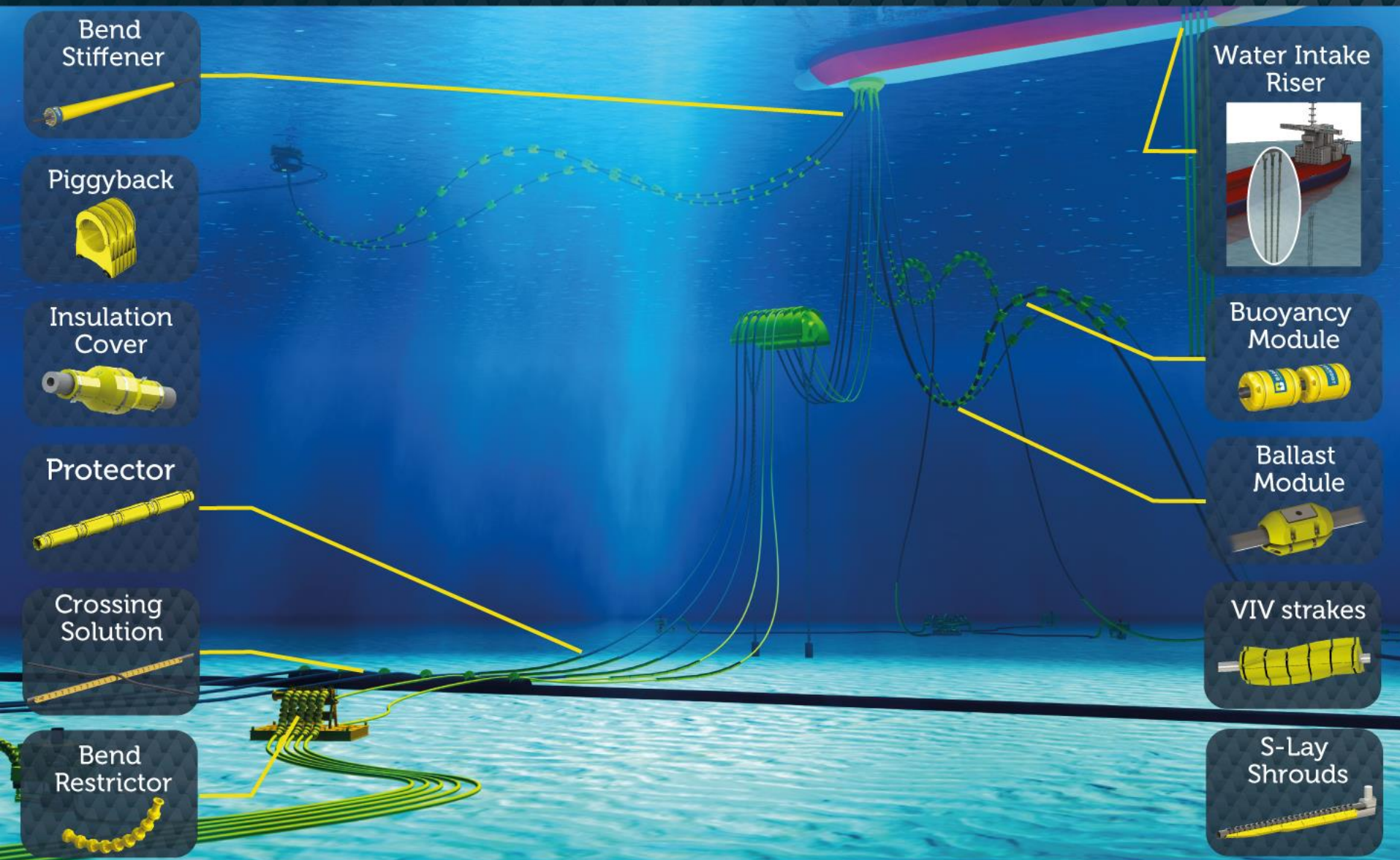


VIV strakes



S-Lay Shrouds







## ➔ DESIGN & ENGINEERING

- Design of Subsea polymer equipment using state of the art calculation tools (FEA, Thermal Analysis, Mechanical analysis).

## ➔ PRODUCTION

- Qualified production sites audited by Bardot Group or on-site production.

## ➔ QUALIFICATION & TESTING

- Done according to the project specification, possibly under the API 17L1 standard. State-of-the-art Experimental Development Center in La Ciotat.

## ➔ PROJECT MANAGEMENT & DOCUMENTATION

- A Project Engineer to be in charge for the whole duration of the project.

## ➔ QA & HSE

- Quality Control at every stage of the project.



**MECHANICAL**



**THERMO-PHYSICAL**



**LONG TERM**



**TRIBOLOGICAL**



**OTHER**



**TENSION**



**COMPRESSION**



**SHEAR**



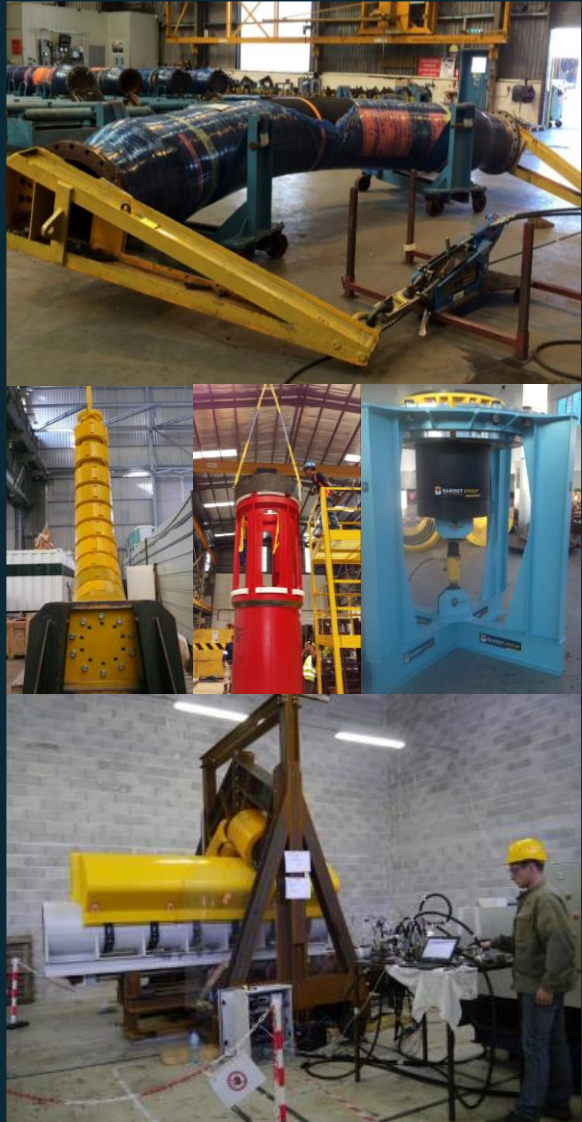
**HARDNESS**



**FLEXION**



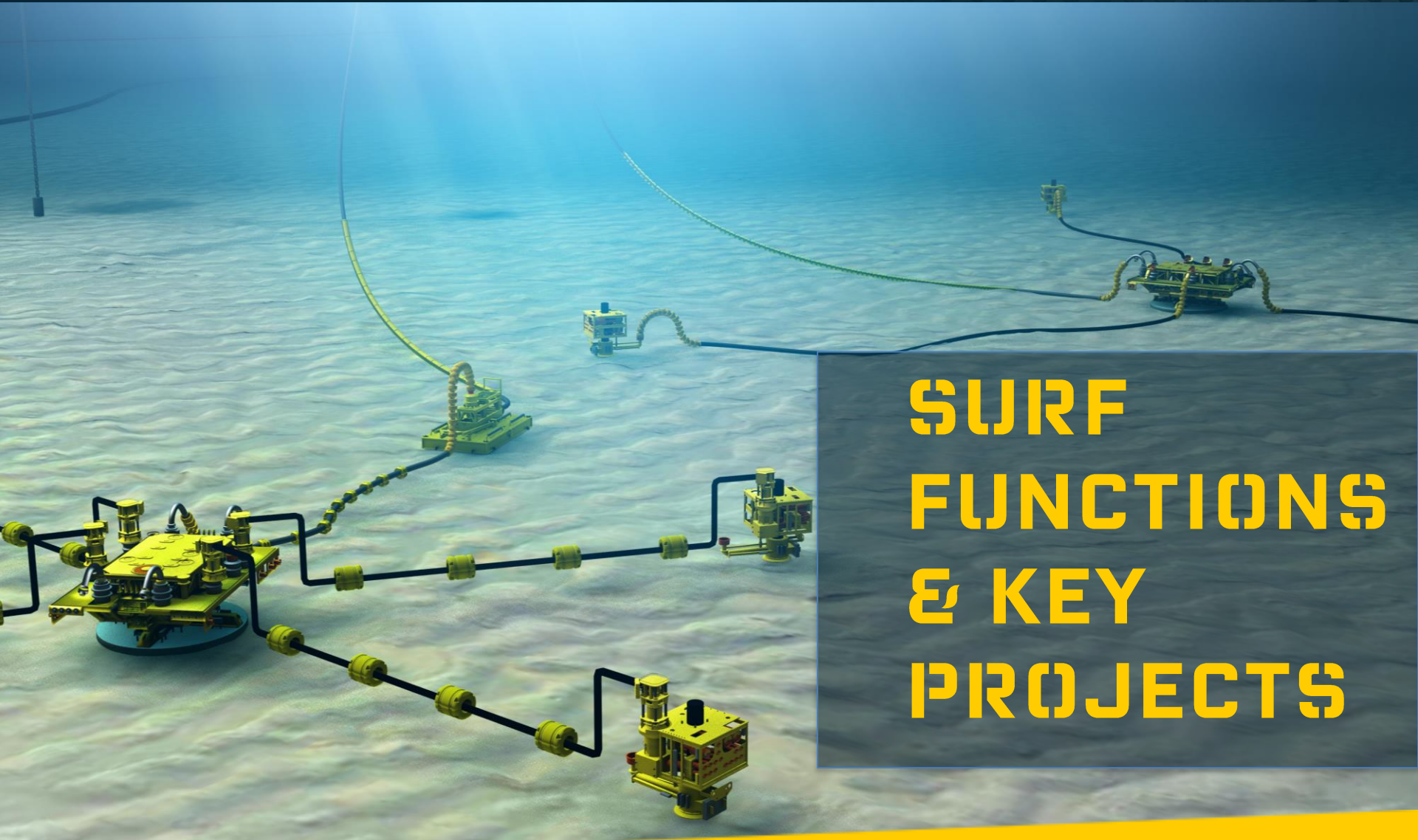
**BOLTING**



Full scale test are performed under BARDOT's supervision in order to validate the fitness for purpose of the components.

## ➤ LABORATORY CAPACITIES

- Axial load test
- Compressive test
- Fit up test
- Bending test
- Leak test
- Pressurized test



# SURF FUNCTIONS & KEY PROJECTS



- In house development team
- Innovative in line process
- Wide range of qualified syntactic foam



ISO 9001

**BUREAU VERITAS**  
Certification



➤ **A VARIETY OF SYSTEM:**

- PE half shell strapped on the line using SuperDuplex straps.

➤ **WIDE RANGE OF QUALIFIED SYNTACTIC MATERIAL – HIGH PERFORMANCE:**

- Standard to ultra light density (0.45),
- Shallow to ultra-deep (2500m),
- Permanent usage.

➤ **EXTERNAL PROTECTIVE SKIN:**

- Sheath made of PE for abrasion & impact resistance.



## strengths

- In house development team
- Innovative in line process
- Wide range of qualified foam

## ➤ PRODUCTION CAPACITY:

- Buoyancy modules up to 7m<sup>3</sup> each
- 2000 tons net buoyancy per year
- 1200 sq.m production factory

## ➤ IN FLOW SYNTACTIC FOAM CASTING:

- Automatic In line Component Monitoring
- Process Temperature Control
- Vacuum system to avoid air in the Mix

## ➤ TESTING:

- Impact test
- Abrasive test
- Hydrostatic resistance (Hyperbaric Chamber up to 600 bars)
- Buoyancy (net-up lift)



### *Production Tip*

- *Duration: 6 to 10 weeks  
If Mold available, 2 weeks  
production onward*
- *Production location: Europe*

## ➔ MODULAR CLAMPING SOLUTION:

- PU Clamp made of BARDEEP 1500-02 (83shD) strapped on the line using TPU Strap and alloy tensioning system.
- Rubber Pad (from 60shA to 80shA) in direct contact with the line.

## ➔ CLAMP DESIGN

- We consider the smallest and biggest outside diameter the flexible may apply throughout its lifetime.
- Rubber pad thick defined thanks to preliminary analysis to prevent any slippage

## ➔ CLAMP TEST & QUALIFICATION

- Clamp being qualified by BV (including rubber material)
- Clamp tests:
  - ✓ Compression Strength / Creep Resistance / Tensile strength / Hardness
  - ✓ Friction Coefficients (Rubber Pad vs Pipe Coating & Rubber Pad vs PU Clamp Body) to predict clamp system slippage limits.
  - ✓ Axial Load Test
- Rubber tests to ensure long term reliability:
  - ✓ Compression test
  - ✓ Relaxation stress



## PROJECT

- Hywind II

## FIELD

- Hywind Scotland Pilot Park

## COUNTRY

- UK

## WATER DEPTH

- 120 m

## CONTRACTOR

- Nexans

## OPERATOR

- Statoil

## SCOPE OF SERVICE

- Design, Fabrication and Procurement of Buoyancy modules & clamps

## SPECIFICATIONS



- 316 buoyancy modules
- 385 kg buoyancy
- DeepFloat® syntactic foam
- Dynamic cable OD 169 mm





## ➤ DESIGN

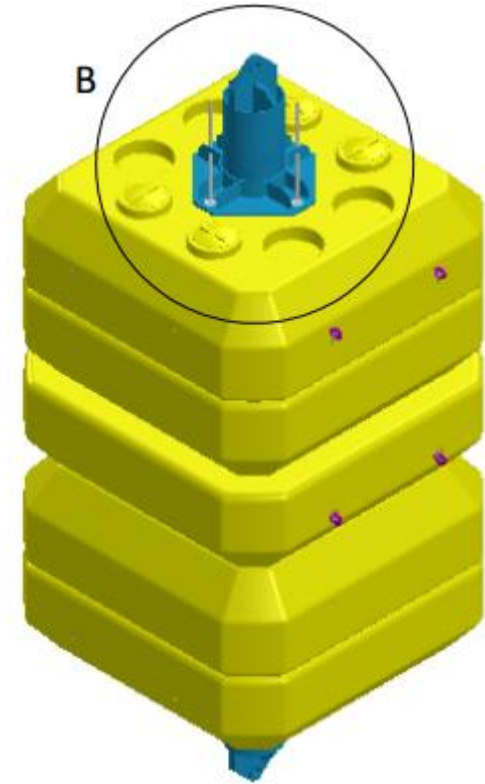
- One-piece or Modular Buoyancy,

## ➤ QUALIFIED SYNTACTIC MATERIAL – HIGH PERFORMANCE

- Standard to light density,
- Shallow to ultra-deep (2500m),
- Reusable device.

## ➤ EXTERNAL PROTECTIVE SKIN

- PU spraid
- PE Sheath.



### *Production Tip*

- *Duration: 6 to 10 weeks*  
*If Mold available, 2 weeks*  
*production onward*
- *Production location:*  
*Europe*

## PROJECT

- Moho Nord Project

## FIELD

- Moho Nord

## COUNTRY

- Congo

## WATER DEPTH

- 800 – 1050 msw

## CONTRACTOR

- Technip

## OPERATOR

- Total E&P Congo

## SCOPE OF SERVICE

- Design, fabrication and procurement of Installation Buoyancy

## SPECIFICATIONS

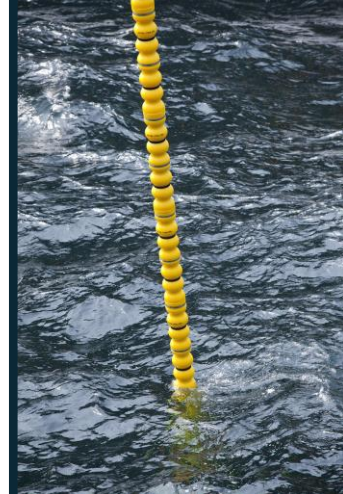


- 6 inches Flexible riser
- Net buoyancy per buoy = 110kg
- DEEPFLEX / 2013 / 80m / OD 304mm
- SAIPEM / WDDM / 2013 / BURULLUS / 850m / OD273mm
- MTC / 2014 / 80m / OD279mm





- Fit for purpose diameter, length & thickness
- Embedded in strips / hinges to prevent opening during bending
- Wide range of straps materials
- Easy & Fast to install
- Installed during laying



- **HIGH PERFORMANCE & COST EFFECTIVE**
- **SHOCK & ABRASION RESISTANCE**
  - Resistance to drop objects
  - Strap Embedded
- **DESIGNED TO ENSURE A FAST INSTALLATION**
  - Half Shells linked with a hinge
  - Grooves ensure radial and axial locking
  - Strapped on the line using non-corrosive material (Inco 625, Ti)
  - Can play on hardness, thickness and stiffness to adapt the design to your needs
- **FLEXIBLE PROTECTION**
  - Preserve the cable from any sharp angle
- **SPECIFIC SHAPE: LOW DRAG EFFECT**



**Production  
Tip**

- *Duration: 4 to 5 weeks  
6 to 10 per cavity per day*
- *Production location: Europe,  
Asia, USA, Brazil*

## PROJECT

- Clipper

## FIELD

- Gulf of Mexico

## COUNTRY

- USA

## WATER DEPTH

- 1036 m

## CONTRACTOR

- CEONA OFFSHORE Houston

## OPERATOR

- BENNU Oil & Gas

## SCOPE OF SERVICE

- Design, fabrication and procurement of Cable Protectors

## SPECIFICATIONS

**CEONA**



## ➔ MAIN FEATURES

- Cast lead added to a Barduct protector

## ➔ HIGH PERFORMANCE & COST EFFECTIVE

- Low cost solution / Cheaper solution than loaded PU

## ➔ SHOCK & ABRASION RESISTANCE

- Qualified Polyurethane / Good abrasion resistance capability

## ➔ DESIGNED TO ENSURE A FAST INSTALLATION

- Strapped on the line using non-corrosive material (Inco 625, Ti)



## strengths

- Fit for purpose diameter, length & thickness
- Wide range of straps materials
- Easy & Fast to install
- Installed during laying

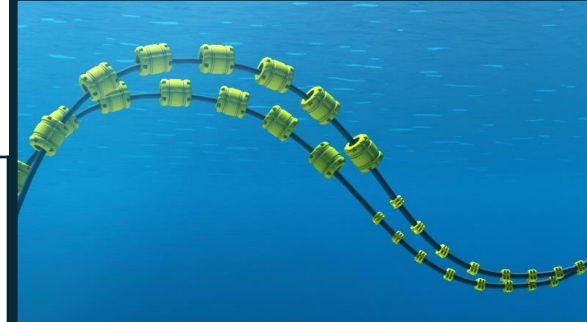
## Production Tip

- *Duration: 7 weeks to start production + 4 ballasted protectors produced per day*
- *Production location: Worldwide*





- Dynamic on-bottom stability solution
- Easy & Fast to install
- Great alternative to concrete mattresses / Time & cost saver
- Local content production
- Corrosion protected solution



## ➔ DYNAMIC BALLAST MODULES:

- Lazy Wave Configuration
- HT Resistant
- Up to 11 800 Kg/m<sup>3</sup> in sea-water
- Internal Clamp Compliant - Pad
- Easy installation

## ➔ STATIC BALLAST MODULES

- On-Bottom Stability Solutions
- Up to 11 800 Kg/m<sup>3</sup> in sea-water
- Up to 30 years life time – corrosion free
- Low installation costs: Installation directly on the line on the vessel
- Suppress concrete mattress heavy operations – Demonstrated on study case ( Zakum)



  
**Strengths**

- Extreme savings on installation / mattresses
- Easy & Fast to install thanks to T-Bolt locker
- Local content production

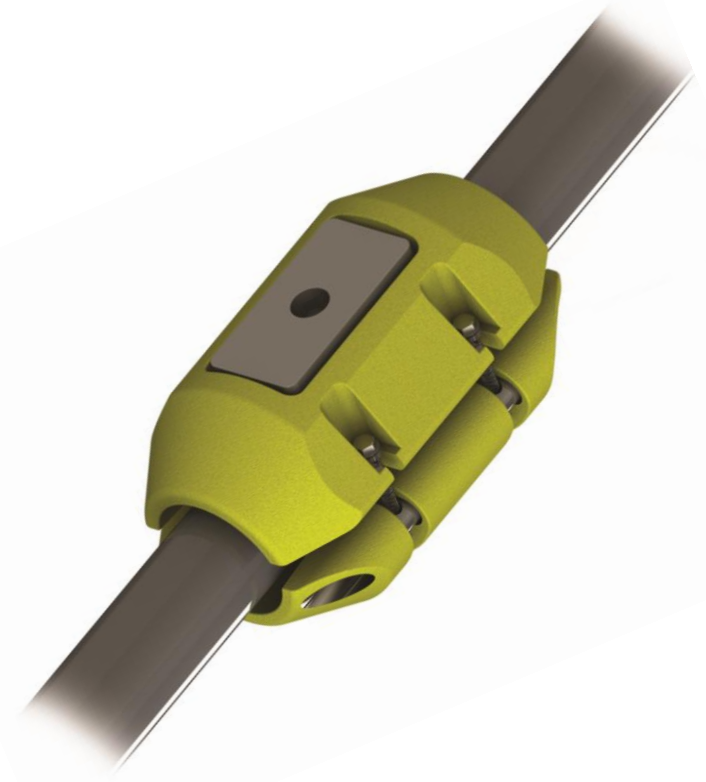


## ➔ ON-BOTTOM STABILITY DESIGN:

- Global screening to identify unstable section of exposed line
- Use of DNV-RP-F109 "Generalized approach and calibrated 3D Finite Element to ensure relative stability" Up to 11 800 Kg/m<sup>3</sup> in sea-water

## ➔ LAZY WAVE STABILITY DESIGN:

- Use of DNV-OS-F201 "Dynamics Risers" and API-RP-2RD "Design for Floating Production Systems (FPSs) and Tension-Leg Platforms (TLPs)"



### Production Tip

- *Duration: 3 weeks to start production + 20 BM per week*
- *Production location: Worldwide*



## PROJECT

- ZKOL, Umm Lulu

## FIELD

- Zakum, Umm Lulu

## COUNTRY

- UAE Qatar

## WATER DEPTH

- 5 to 25 msw

## CONTRACTOR

- NPCC

## OPERATOR

- ADMA OPCO, QP, Bundug

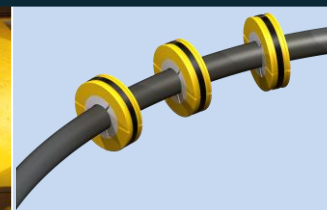
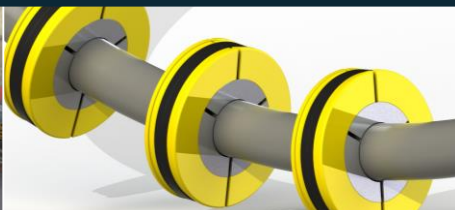
## SCOPE OF SERVICE

- Engineering, Design and Local Fabrication of Cable stabilization products

## SPECIFICATIONS



- 33,000 + ballasts for on-bottom stability of umbilical
- Local content produced in Middle East



## ➤ MAIN FEATURES

- An innovative protection adaptable for two usages: IMPACT & ABRASION .
- Designed to follow the bending of the protected lines.
- Adapted to accommodate cyclic bending
- Stiffness Adaptation (MBR/Cable) from 0.5 to 7kN.m2.
- High Performance,
- Qualified PU material,
- Strapped on the line using non-corrosive material



**strengths**

- Respect line bending
- Wide range of straps materials
- Easy & Fast to install
- Installed during laying

## PROJECT

- Anguille

## FIELD

- Anguille Field

## COUNTRY

- Gabon

## WATER DEPTH

- 30 msw

## CONTRACTOR

- SBM

## OPERATOR

- Total

## SCOPE OF SERVICE

- Design, fabrication and procurement of Stifflex® PRODUCTS

## SPECIFICATIONS

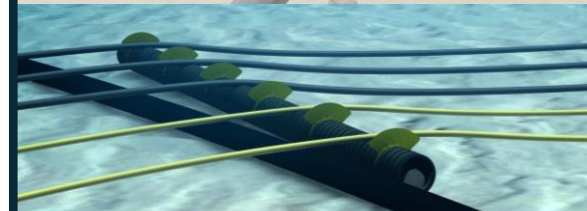
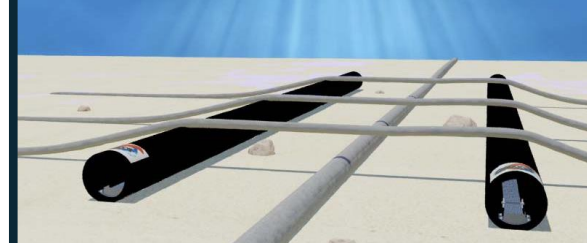


- OD: 67mm / MBR1.01m
- OD: 97mm / MBR:1.5m
- OD: 100mm / MBR:1.5m
- Impact load 11kJ





- Crossing / Slippers
- Great alternative to concrete mattresses
- Significant saving on installation cost
- Corrosion free solution



## ➔ BARPEARL®

- Made of PU. Installed on the line thanks to a PU internal Clamp.
- Multi-Crossing Points with small external diameter and low current.

## ➔ BARSPEACE®

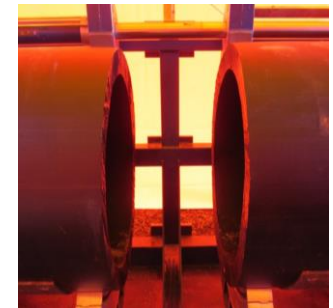
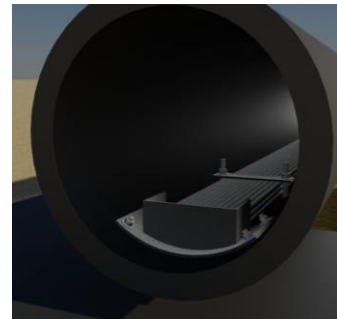
- Made of HDPE extruded, ballasted with Marine Concrete or Steel Bar.
- Guarantees a 300mm clearance according to DNV OS-F101.
- Possibility to install one on each side of the existing line.

## ➔ DESIGN

- Solution OD design to create the necessary gap with the existing line. Design based on FEA study to define the right thickness
- The solution thickness chosen in order to withstand the maximum loads applied onto each solution.
- Solutions made of HDPE
- HDPE joints can be welded on site if needed
- Stabilization thanks to Steel bars or Concrete

### *Production Tip*

- *Duration: 7 weeks minimum*
- *Production location: Worldwide*



## PROJECT

- Kizomba satellites project Epc3 tiebacks

## FIELD

- Kizomba Satellites

## COUNTRY

- Angola

## WATER DEPTH

- 1.350 m

## CONTRACTOR

- Saipem SA

## OPERATOR

- ESSO Exploration Angola (Block 15) Limited

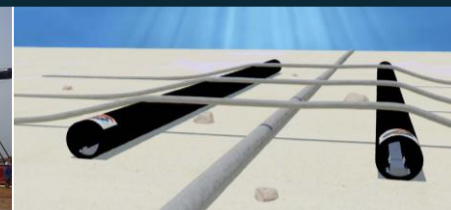
## SCOPE OF SERVICE

- Design, Fabrication and Procurement of Crossing support

## SPECIFICATIONS



- *HDPE pipe OD 900mm & 1100mm*
- *Total length 107 m*
- *Local content: welding operation*





- In-house engineering
- Dynamic application
- Qualified material





## ➤ DESIGN:

- Designed to add local stiffness to a riser or a flowline limiting the bending stresses and curvatures to an acceptable level.
- Possibility to supply Bend Stiffeners designed for protection application.

## ➤ THREE DIFFERENT WAYS TO BE DESIGNED:

- Functional cone defined,
- Tension/angle and fatigue load cases:
  - *Screening calculations*
  - *Functional cone definition*
  - *Structural calculations (FE)*
  - *Fatigue calculations (FE)*
- Wave and current values:
  - *Hydrodynamic calculations*
  - *Definition of BS*
  - *Assessment static /dynamic behavior*
  - *Definition of fatigue loads*
  - *Design advises (overall design improvement)*



Softwares: *Matematica, Abaqus, Ansys, Deeplines & Orcaflex*

## ➔ MASTERING PRODUCTION PROCESS:

- Project oriented & Fast Delivery time
- Huge ovens for Urethane casting available in Brazil and Europe manufacturing sites
- Vertical casting in temperature controlled oven for improved mechanical performances
- 150 kg/min casting machine
- Molds designed and manufactured in house on 5 axis milling machines
- REACH compliant Urethanes (Hardness Currently Used 90ShA  $\pm$ 5)

### *Production Tip*

- *Duration: 10 to 12 weeks  
If Mold available, 2 weeks  
production onward*
- *Production location: Europe  
& Brazil*



## PROJECT

- CENDOR PHASE 2

## FIELD

- Cendor

## COUNTRY

- Malaysia

## WATER DEPTH

- 70 m

## CONTRACTOR

- Primage Engineering

## OPERATOR

- Petronas Carigali

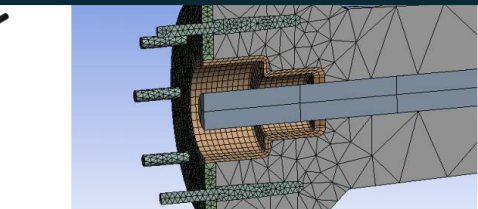
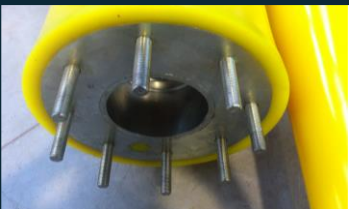
## SCOPE OF SERVICE

- Design, Fabrication and Procurement of 2 bending stiffeners

## SPECIFICATIONS



- *BS length: 3400mm*
- *ID: 66mm*
- *MBR: 1250mm in Dynamics*
- *Cycles: 7 Million*



- Impressive track-record
- Static application
- Qualified materials
- API17L1 compliant

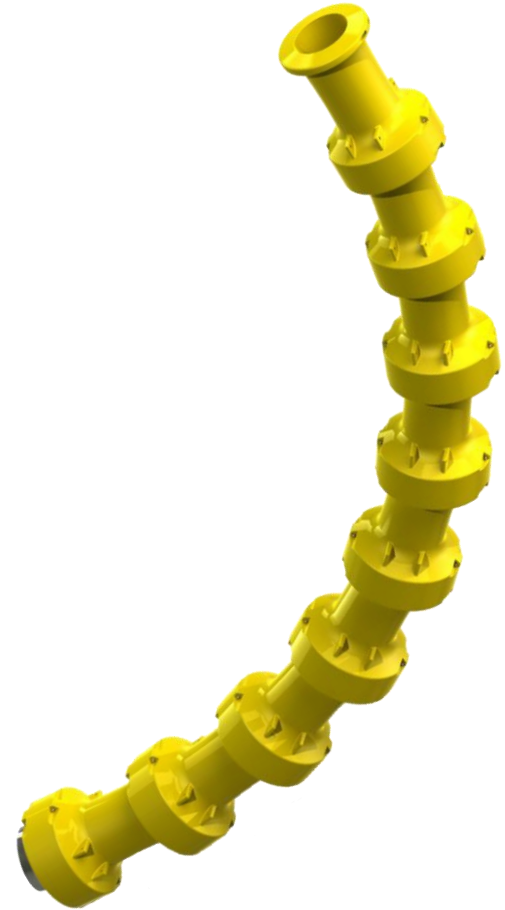


## ➤ DESIGN:

- Bend Restrictors composed of interlocking elements and reaction collar/fitting elements
- FE Analysis to ensure fit for purpose solution for each characteristic of the cable/umbilical line (MBR, Coverage, Loads, etc.)
- Easy & Fast installation with adequate lifting points
- Thermal analysis verification for high operating temperatures

## ➤ QUALIFIED MATERIAL

- Field proven material BARDEEP PUR 1500 MED
- (Qualified Urethane polymer for extreme subsea loading)
- Stainless steel material for Fasteners (Inconel, SuperDuplex)
- Reaction Collar fitted with cathodic protection



## MANUFACTURING & TESTING:

- Strict Quality Controls during manufacturing
- Material Certificates and qualification of BARDEEP materials
- Load Test and Fit-up Test
- Destructive test performed and witnessed by a Third Party to validate our Bend Restrictor design model

### *Production Tip*

- *Duration: 10 to 12 weeks  
If Mold available, 2 weeks  
production onward*
- *Production location: Europe  
or US*



## PROJECT

- JANGKRIK COMPLEX PROJECT

## FIELD

- Jangkrik

## COUNTRY

- Indonesia

## WATER DEPTH

- 200-500 m

## CONTRACTOR

- Consortium of PT. Technip Indonesia & Technip Geoproduction (M) SDN. BHD

## OPERATOR

- ENI Muara Bakau B.V.

## SCOPE OF SERVICE

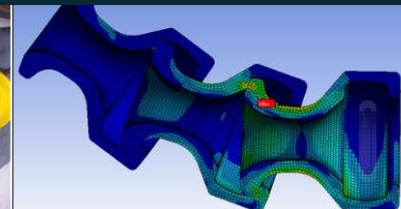
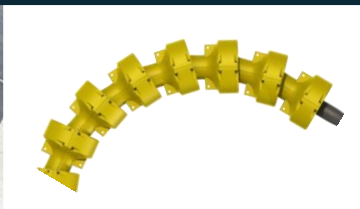
- Design, Fabrication and Procurement of 52 Bend Restrictors assembly + Reaction Collar

## SPECIFICATIONS

**Technip**



- 52 lines
- BR with 3 different sizes 6" 8" 12"





- Fit for purpose solution
- Wide range of materials
- Fast installation
- High local content %



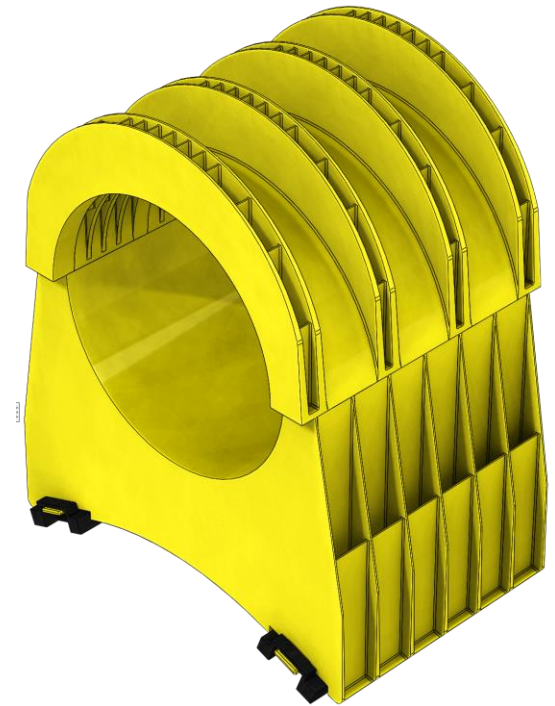


## ▶ PIGGY-BACK SADDLES

- Design to match project requirement
- Material tested and qualified
- Low cost solution in (Polypropylene / PP)
- Innovative design to suit high temperature

## ▶ PIGGY-BACK PROTECTORS

- Low cost solution in PP / Used to protect entire rigid pipes length
- Design to resist to high damage (FEA modeling including fatigue)
- Material (Polypropylene / PP) tested and qualified
- Full scale testing on equipment (Drop Impact testing)



### *Production Tip*

- *Duration: 9 weeks to start production*
- *Fabrication location: Europe, Asia, USA, Brazil*

## PROJECT

- JANGKRIK COMPLEX PROJECT

## FIELD

- Jangkrik

## COUNTRY

- Indonesia

## WATER DEPTH

- 200-500 m

## CONTRACTOR

- Consortium of PT. Technip Indonesia & Technip Geoproduction (M) SDN. BHD

## OPERATOR

- ENI Muara Bakau B.V.

## SCOPE OF SERVICE

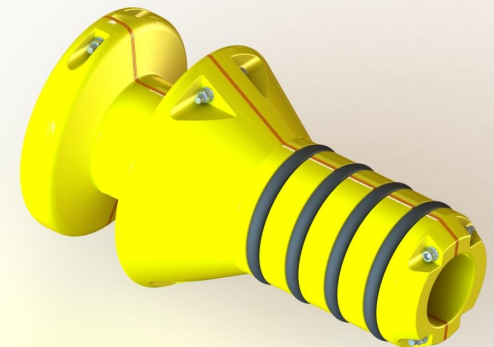
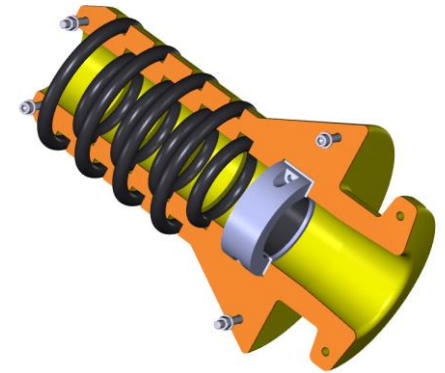
- Design, Local Fabrication AND PROCUREMENT of Piggyback Block for 4" CEP and 24"GEP

## SPECIFICATIONS





- Significant track-record
- PU Steel
- Qualified materials
- ROV Friendly



## ➤ QUALIFIED MATERIAL & DESIGN:

- Fit for purpose solution with innovated design, adapted to our client specific requirements.
- Field proven & fully qualified polyurethane material BARDEEP PUR 1500 MED for extreme subsea loading

## ➤ MULTIPLE CABLES DESIGN

- Multiple cables Seal – Field proven

### *Production Tip*

- *Duration: 6 to 10 weeks*
- *Production location: Europe*



## PROJECT

- TEN

## FIELD

- Ten Oil Field

## COUNTRY

- Ghana

## CONTRACTOR

- Technip

## OPERATOR

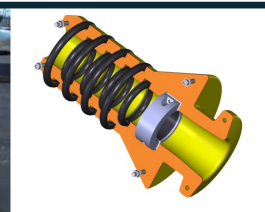
- Tullow Oil

## SCOPE OF SERVICE

- Design, Fabrication and Procurement of J-tube seal/Connectors

## SPECIFICATIONS

**Technip**



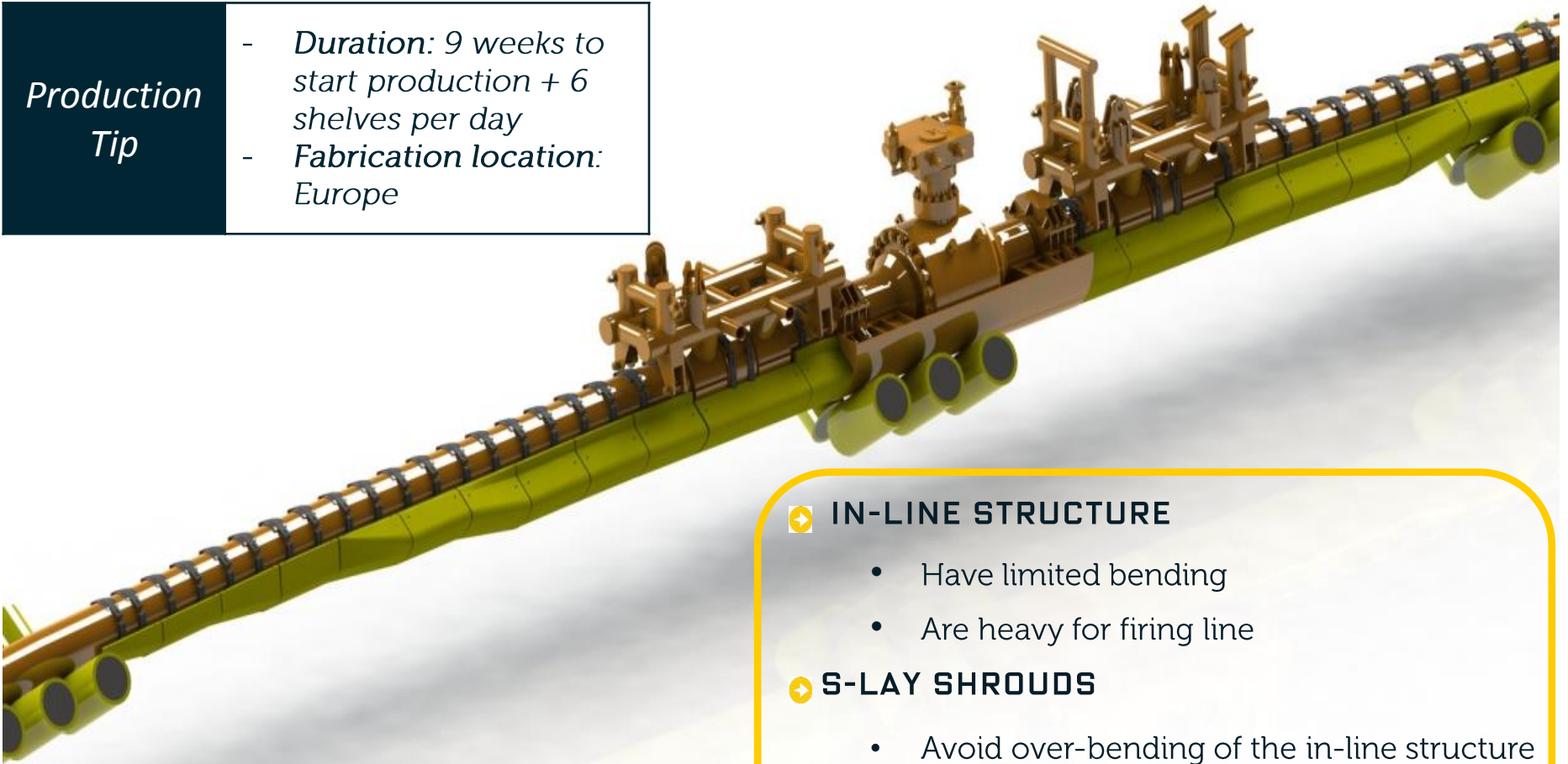


- Ramp for ILT laying
- Fit on purpose solution
- Qualified materials
- High loads resistant



## Production Tip

- *Duration: 9 weeks to start production + 6 shelves per day*
- *Fabrication location: Europe*



### ➤ IN-LINE STRUCTURE

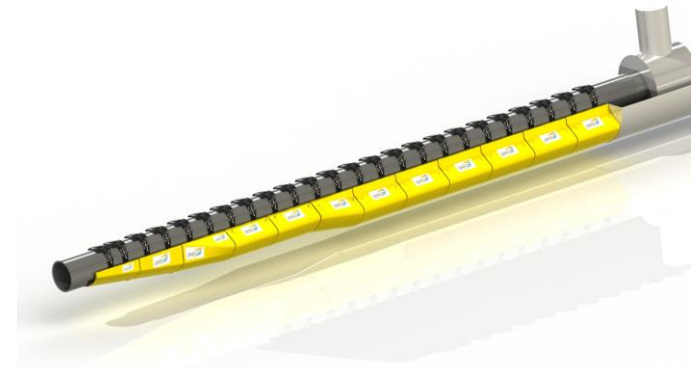
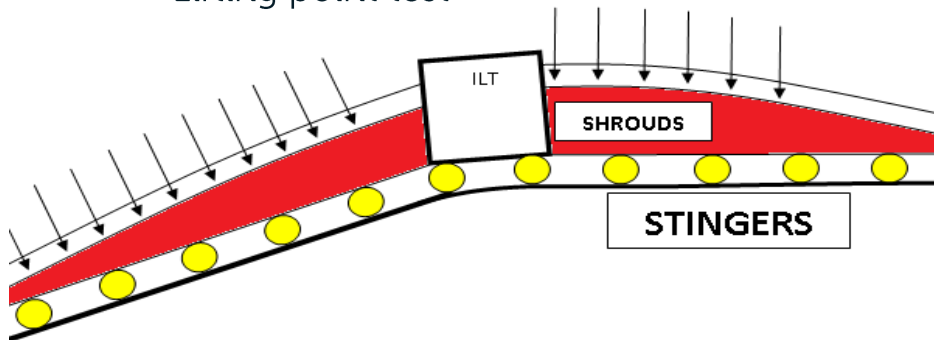
- Have limited bending
- Are heavy for firing line

### ➤ S-LAY SHROUDS

- Avoid over-bending of the in-line structure by providing a smooth transition when passing on the stinger
- Spread load on the rollers

## ➤ WIDE RANGE OF TESTS AVAILABLE

- Static test:
  - 60 Tons applied for 12 hours
  - 60 Tons applied for 5 minutes: 30 cycles
- Dynamic test:
  - 60 Tons applied while moving on shrouds
  - Applied for 40 cycles
- Lifting point test





## PROJECT

- Keathley Canyon Connector (KCC)

## FIELD

- Gulf of Mexico

## COUNTRY

- USA

## WATER DEPTH

- 2100 m

## CONTRACTOR

- SAIPEM America

## OPERATOR

- CHEVRON

## SCOPE OF SERVICE

- Design, Fabrication and Procurement of Shrouds for Rigid 24" & 20" pipe

## SPECIFICATIONS

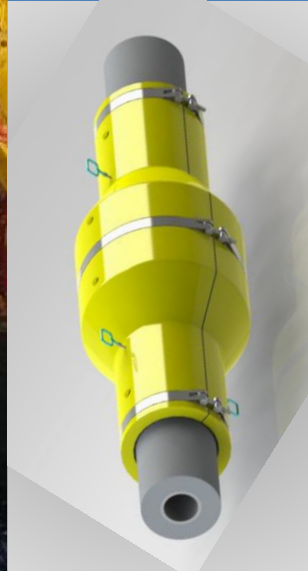
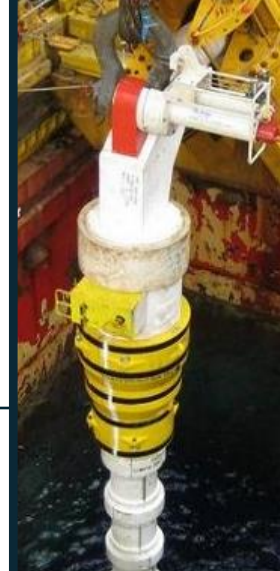


- 21 designs
- 400 units
- In-house compressive load test





- Qualified materials
- API17L1 compliant
- Full scale tests



## ➤ A FIELD PROVEN SEALANT SYSTEM

- Design to match project requirement: overall heat transfer coefficient or design 'cool down' time,
- Seals to ensure thermal integrity,
- Strap fastener installable by diver or ROV friendly,
- Material tested and qualified, Thermal analysis and FAT (Leak Test)
- Urethane with a maximum operated temperature of 90°C



## PROJECT

- Moho Nord Project

## FIELD

- Moho-Bilondo

## COUNTRY

- Congo

## WATER DEPTH

- 800 - 1050 MSW

## CONTRACTOR

- Technip

## OPERATOR

- TOTAL

## SCOPE OF SERVICE

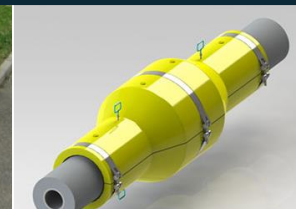
- Design, Fabrication and Procurement of insulations covers

## SPECIFICATIONS

**Technip**

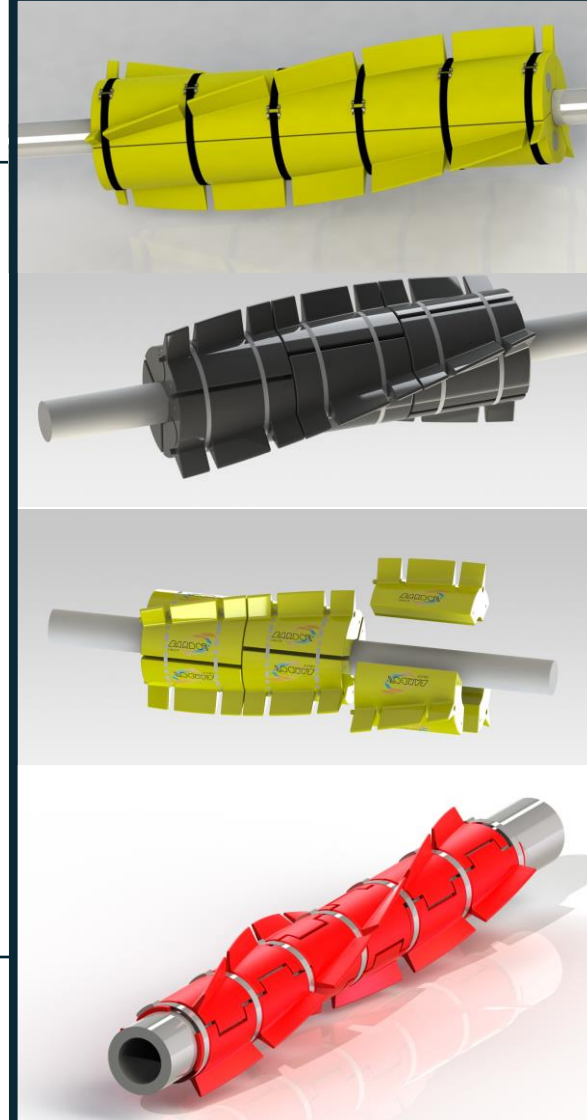


- 8" & 9.31" spool & riser end-fittings
- 41 units
- 6 designs
- FAT includes lifting & leak test





- Qualified materials
- API17L1 compliant
- Full scale tests



## ➤ MAIN FEATURES

- Installed on Risers, Flowlines and Jumpers
- Protect from VIV phenomenon

## ➤ DESIGN & MATERIAL

- Low installation time (interlocking, self aligning system)

## ➤ QUALIFICATION & TESTING

- Installation via stinger roller to be done by load testing

**UNDER DEVELOPMENT & API 17L1  
CERTIFICATION**





# SURF PACKAGES

## FULL EPC SURF PACKAGE:

- Mechanic & hydrodynamic Engineering
- Procurement & Installation of subsea line + ancillaries

➤ WATER INTAKE RISERS  
➤ POWER & DATA CABLES

➤ SUBSEA UMBILICALS  
➤ OFFLOADING LINE

➤ RISERS & FLOWLINES

SUBSEA  
UMBILICAL  
RISER  
FLOWLINE







- Weight quasi neutral in seawater
- Can go deeper than standard solution
- Drastic top-side reduction
- Easy com & decom
- OPEX Saver

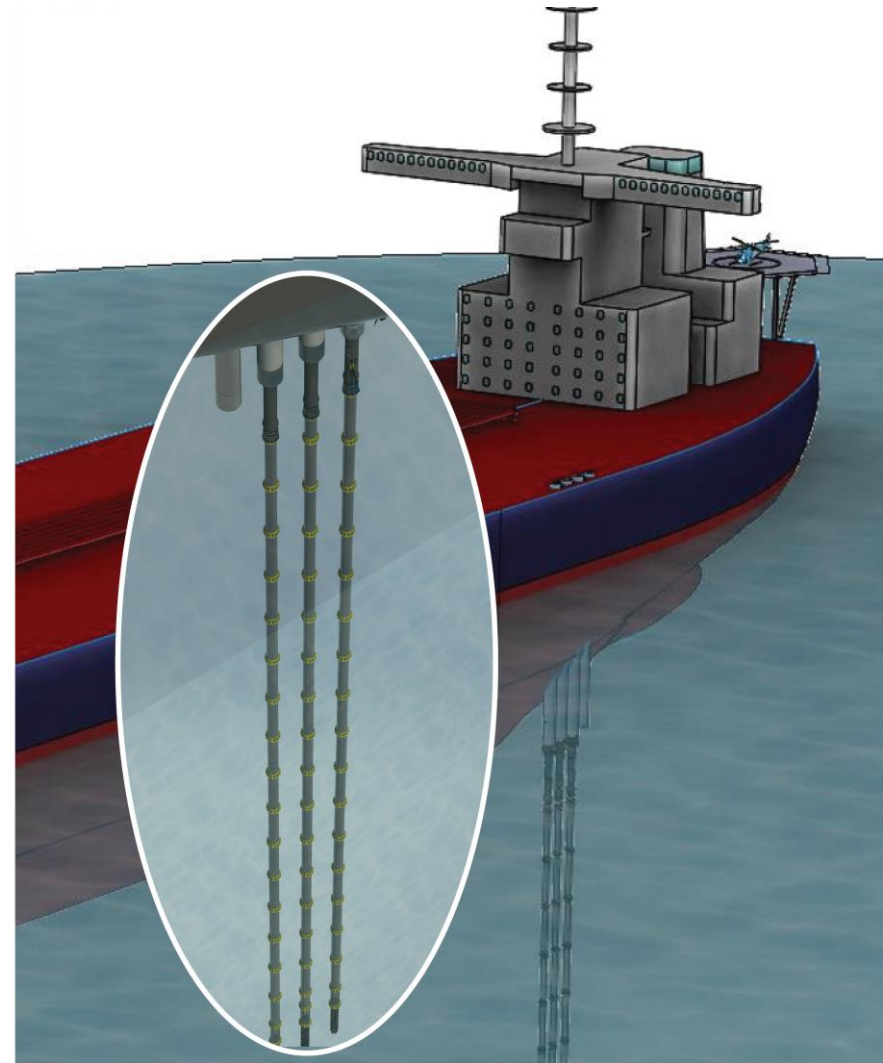


## ➤ APPLICATIONS

- Oil & Gas Process & Liquefaction systems:  
FPSO / FLNG
- Supply of cold water, up to 4°C (40°F) / >  
1000m
- Re-injection of water after use
- Pumping away from near-surface  
pollution

## CONFIGURATION

- Free hanging
- Multi-Hose

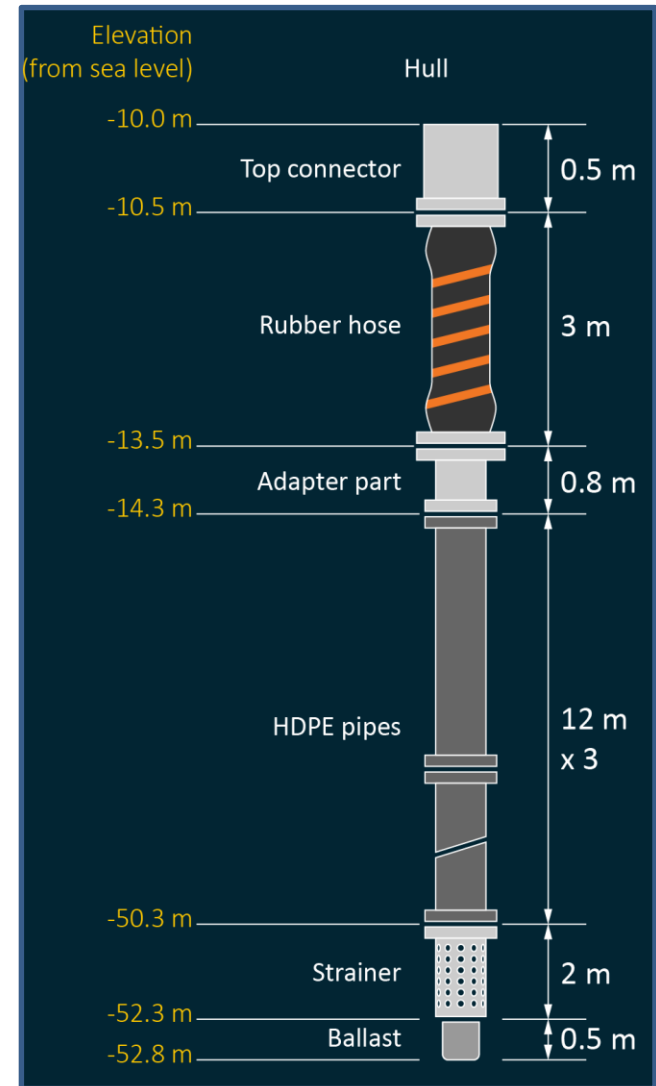


## PRODUCTS

- Interface & connector, Flanges
- HDPE Riser
- Rubber Hose
- Hypochlorite line
- Strainer, Ballasts
- Handling and installation tools

## SCOPE OF SERVICE

- Design
- Engineering
- Procurement
- Qualification and testing
- Project management



## PROJECT

- KAOMBO FPSO CONVERSION

## FIELD

- Kaombo

## COUNTRY

- Angola

## WATER DEPTH

- 1.250 m

## CONTRACTOR

- Saipem SA

## OPERATOR

- TOTAL E&P Angola Block 32

## SCOPE OF SERVICE

- Design, Fabrication and Procurement  
6 Water intake riser and 2 Fire water Riser

## SPECIFICATIONS



- *HDPE Pipe*
- *OD 710 mm*
- *Length 120 m*



## BENDING

CONTRACTOR	PROJECT
DCNS	Fundy
HHI	Tamna
TECHNIP INDONESIA	Jangkrik
DUCO INC	Medusa
MTC ENGINEERING	KM & AK
TECHNIP	Girri 2
TECHNIP	Lianzi
TECHNIP USA	Medusa
BHP BILLITON	Shenzi

## PROTECTION

CONTRACTOR	PROJECT
OMNI OFFSHORE	-
CEONA OFFSHORE	Cliper
OAKWELL ENGINEERING	Sealine
TECHNIP USA	MWCC EPC3B URF
SBM	Anguille
TECHNIP	ABO 5
TECHNIP	West Delta
TECHNIP USA	Cesar Tonga

## BUOYANCY

CONTRACTOR	PROJECT
MTC ENGINEERING	KM & AK
ONE SUBSEA	-
SAIPEM FANO	Burullus WDDM
SAIPEM FANO	Burullus WDDM
TECHNIP	Moho
DEEPFLEX	KM & AK
SAIPEM	Cabiunas
SUBSEA 7	ALNG

## PIGGYBACK SYSTEMS

CONTRACTOR	PROJECT
SAIPEM	Shah Deniz
TECHNIP INDONESIA	Jangkrik
COOEC	PBHY
SWIBER	Vega Pleyade
SAIPEM UK	York
TECHNIP OCEANIA	Kupe

## J-TUBE SEALS/CONNECTORS

CONTRACTOR	PROJECT
CMP DUNKERQUE	Prelude
TECHNIP	Moho
TECHNIP	Ten
TECHNIP France	Moho North
TECHNIP GEOPRODUCTION	Laila D12
TECHNIP GEOPRODUCTION	Panyu

## SURF PACKAGES

CONTRACTOR	PROJECT
NPCC	OSII Phase 2
NPCC	Umm Lulu Field Development Package II
NPCC	Upper Zakum
SAIPEM	Kaombo

CLIENT	CONTRACTOR	PROJECT
<b>BENDING CONTROL</b>		
-	DCNS	Fundy
-	HHI	Tamna
ENI	TECHNIP INDONESIA	Jangkrik
MURPHY	DUCO INC	Medusa
PETRONAS	MTC ENGINEERING	KM 8AK
TOTAL	TECHNIP	Girri 2
CHEVRON	TECHNIP	Lianzi
MURPHY	TECHNIP USA	Medusa
BHP BILITON	BHP BILLITON	Shenzi

CLIENT	CONTRACTOR	PROJECT
<b>PROTECTION</b>		
TALISMAN	OMNI OFFSHORE	
-	CEONA OFFSHORE	Cliper
-	OAKWELL ENGINEERING	Sealine
MWCC	TECHNIP USA	MWCC EPC3B URF
TOTAL	SBM	Anguille
AGIP	TECHNIP	ABO 5
BURULLUS GAS	TECHNIP	West Delta
ANADARKO	TECHNIP USA	Ceasar Tonga

CLIENT	CONTRACTOR	PROJECT
<b>PIGGYBACK SYSTEMS</b>		
BP	SAIPEM	Shah Deniz
ENI	TECHNIP INDONESIA	Jangkrik
CNOOC	COOEC	PBHY
TOTAL	SWIBER	Vega Pleyade
CENTRICA ENERGY	SAIPEM UK	York
ORIGIN ENERGY	TECHNIP OCEANIA	Kupe

CLIENT	CONTRACTOR	PROJECT
<b>J-TUBE SEALS/CONNECTORS</b>		
SHELL	CMP DUNKERQUE	Prelude
TOTAL	TECHNIP	Moho
TULLOW	TECHNIP	Ten
TOTAL	TECHNIP FRANCE	Moho North
PETRONAS	TECHNIP GEOPRODUCTION	Laila D12
CNOOC	TECHNIP GEOPRODUCTION	Panyu

CLIENT	CONTRACTOR	PROJECT
<b>BUOYANCY</b>		
PETRONAS	MTC ENGINEERING	KM & AK
-	ONE SUBSEA	-
BURULLUS GAS	SAIPEM FANO	Burullus WDDM
BURULLUS GAS	SAIPEM FANO	Burullus WDDM
BM	TECHNIP	Moho
PETRONAS	DEEPPLEX	KM & AK
PETROBRAS	SAIPEM	Cabiunas
SONANGOL	SUBSEA	ALNG

CLIENT	CONTRACTOR	PROJECT
<b>SURF PACKAGES</b>		
ADMA OPCO	NPCC	OSII Phase 2
ADMA OPCO	NPCC	Umm Lulu Field Development Package II
ADMA OPCO	NPCC	Upper Zakum
TOTAL	SAIPEM	Kaombo





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