

# IN THE GROOVE

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## Lebus system fitted on world's largest pipe laying vessel

The world's largest pipe laying vessel is nearing completion in the Keppel shipyard in Singapore with Lebus spooling technology at the heart of its operations.

Pipe laying barges are propelled by anchor winches pulling the vessel towards anchors set down ahead by tug boats. Without smooth spooling of the winches, the entire operation is stalled.

The *Castorone* will be the flagship pipe laying vessel of Italian offshore oil and gas contractor Saipem, a division of the Italian energy company Eni.

*Castorone* is designed for high productivity operations in extreme environments. It already has offshore contracts worth €1.5bn and it has not even gone to sea yet.

In 2014 it will travel to Australia to install the gas export pipeline (GEP) on the Ichthys LNG project for INPEX. It will install 889km of 42-inch diameter subsea pipeline in water depths of up to 275m, connecting the offshore central processing facility to the onshore processing facility in Darwin.

But before that, it will be in the Gulf of Mexico next year to install 350km of 20-inch diameter pipeline in waters up to 2,100m deep for the Walker Ridge project.

Lebus delivered 11 sets of sleeves that are installed on the drums of the winches that propel the barge at speeds of up to 14 knots. To move the vessel forward, tug boats unspool the high capacity wire rope on eight anchor winches on each side of the vessel and drive them forward. They carry the anchors and set them down onto the sea bed ahead.



As the winches are turned, the vessel moves towards the anchors, laying down pipeline at the back as it moves forward. A dynamic positioning system keeps the 330m-long vessel steady at all times.

Lebus also supplied sleeves for the vessel's main 600t crane and two pipe-handling cranes, which each have a lifting capacity of 52 tonnes.

For the vessel, Redaelli supplied a wire rope measuring 3,850m long and 152mm in diameter, and weighing 420 tonnes. The rope is stored on, and pulled by, massive Rema traction winches.

## Costa Concordia salvage operation looks to Lebus drum sleeves

Titan Salvage of the USA and Italy's Micoperi have begun work to salvage the *Costa Concordia* cruise ship, which capsized off the coast of Italy in January 2012, killing 32 of its passengers. The project is expected to take a year and will cost more than €200m.

Lebus is supplying drum sleeves for the winches that will be used to pull the 114,000t vessel to port after it has been made upright and filled with airbag-type flotation devices.

Lebus has supplied equipment to other high profile salvage operations in the past, notably the raising of the Russian submarine *Kursk*, after it exploded in the Barents Sea, by Dutch contractors Smit and Mammoet in 2001.



## Customer focus

# AP Van den Berg

Geological investigation of the seabed is extending to ever increasing depths. As engineers want go deeper and deeper, new demands are placed on the technology and equipment that is used.

Cone penetration testing (CPT) was initially developed in the Netherlands in the 1950s and it remains one of the most used soil investigation methods. CPT consists of pushing an instrumented cone into the ground, point down, at a controlled rate and measuring resistance and friction.

Dutch company AP van den Berg produces soil testing equipment, including a new proprietary system for deep water exploration called the Deep Water Wison-APB. This is used in the drill pipe of a geotechnical survey vessel to test seabed soil conditions under water depths of up to 550m.

An electric constant tensioning winch with a reinforced umbilical cable allows fast down-hole operation to a depth of 3km. The 600m umbilical cable is attached to the Wison-APB for the power supply, data transmission and hydraulics from the winch. The Wison-APB is lowered into a drill string by paying out the cable on the winch.

In this application, it is absolutely critical that the cable spools smoothly onto and off the drum with total reliability all the time. Therefore the Wison-APB uses a Lebus drum for multi-layer spooling combined with a screw level winder. The winch drum holds 10 layers of 36mm diameter rope. The diameter of the drum is 1450mm and the length of the rope is 3200m.



## Testing facility will be highlight of third factory hall

Lebus International Engineers GmbH is planning to open a third factory hall in the autumn of 2012.

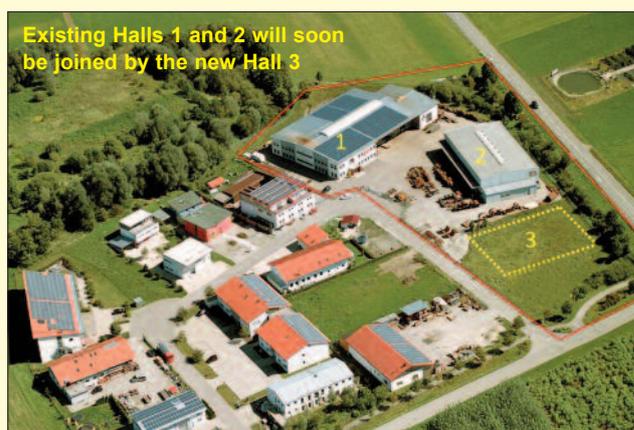
The new hall will be used for warehousing and assembly, and be equipped with a pair of 10t overhead cranes. It will also house a new test stand to analyse the behaviour of different types of wire rope under different operating conditions.

At 800 square metres, the third hall will be just slightly smaller than the two existing production halls at the factory in Finning, Bavaria.

The test stand will have a large multi-purpose variable winch inside the new building and a 16m-high tower outside. The system will include a traction system to create loads of up to three tonnes.

Lebus already tests drums and sleeves before delivery using an overhead crane in the main workshop. The new test bed will allow more comprehensive testing of new drum grooving patterns to see how ropes behave over a longer period in test conditions. The goal is to further refine the geometry of Lebus grooving to lengthen the life of wire rope.

It will also enable Lebus to simulate specific problems that wire rope users sometimes have, to come up with new solutions for them.



Cris Seidenather, managing director of Lebus International Engineers GmbH, says that he has dreamed of having such a research facility for his entire career. "I have wanted this for more than 40 years," he says, "but we have never had the space before."

Lebus International Engineers GmbH moved to its new premises in Finning in 2002, with a single 1,000 square metre production hall and office building. It opened a second 900 square metre hall on adjacent land in 2009.

# Research ship presents challenges for Rapp Hydema deck machinery

One of the most challenging projects with which Lebus has been involved recently is *The Investigator*, a new oceanographic research vessel that is being built for Australia's Commonwealth Scientific & Industrial Research Organization (CSIRO).

The vessel is scheduled to launch in mid 2013. CSIRO selected Teekay Holdings Australia and Sembawang Shipyard in Singapore to carry out the design, build and commissioning of the vessel. Norwegian specialists Rapp Hydema and Triplex are working to deliver the massive deck machinery before the end of 2012. Lebus is supplying winch drum sleeves for what can only be described as 'ultra multi spooling'.

What makes the equipment so special is that *The Investigator* is designed to work in extreme sea depths. There are six winches in total – four for wire rope and two for synthetic rope – with spooling in up to 27 layers.

One of the winches will hold 8.4km of 24mm-diameter synthetic Kapaneema Plus 12-strand plaited fibre rope made from Dyneema SK-75. The drum of this winch has a pitch circle diameter of 719mm and length between flanges of 4300mm. The rope spools onto the drum in 16 layers. The pulling force is 20 tonnes.



Another winch holds 8km of 16mm drawn galvanised steel wire rope in 23 layers. Pitch circle diameter of the drum is 451mm and length between the flanges is 2625mm. Pulling force of this winch is 5.6 tonnes.

All deck machinery systems are also designed for ambient operating temperatures of -30°C to +45°C.

The scientific research winch package includes six different high-tech winches with lifting capacities of 3t to 38t for a giant piston corer operation at extreme water depths. Such is the scale of the deck machinery package, the new vessel has three winch rooms. It has been quite a design challenge for all concerned.

## Geothermal drilling

The quest for sustainable and renewable energy sources has spurred interest in geothermal energy, based on the release of hot gases trapped deep underground.

While Iceland is often considered the capital of geothermal drilling, Germany is seeing growing activity in this field too, particularly in the northern plain, in the Upper Rhine area and in southern Bavaria. Near Unterhaching, for example, in the southern suburbs of Munich, there is a geothermal power plant that has been in operation since 2007, supplying more than 200 households.

This year has also seen geothermal drilling take place nearby in Pullach, another south Munich district. Drilling to a massive depth of 4km has been commissioned by Innovative Energie für Pullach (IEP), a communal provider that is now into its third geothermal venture.

The drilling has been carried by Hekla Energy, which used a Euro Rig drilling machine produced by Bentec. The drilling rig, which stands 53m high and has a load capacity of 350t uses a Lebus multi-layer wire rope spooling system with a 35mm diameter wire rope spooled in four layers on the drum.



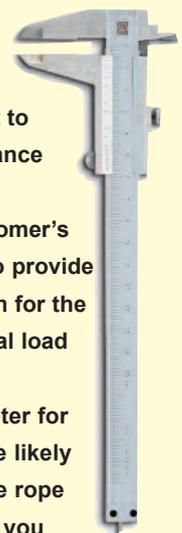
## Top Tech Tip: Measure your rope

Before you start any hoisting or winching operation, make sure that the diameter of the new rope you are about to install is the correct one and in accordance with Lebus recommended tolerances.

For multilayer spooling, it is the customer's or rope manufacturer's responsibility to provide a rope construction that is suitable both for the specific application and for the technical load data given in specification.

Keep a record of the new rope diameter for future reference. At some stage you are likely to be asked to determine how much the rope diameter has decreased in service and you must know the actual diameter of the rope after the run in period.

When measuring the rope, do not measure the layer on the reel. Pull a couple of metres off the reel and measure the rope when straight. It is advisable to take four measurements around the axis of the rope in different places and taken an average of the results.



# Engineers' Corner

## Lebus quality control



Interview with  
Tim Seidenather,  
managing director for  
quality & production

**Lebus multi-layer wire rope spooling systems are designed for moving extremely heavy loads. How do you ensure safety?**

"First of all, as a company, we meet EN ISO 9001 quality management norm. This is the international standard for enterprises documenting their qualification for quality management on all operating levels, from purchasing to distribution. We have been certified to EN ISO 9001 since 1994."

**Do any markets have their own special standards - for example offshore installations?**

"Yes, for sure. Det Norske Veritas (DNV) – initially in Norway and these days internationally – performs special certifications for materials, components and systems for vessels and offshore-installations. All Lebus systems delivered worldwide for such installations meet DNV standards."

**Who does your auditing?**

"We use an internal auditor according to DIN 287/288 and, depending on customer requirements and export conditions, we use external auditors from TÜV, Lloyds and Bureau Veritas."

**Do you also have your own standards for production and quality assurance?**

"Every quality effort of Lebus is subordinated to one principle: total function assurance and control for our customers. This starts with our consulting service and is followed by a continuous process from the original Lebus groove to our testing procedures. We use sonar and surface-magnet test procedures as well as x-ray appliances to test welds. Our procedures are in accordance with the international Welding Procedure Qualification (WPC) norm. Our welding processes are also tested for temperatures below -50°C because our systems have to function under extreme conditions."

**What recent investments have you made in production and quality procedures?**

"In the main workshop we have invested in new CNC lathes. We have recently installed a new computerised large lathe. It is an impressive machine that can process tubes of up to 1m diameter, 3m in length and 4.8 tonnes in weight. We also continuously invest in training programmes for our employees."

**Lebus grooving is engineered according to the construction of the wire rope being used. You must have to co-operate closely with wire rope manufacturers?**

"We have developed close relationships over the years. We are an associate member of EWRIS (the European Federation of Wire Rope Industries) and we keep our ears and eyes very close to innovations in the industry. We know how different wire ropes behave under heavy load and this knowledge is an important part of our consultancy service."

**How do you seek to maintain your advantage in quality?**

"In our customer relationships, we are striving not only to produce products of the highest quality but also to offer the best possible service. This approach gives us strong feedback from our customers. This is creating our advantage: always being a step ahead in what our customers need and want."

**What guarantees do you offer?**

"We guarantee perfect and controlled spooling. Trouble-free operation of hoisting systems is critically important. We know that any failure soon becomes expensive. Within the Lebus service network, in the event of any fault we aim to be on site within 48 hours, worldwide. We carry out a full investigation into the cause, compile a detailed damage analysis and draw up a solution to the problem. In addition, we provide advice on how to prevent such incidents in the future."

### About Lebus rope drums

In 1937 Frank LeBus, a supplier of equipment to oilfields, patented the use of a groove bar on hoisting drums to guide the spooling of rope. In the 1950s he refined the grooving geometry and came up with the LeBus Counterbalanced Spooling System, which is still the most effective way to ensure that wire rope wrapped around a hoist drum in multiple layers continues to spool totally smoothly, and in a way that maximises the life of the rope. Tests have shown that a Lebus drum, with grooves designed specifically to match rope size, can extend rope life by more than 500%.

Today, the term 'Lebus' is often used incorrectly to refer to any drum with parallel grooves. In fact, only a drum or sleeve produced by Lebus can truly claim to be a Lebus drum.

### About Lebus International

Lebus International Engineers GmbH was established by Karl Seidenather in 1962. It is a sister company of Lebus International Inc. of the USA and also has sister companies in the UK and Japan.

Lebus International manufactures drums and rope spooling systems for a wide range of onshore and offshore winching applications. Products include:

- Rope drums with grooves cut directly into them (with or without bolted or welded flanges, as required)
- Grooved split sleeves that can be placed over smooth, ungrooved drums – good for retrofitting and for applications where drums may require replacing in future.
- Spooling accessories such as spooling angle compensator and cross thread spindles.

### Contact us:

For any queries concerning wire rope spooling, Lebus products or details of how Lebus can help you, please contact:

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