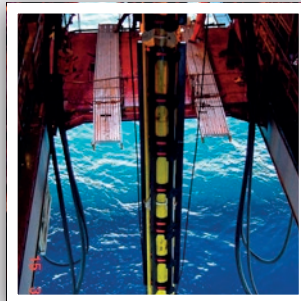
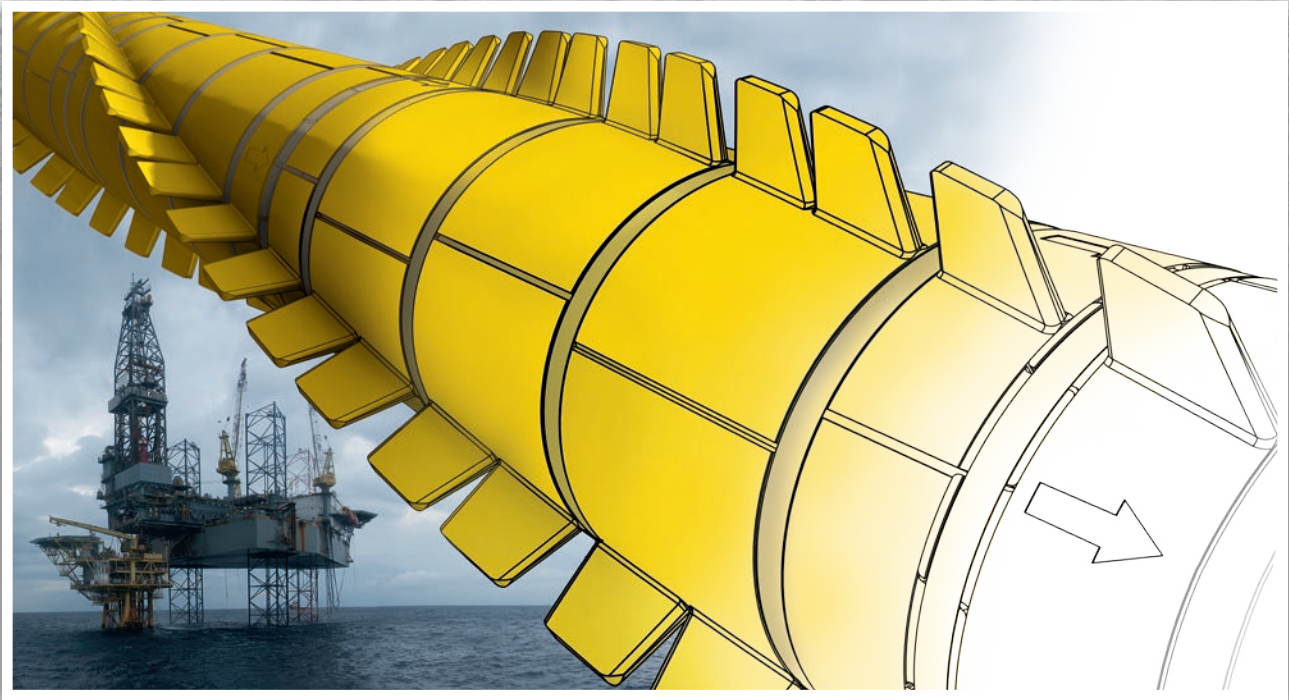


# Lankhorst | *Engineered Products*



*Leader in Offshore Engineering Solutions*

[WWW.LANKHORST-OFFSHORE.COM](http://WWW.LANKHORST-OFFSHORE.COM)



# Lankhorst | *Engineered Products*

## VIV Suppression Solutions



TriVIV Suppression Strakes



VIV Suppression Fairings

## Piggy Back Blocks



## Pipeline Protection



UraGUARD & QuickGUARD



Boltless Bend Restrictors



Clearance Protection

## Drilling Riser Protection & Storage

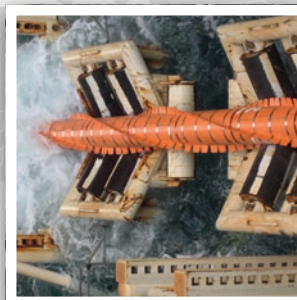
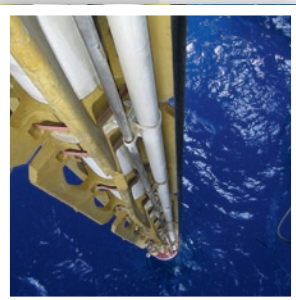


RiserTECT Fins & Shims



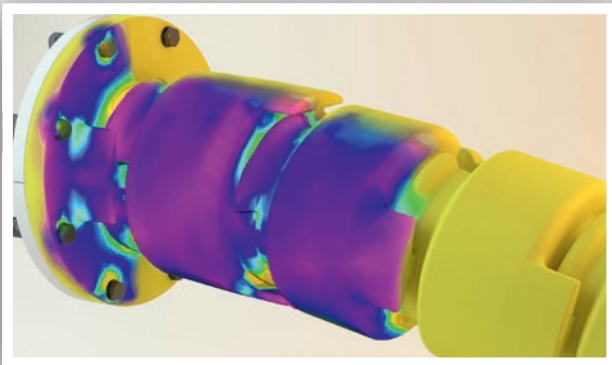
Guiding Cones

## Custom Solutions



## Innovative Offshore Engineering Solutions

Lankhorst Offshore is a leading manufacturer and supplier of high performance mouldings for offshore exploration, production and field development. Superior technical innovations in the application of advanced polyolefin, epoxy and polyurethane polymer and moulding technologies lie at the heart of their success. With the unique thick-walled plastic production technology, they can supply high-performance innovatively engineered products to meet the demands of the offshore industry.



From piggy back blocks and clamps for laying pipelines and vortex-induced vibration suppression riser protection, through to bend restrictors and pipeline protection, Lankhorst's precision engineered components deliver outstanding performance in the most demanding subsea environments.



## Safe, Sustainable and Reliable

Lankhorst carries out a range of tests on the unprocessed raw materials, production samples and end products to ensure a consistent quality throughout the manufacturing process.



In addition to ISO 9001 and ISO 14001, Lankhorst is OHSAS 18001 certified, reflecting their commitment to safety during manufacturing, handling and offshore installation of the products.



With over 200 years of experience in the developing and manufacturing of robust products, Lankhorst has attained its competitive advantage through knowledge, technology, and the quality requirements necessary to produce a range of products for a number of industries.

The products share a common underlying theme of sustainable strength and are foreseen to be used again and again.



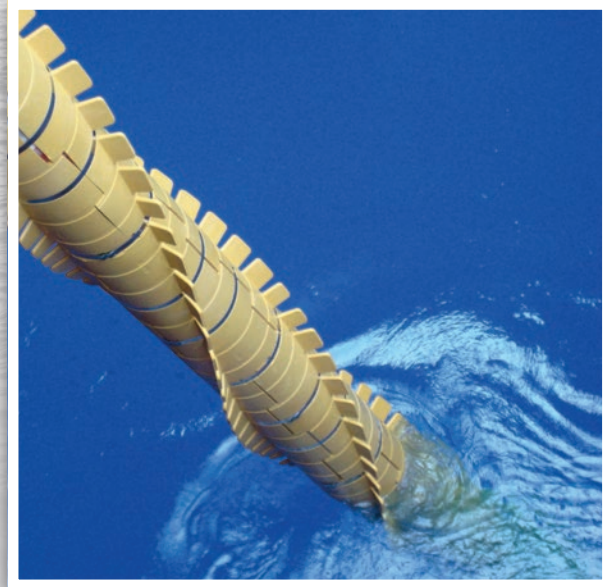
## Products

### VIV Suppression Solutions

#### TriVIV Suppression Strakes



The VIV oscillations of submerged pipes are known to increase drag and lead to structural fatigue. One proven means of suppressing this vibration is the use of strakes, which modify the flow along the pipe, tripping the production of Karman vortices. Lankhorst Tri-shell VIV Suppression Strakes have been designed with ease and speed of installation in mind to minimize the expense of offshore installation time.



#### VIV Suppression Fairings



As an alternative to VIV Strakes, VIV Fairings are recognized by a free rotating shell supported by a rigid collar. Various shapes are available designed under licences acquired from Shell Global Solutions and Norwegian Deepwater Program. The typical Lankhorst Fairing will deliver a suppression efficiency that is well beyond the generally required 90% whilst at the same time also reducing the drag. Lankhorst Fairings are available in a wide range of sizes to fit anything from small OD umbilicals to large OD drilling risers.



Lankhorst is the market leader in VIV Suppression.

### Piggy Back Blocks



Lankhorst's Piggy Back Blocks are designed to be a high-impact resistant support for the secondary pipelines, and can be manufactured with a range of different materials, sizes and configurations depending on the requirements of the client.



## Pipeline Protection

### UraGUARD & QuickGUARD



In harsh offshore environments subsea umbilicals, flexibles, risers or fibre optic cables can be subjected to large impacts or high levels of abrasion due to rocky seabeds, pipeline/cable crossings etc. Installing protection around the pipeline during pipelay is an alternative to concrete mattresses or rock dumping. Lankhorst can provide an industry typical solution of UraGUARD, half shells moulded from high impact resistant polyurethane. Alternatively a new and improved solution of QuickGUARD, consisting of click-fit half shells with reduced quantities of strapping and therefore reduced installation time produced from robust polyethylene. Both types are available in a wide range of inside diameters and wall thickness.

### Boltless Bend Restrictors



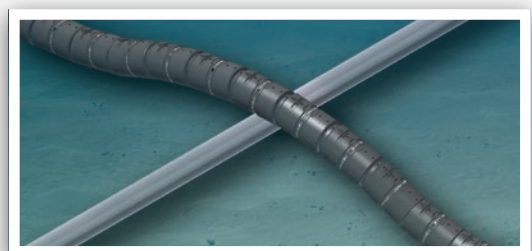
A bend restrictor assembly is mounted around the cable and attached to the structure so that bending of the cable will be prevented beyond the designed locking radius of the bend restrictor, thus preventing the cable from overbending. The Lankhorst Boltless Bend Restrictor does not require bolting along the string, because of its unique interlocking system and can be easily installed much faster than any other bend restrictor, saving a lot of offshore installation time.

### Clearance Protection System

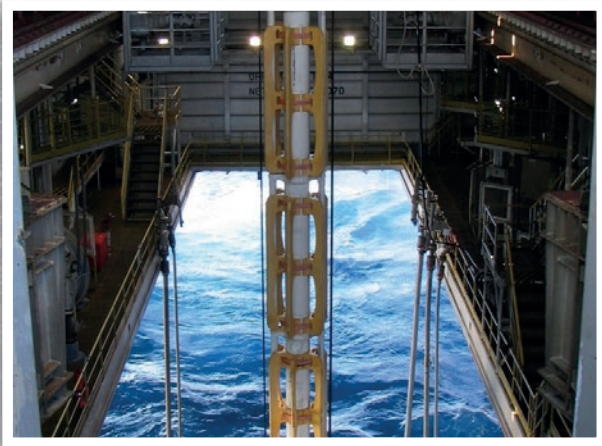


Lankhorst's Clearance Protection System consists of cylindrical half shells moulded from high impact resistant polyurethane (PU) or polyethylene (PE) material, and is available in a wide range of inside diameters, lengths and clearances. The system is designed to provide clearance between two cables or pipelines when they cross each other, as an alternative to concrete mattresses or rock dumping.

The system can be installed during the normal pipe-lay operations, removing the need to bring in a separate vessel to cover the pipe. Lankhorst Clearance Protector System is designed to be safe to handle and fast to install. The design features interlocking half shells to provide a close fitting protection around the pipeline, whilst also ensuring alignment during installation.



# Lankhorst | *Engineered Products*



## Drilling Riser Protection & Storage

### RiserTECT Fins & Shims



Lankhorst's patented Riser Fin Protection System is designed to protect the bare riser joint and its auxiliary lines from any form of impact, and guide the riser through the riser tower. One set consists of five to eight riser fins that are made from a high impact resistant neutral buoyant thermoplastic material. The fins duplicate the O.D. of buoyant joints, when present, to allow easier handling on the riser handling equipment. This support ring system enables drilling risers to be stacked horizontally up to 14 levels high. The rings are made from a high compression resistant plastic material, and duplicate the O.D. of the installed Riser Fins and any buoyant joints.

### Guiding Cones



Guiding Cones can be used to assist in the positioning and placement of the riser joints when stored vertically in the riser bay.



## Custom Solutions



Lankhorst can also develop customer-specific tailored products. Examples of these products are the Anode Tapers, Field Joint Infill Sheets and FixFLEX Pipe Carriers. The Anode Taper secures and protects the anode during installation and allows smooth passage over the stinger roller boxes. The Field Joint Infill Sheets are used as sheathing for applying a PU coating on welded pipe-ends. The PU attaches to the woven sheet so that the sheet remains permanently connected to the pipe. Thus no environmental problem, because of detachable sheets, can arise. Lankhorst FixFLEX Pipe Carriers are engineered for safe and efficient onshore storage and handling of Oil Country Tubular Goods (OCTG).

Together with sister company Lankhorst Ropes, a world leading rope manufacturer, a wide range of innovative products can be supplied to the offshore industry.



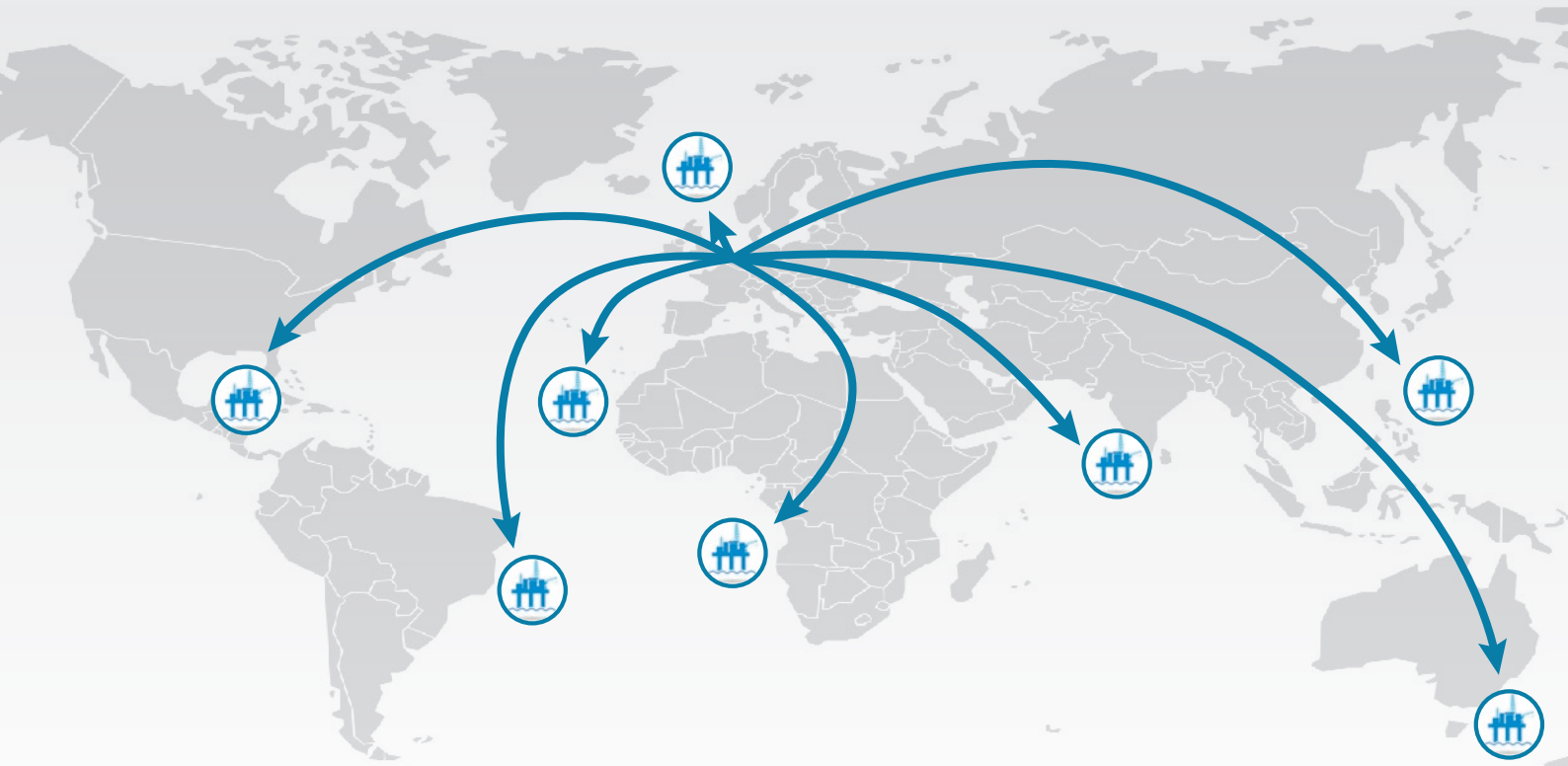
## References

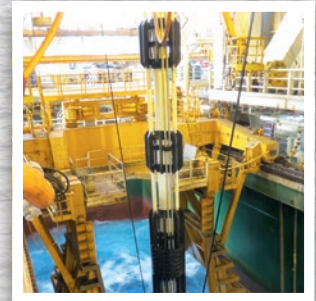
Lankhorst Offshore has a proven track record in providing the offshore industry with innovative polymer based technical solutions that stand the test of time.

Lankhorst has delivered many projects worldwide, including:

- Shell Stones
- QatarGas Barzan
- Reliance KGD6
- ExxonMobil Liza
- Chevron Big Foot
- Equinor Aasta Hansteen
- Eni Zohr
- Anadarko Lucius
- BP Shah Deniz
- Petrobras P55

And many others. A full reference list is available upon request.

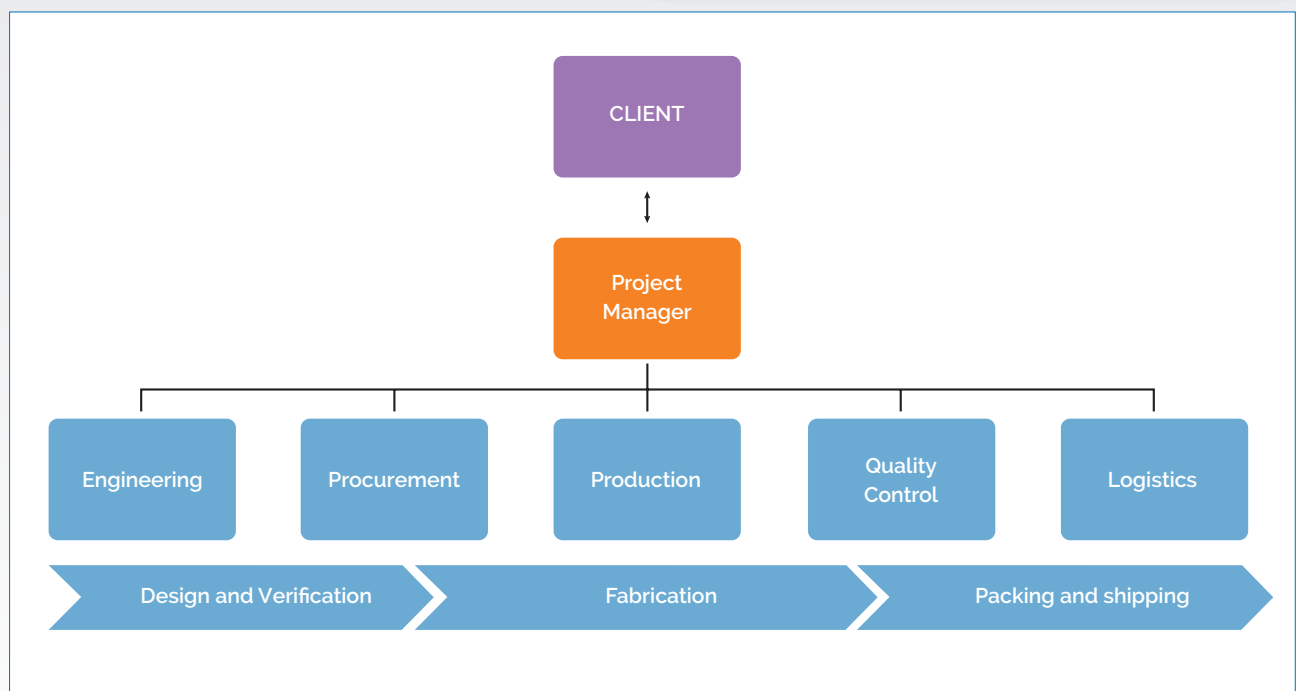




## Project Management

Lankhorst places importance in delivering a great customer service that matches the quality expected of their products.

Every order is followed by a dedicated Project Manager, who remains the sole point of contact throughout order execution and ensures that products are designed, engineered, tested, produced and shipped to the expectations and requirements of the client and their specifications.



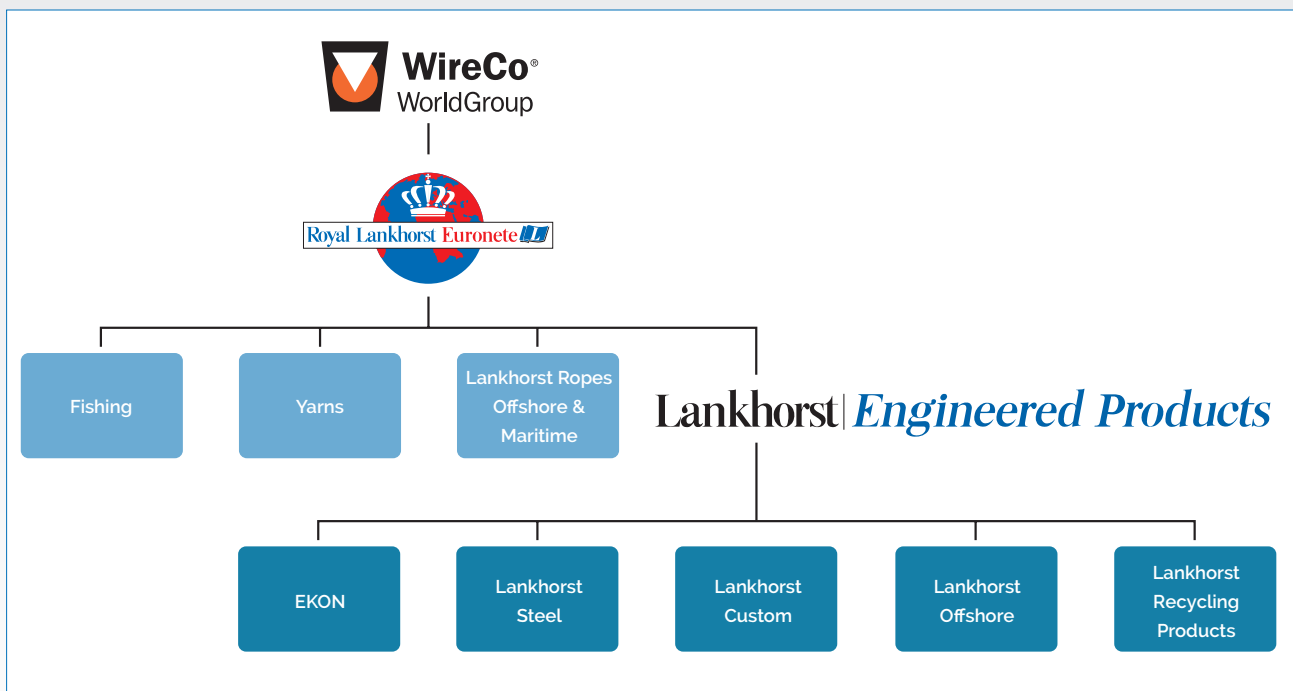


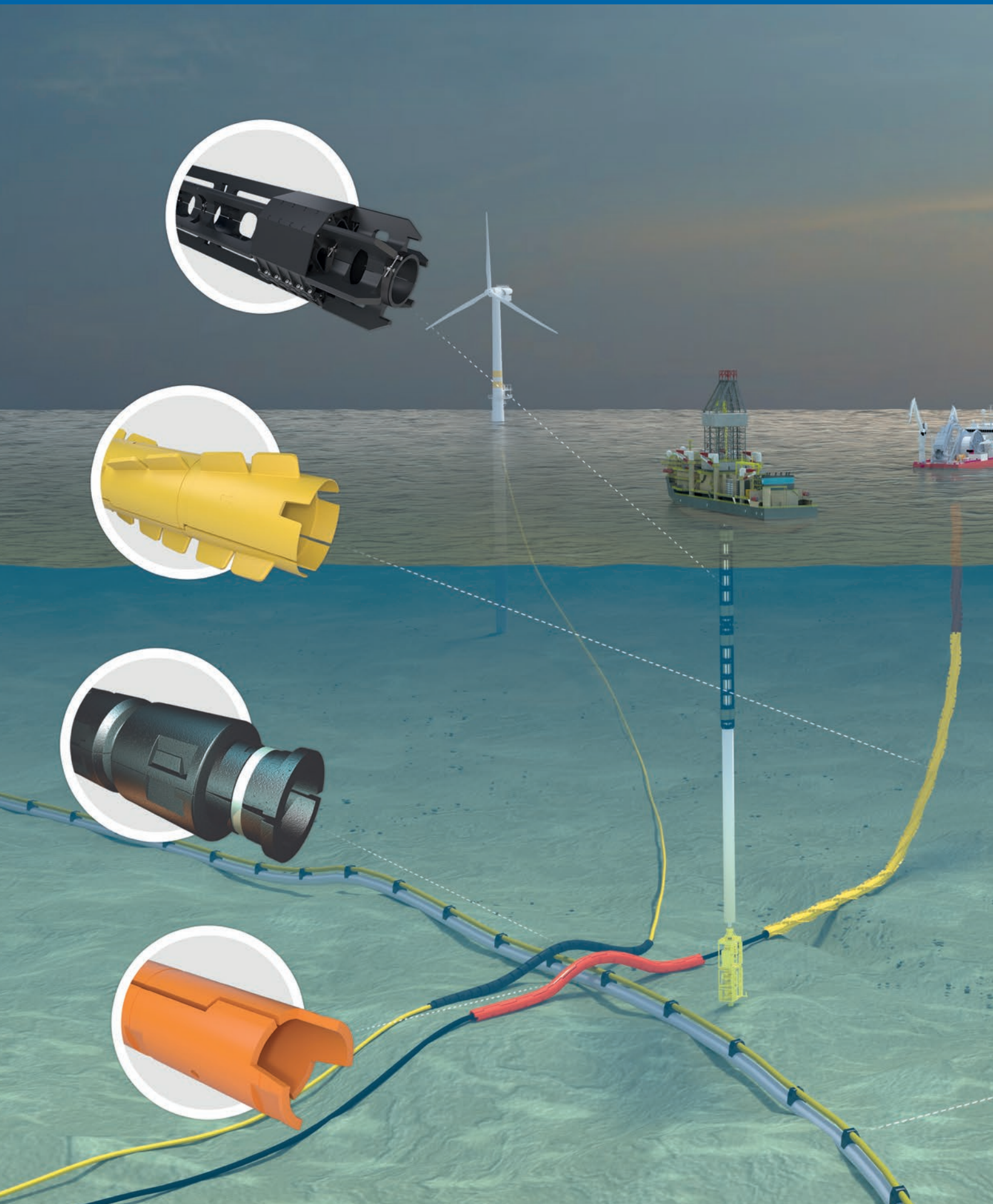
## Royal Lankhorst Euronete

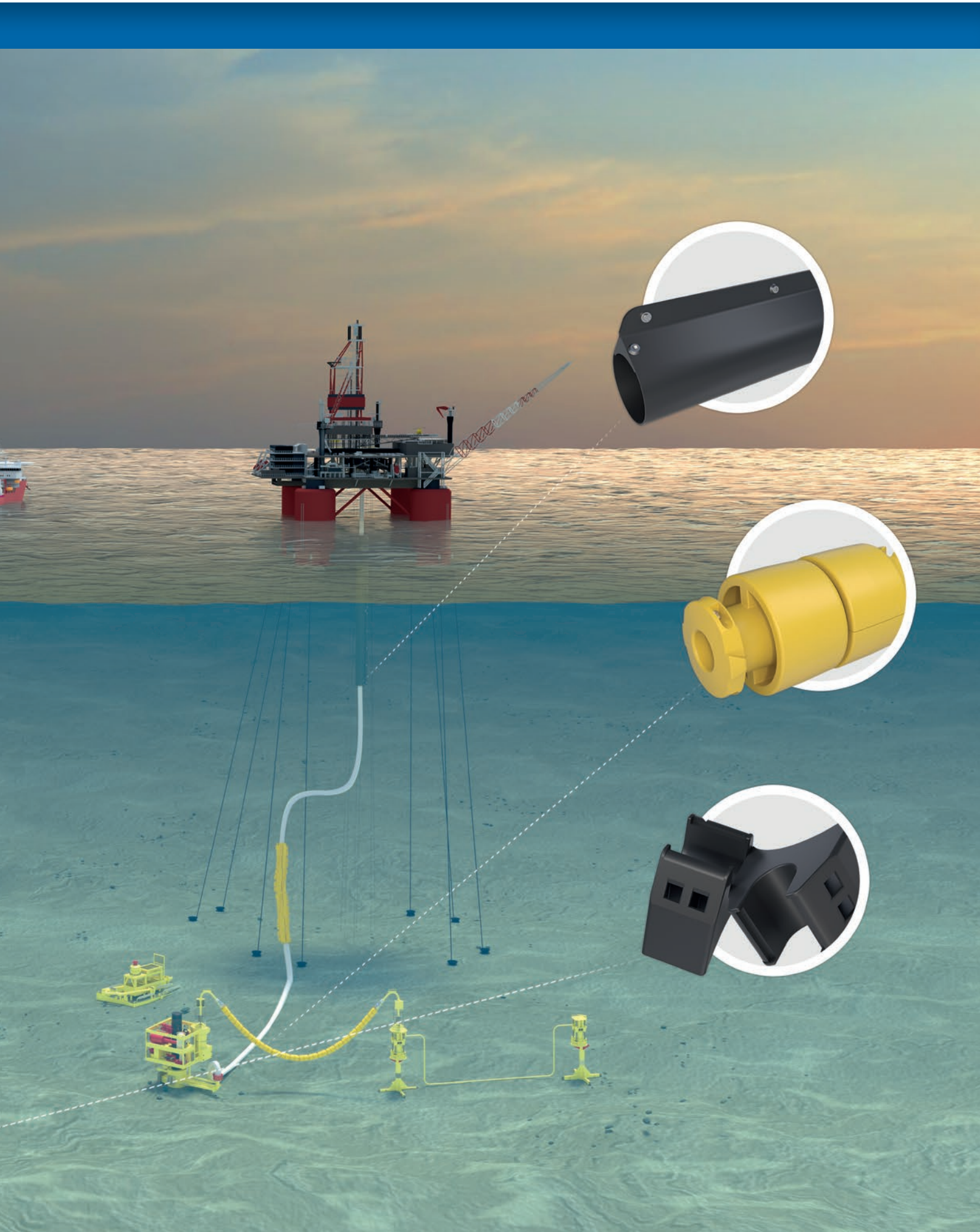
Lankhorst Engineered Products is a subsidiary of Royal Lankhorst Euronete. Its origins date back as far as the year 1803 on the exact same spot where the offices and factories can be found today. In 2003, on the occasion of the group's bicentennial anniversary, Her Majesty the Queen of The Netherlands granted the company by Royal Warrant the predicate "Royal".

Royal Lankhorst Euronete expanded from a regional family owned company into a worldwide operating company with leading positions in markets including ropes, industrial yarns, fish netting, reinforced composites and recycled plastics. Lankhorst exchanges knowledge and ideas and creates synergies for joint developments.

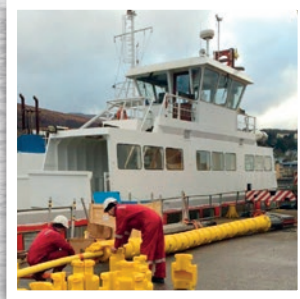
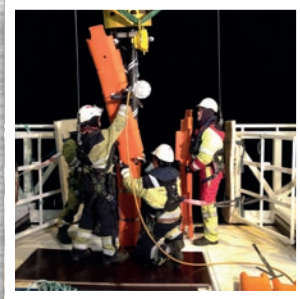
In 2012 the Royal Lankhorst Euronete Group was acquired by WireCo WorldGroup Inc., a global leader in producing and marketing of wire rope, electromechanical cable and a major manufacturer of wire products, headquartered in Kansas City.







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