

## Umbilical Systems



# Technip Profile



Listed on Euronext Paris

Revenues: 7.9 billion euros in 2007

23,000 people worldwide

One of the five world leaders in engineering, technology and project management for oil and gas, petrochemical and other industries

Confirmed leadership and proprietary technologies in 3 business segments:

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## Subsea

- Design, manufacture and supply of deepwater flexible and rigid pipelines, umbilicals and riser systems
- Subsea construction and pipeline installation services
- Five state-of-the-art flexible pipe and umbilical manufacturing plants
- Five spoolbases for reeled pipeline fabrication
- A constantly evolving fleet strategically deployed in the world's major offshore markets

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## Offshore

- Engineering and fabrication of fixed platforms for shallow waters (TPG 500, Unideck®)
- Engineering and fabrication of floating platforms for deep waters (Spar, semi-submersible platforms, FPSO)
- Leadership in floatover technology
- Three construction yards

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## Onshore

- Gas treatment and liquefaction (LNG), Gas-To-Liquids (GTL)
- Oil refining (refining, hydrogen and sulphur units)
- Onshore pipelines
- Petrochemicals (ethylene, aromatics, olefins, polymers, fertilisers)
- Biofuel and renewable energies
- Non-oil activities (pyrotechnics, life sciences, metals, buildings and infrastructures)

# Key features



As members of the Technip group, the DUCO umbilical centres benefit from global operations with other entities working in partnership for the purpose of achieving the highest level of client satisfaction. Wherever activities are being undertaken DUCO will ensure their clients umbilical systems are delivered according to the same high specification without any compromise to safety, quality or schedule regardless of manufacturing location.

To maintain these high levels DUCO recognises that customer focus is a critical aspect in its operations and that the importance of achieving a positive client experience is the primary objective of DUCO. To this end the DUCO companies operate a Customer Focus Programme whereby clients are encouraged to provide feedback on project performance which can then be used as part of the continuous improvement programme.

In the challenging and demanding subsea oil and gas industry, project performance and product reliability are crucial to the success of DUCO and its clients.

## CENTRE OF EXCELLENCE

DUCO's Newcastle facility is Technip's centre for Umbilical engineering excellence with overall responsibility for worldwide product and project engineering, FEED studies, industry related programmes and research and development activities. DUCO has recognised engineering specialists in the field of umbilical

system design and, as part of the Technip group, has access to extensive and specialist engineering resources covering all aspects of the onshore and offshore oil and gas industry.

## PIONEERING TECHNOLOGY

For more than 30 years DUCO Ltd has been heavily involved with subsea production pioneering projects many of which have been very demanding and challenging to both DUCO and its clients. It is as a result of such projects that DUCO has developed high level skills and knowledge that, coupled with investment in plant and equipment, now allows the design and production of large and complex Umbilical systems. Additionally, as the industry continues its quest into deeper water and harsher environments the basis will allow DUCO to continue to engage in the increasingly complex project requirements. DUCO will continue to constantly challenge the limits of existing technology to remain at the frontier of Umbilical technology.

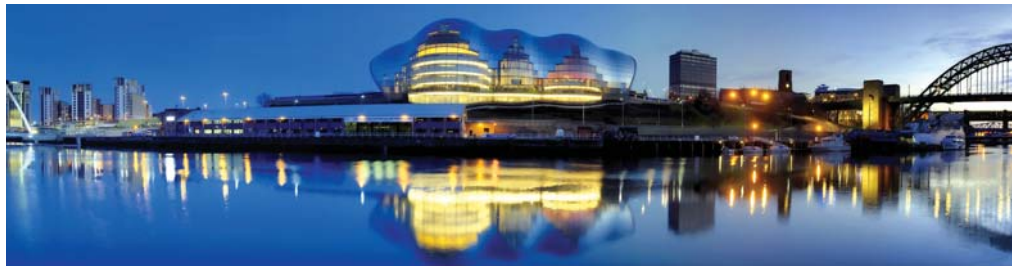
# The Umbilical business

Within the Technip group there are three companies dedicated to manufacturing umbilical systems: DUCO Ltd, DUCO Inc. and Angoflex Lda.

These are located in Newcastle in the UK, Houston in the USA and Lobito in Angola respectively. DUCO is the world leader in Umbilical design and manufacture, with both DUCO Ltd. and DUCO Inc. facilities supported by dedicated project management and engineering teams which also support Angoflex project activities.

Umbilicals are custom designed and manufactured complete with end terminations and ancillary equipment and are loaded-out for offshore installation from purpose built modern afore-mentioned manufacturing facilities in the UK, USA and Angola.

In undertaking its business activities, DUCO puts great emphasis on QHS&E and R&D. Personal health and safety and care of the environment are given the utmost priorities. R&D is considered fundamental to the understanding of Umbilical systems and enables Technip to provide the industry with advanced and verified engineered solutions and products for the subsea production industry.



**Newcastle upon Tyne, England:** strategically located on the River Tyne, the facility is ideally positioned for supply to the principal oil and gas production areas of the North Sea, and also export to other subsea production locations.



**Houston, Texas:** well located adjacent to the Houston Ship Channel, the facility is conveniently positioned for supply to field development sites in the Gulf of Mexico and also export, to other subsea production locations.



**Lobito, Angola:** located some 400km south of Luanda, the capital city, The factory was primarily built to service the Angolan deep offshore market. It is located within the Sonamet industrial park which provides a sheltered quay and convenient load out facilities.

# Umbilical manufacturing

From facilities located in the UK, USA and Angola, DUCO have the ability to design, manufacture and supply bespoke umbilical products to the global offshore oil and gas market.

## Facilities

### DUCO LTD.



- Established in 1977
- 400 permanent employees
- Production capacity: 300 km/year
- Products: thermoplastic hose Umbilicals, steel tube Umbilicals, jumpers and flying leads

### DUCO INC.



- Established in 1996
- 110 permanent employees
- Production capacity: 200 km/year
- Products: steel tube Umbilicals, jumpers, and flying leads

### ANGOFLEX LDA.



- Established in 2003
- 70 permanent employees
- Production capacity: 100 km/year
- Products: steel tube Umbilicals

*Steel tube and thermoplastic hose Umbilicals can also contain electric cables and optical fibre cables as required*

# Quality, Health, Safety and Environment



Safety  
for all

Quality of design and manufacture, visitor and employee health and safety and, care of the environment are all given high priority. Effective QHS&E management is key to safe and efficient operations and to continuously improving performance and capabilities at all levels.

## DUCO'S COMMON GOALS ARE:

- Maintaining a safe, healthy and injury free workplace
- Quality in the performance of functions
- Respect for, and avoidance of damage to the environment

## OUR COMMON CULTURE IS ONE OF:

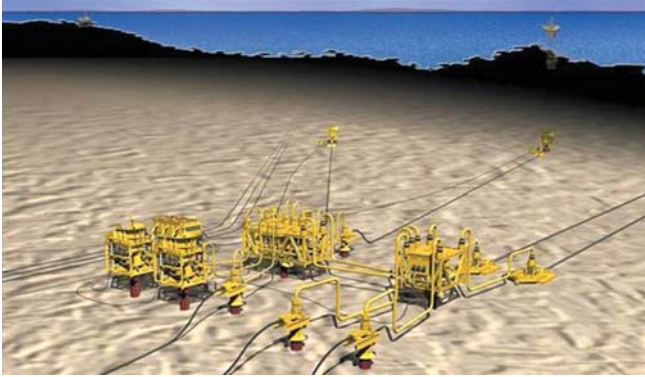
- Safe working systems which anticipate hazards and reduces risks
- Compliance with applicable standards and clients' requirements
- Working as a team and in partnership with clients and suppliers

## ACCREDITATIONS

- ISO 9001:2000
- ISO 14001:2004
- OHSAS 18001:1999
- Investors in People (2001)
- Chevron Agbami IIF Award (2006)
- RoSPA (Royal Society for the Prevention of Accidents) Gold Award (2001, 2006)
- Queen's Award for Enterprise: International Trade 2008



# Umbilical Systems



Engineering reliable umbilical designs for clients deepwater developments.

## PRODUCTION CONTROL & JUMPER UMBILICALS

All companies umbilicals connect from a surface facility (e.g. Floating Production Storage and Offloading unit, Spar, semi-submersible, SSIV or fixed platform) to the wellhead or connect between subsea structures (e.g. trees and manifolds) on the seabed.

The functional components, within the umbilical, typically support the following systems:

- Hydraulic control of subsea wells
- Injection of chemicals for well service duty
- Transport of methanol:
  - DUCOflex ultra low permeation thermoplastic hose liner material proprietary to DUCO
  - steel tubes
- Operation of subsea isolation valves (SSIV's)
- Gas lift
- Electrical power between installations
- Electrical power for subsea pumping processes
- Data transmission and communications (optical fibres or electric cables)

**If you have a particular project with new or unusual requirements, DUCO would be pleased to discuss these with you at the earliest opportunity to identify solutions.**

# Research & Development



Working on deepwater pumping projects

## DESIGN VERIFICATION OF DYNAMIC POWER UMBILICAL

**Verify design principles for operational and severe dynamic service conditions**

### Manufacture of prototype length:

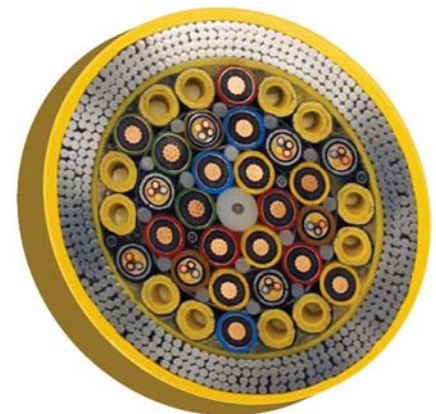
- Diameter: 281mm (11.1")
- Weight: 160kg/m (107.3lb/ft)
- Heavily ballasted with 5 layers, 6.3mm (1/4") diameter armour wire

### Major design verification programme:

- Flex fatigue (service conditions, 10 times safety factor and test to destruction)
- Internal heat build-up measurement and analysis
- Cross talk measurement and evaluation
- Tensile/torque balance measurement
- Bend stiffness evaluation
- Impact assessment
- Frictional grip assessment
- Buoyancy module clamping assessment

### Functional components:

- 15 x 150mm<sup>2</sup> 17.5kV power core
- 8 x 10mm<sup>2</sup> armoured quad
- 2 x optical fibre cable
- 12 x thermoplastic hoses





# Product range

Total design flexibility



## SOLUTIONS

### Thermoplastic

- Hoses in sizes between ¼" - 1.5" ID with working pressures between 3000-12,500 psi (bore size dependent)
- DUCOflex ultra low permeation and polyimide hose liner materials available across the range
- High collapse resistant hoses for deepwater applications

### Steel tubes

- Steel tubes in sizes between 3/8" - 3" ID with a range of wall thicknesses to suit pressure requirements
- Available in a range of materials including carbon steel, stainless steel, 19D, Duplex and Super Duplex
- Tubes can be seamed or seamless and anti-corrosion coatings can be applied if required

### Hybrid Umbilicals

- Cost effective solution combining thermoplastic hoses along with steel tubes, electrical cables and fibre optics if required

### Opto-electric cables

- Low voltage electrical signal and power cables ranging in cross sections between 2.5-25mm<sup>2</sup>
- Pairs, triads, quads can be produced with or without screening and armoured if required for improved mechanical and flex fatigue performance
- Medium voltage power cores ranging in size between 35mm<sup>2</sup> to 400mm<sup>2</sup> with voltage ratings up to 36kV
- Optical fibres for communications service designed for subsea applications
- Can be incorporated with MV power cores and hoses/tubes in hybrid umbilical design

# Onshore and Offshore Support Services



Global availability

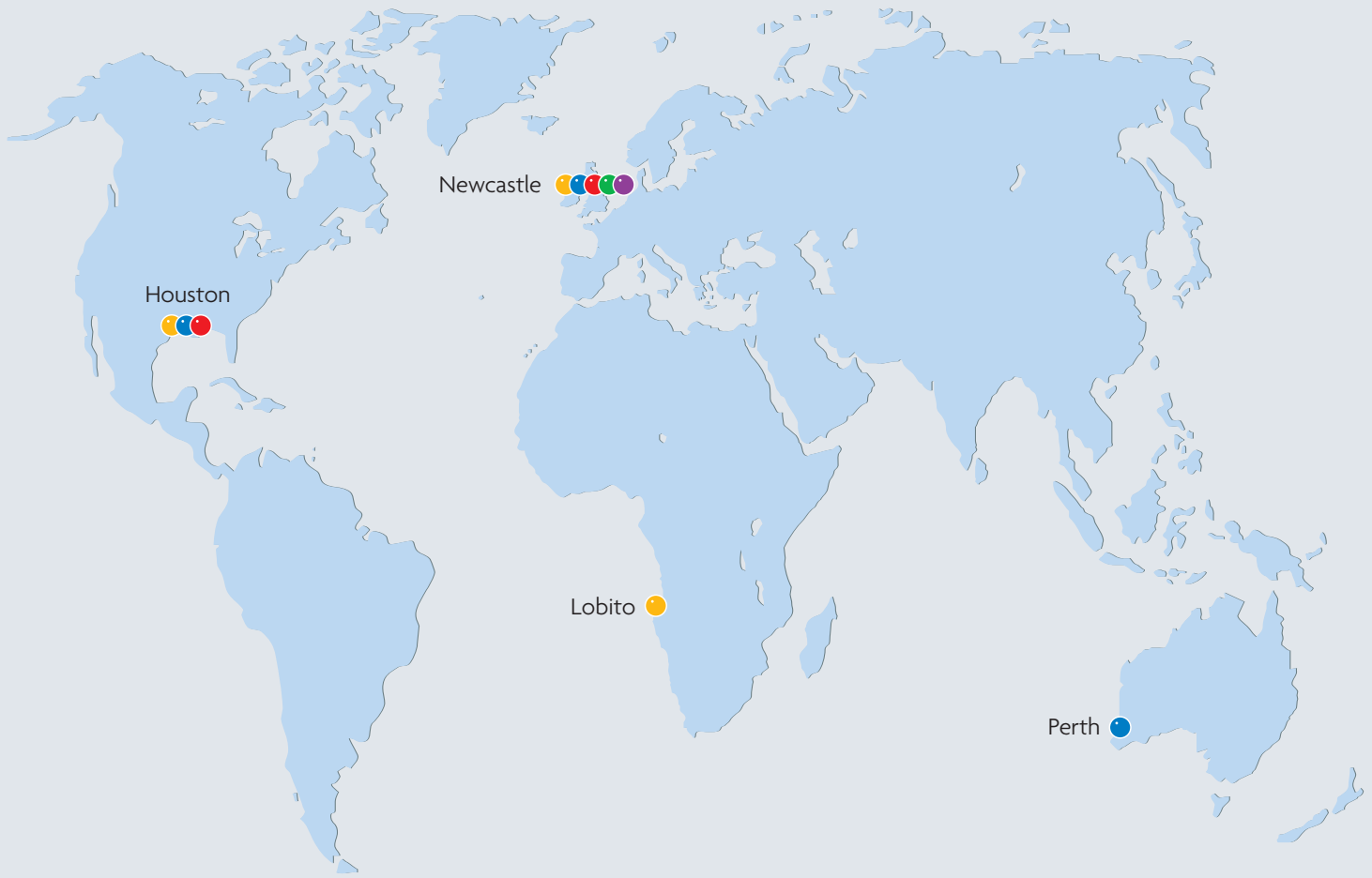
## EXPERT ONSHORE / OFFSHORE UMBILICAL SUPPORT

- Umbilical installation monitoring, hook-up and commissioning
- Umbilical lay monitoring
- Spare length inspection/testing
- Emergency repairs
- Diagnostic investigations
- Factory acceptance testing
- System integration testing
- Flushing and cleaning
- Large range of testing equipment
- Diver or ROV mateable end terminations
- Bend strain relief to suit installation method and installed configuration



# Umbilicals business

## Global locations



- Umbilical Systems Manufacturing
- Sales and Customer Support
- Projects Management & Engineering
- Centre for R&D
- Hose Manufacturing

## CONTACTS

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With a workforce of 23,000 people, Technip ranks among the top five corporations in the field of oil, gas and petrochemical engineering, construction and services. The Group is headquartered in Paris. The Group's main operating centers are located in France, Italy, Germany, the UK, Norway, Finland, the Netherlands, the USA, Brazil, Abu-Dhabi, China, India, Malaysia and Australia. In support of its activities, the Group manufactures flexible pipes and umbilicals, and builds offshore platforms in its manufacturing plants and fabrication yards in France, Brazil, the UK, the USA, Finland and Angola, and has a fleet of specialized vessels for pipeline installation and subsea construction. The Technip share is listed on Euronext Paris.