

# IN THE GROOVE

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## Revised DNV standard makes waves offshore

Lebus International Engineers GmbH is working with standards body Det Norske Veritas (DNV) to refine and improve standards relating to winch design in offshore applications.

DNV published a revised version of its Standard for Certification No.2.22 Lifting Appliances in October 2008 in response to a winch drum failure caused by a flange breaking. Revisions focused on recommended safety factors for calculating hoop stress imposed on winch drums. While the safety factor for drums with conventional helix grooves remains unchanged (1 for one layer of rope, 1.75 for two layers or more), DNV has specifically targeted Lebus-style grooved drums for an increase in the safety factor.

When using Lebus-style parallel grooved drums with five or more layers of wire rope – an increasingly common scenario in offshore applications – DNV's recommended safety factor has been increased from 1.75 to 3. This effectively limits the use of deepwater cranes to just 58% of their rated capacity.

Cris Seidenather, managing director of Lebus International Engineers GmbH, has since advised DNV that actually the same pressures are exerted on the flanges of a drum regardless of the grooving pattern. "The only difference is that the Lebus pattern has been proven over the years – and this is well accepted by engineers and lifting contractors – to ensure much smoother spooling in multi-layer applications. It is an inherently safer design and much more accurate calculations can be made," he says. "There is absolutely no logical reason to suggest that higher safety factors are needed for Lebus-style parallel grooved drums than for helical grooved and plain drums."

Mr Seidenather adds: "We understand that DNV needed to respond to concern, and sympathise with the pressures they are under. However, more work is required to refine this guidance. Stresses on the flange are very complicated to calculate. DNV has produced this new formula without a proper scientific basis. Other factors need to be considered, including drum construction - whether the flanges are welded or bolted - and the type and construction of the wire rope being used, in particular its modulus of elasticity."

Mr Seidenather also points out that the new DNV standard will have a significant impact on deep water lifting operations, since a lot of equipment will no longer be able to be used at full capacity. He concluded: "Offshore contractors are working in deeper and deeper waters, lifting heavier equipment down

## Our good name

### No one else makes Lebus drums

One of the concerns that Lebus had with the revised DNV standard is that it specifically singles out the Lebus brand by name. No industry standard has ever done this before.

Most standards bodies and regulatory agencies fully recognise that, while patents may have since expired on the Lebus original parallel groove drum design, the Lebus name remains a protected brand.

Lebus strongly believes that it was an unfortunate oversight on the part of DNV to use the company name instead of the correct generic term 'parallel grooved drums'.

While it is said that imitation is the sincerest form of flattery, to help avoid any future confusion, we have devised this mantra:

**Only Lebus makes Lebus drums and sleeves.**

**Others may make parallel grooved drums that copy the geometry of Lebus drums, but these are not Lebus drums.**

**If it is not made by Lebus, it is just an ordinary parallel grooved drum. It is not a Lebus drum and cannot claim to be so.**

**Only Lebus drums come with a 100% Lebus lifetime warranty certificate.**

**Only Lebus drums come with Lebus lifetime customer service.**

**We are very proud of our name. Others have no right to use it without our permission.**

to ever deeper depths."

Lebus is keen to work with both DNV and offshore contractors to help the industry to find a practical way through this situation. It is likely that the best way forward lies in more complete documentation relating to winch drum design. The revised DNV standard does say that lower safety factors may be applied if there is thorough documentation. Lebus promises to help its customers with any documentation that they require. Anyone concerned by how the new DNV standard may affect their lifting operations is invited to contact Lebus managing director Cris Seidenather at [cris.seidenather@lebus-germany.com](mailto:cris.seidenather@lebus-germany.com)

## Our partners

### Powertech (China)

Powertech (China) Ltd has represented Lebus in China since 2003. The company had been set up the previous year by Brian Yam, a professional mechanical engineer from Hong Kong whose association with Lebus goes back more than 30 years.

"I started representing Lebus in 1978 when I was working for a German company as general manager," he says.

Although he still lives in Hong Kong, 63-year-old Brian Yam spends most of his time travelling three days, usually in mainland China but also internationally. Powertech (China) specialises in supplying hydraulic solutions and spooling systems to the offshore and shipbuilding industries. It has seven employees based in Hong Kong and a further eight in its Shanghai office. The company turns over US \$12m a year.

Brian Yam has the experience to help customers with their projects, having delivered hydraulic systems for clients on projects as large as the massive Three Gorges hydro-electric power project. Over the years, he has also played a major role in hundreds of other large scale projects covering marine and shipbuilding, offshore and dredging, steel industry, civil engineering, mobile and construction equipment, plastic injection molding machines and machine tools.

As the economy of China has developed in recent years, it has become an increasingly important market for Lebus, producing spooling systems and winch drum sleeves for numerous heavy lifting vessels and barge cranes, up to 8,000t capacity.



**Brian Yam**

### Agent appointed in Brazil

Synapsis Engenharia Ltda, based in Rio de Janeiro, Brazil, has been appointed South American distributor for Lebus International Engineers GmbH.

The company is led by Paulo Machado, an engineer who previously worked for the state oil company Petrobras.

Brazil is one of the fastest growing economies in the world and is an increasingly important market to Lebus, with several major projects coming up. For example, Petrobras is building 28 drill rig vessels, with each one requiring up to 15 sets of Lebus drum sleeves for multi-layer spooling.



**Paulo Machado  
of Synapsis**

### Workshop adds new CNC lathe



Despite the current difficult economic climate, Lebus continues to reinvest in the business. It has recently installed in its main workshop a new Iberimex-Geminis CNC turning lathe with a special control unit for forming both parallel and helical grooving. It has the capacity to work on tubes up to 1000mm in diameter, 3000mm long and up to 4800kg in weight.



**The Powertech team with Cris Seidenather of Lebus (centre) in their booth at the Marintec trade fair in Shanghai in December 2009**

### CAD diploma for Lebus apprentice

Christoph Thalmayer, who joined Lebus as an apprentice in 2007, has completed qualified as a CAD designer after 18 months of study. He is pictured here being presented with his diploma by Lebus quality manager Tim Seidenather.



**Christoph Thalmayer, left, with Tim Seidenather, right**

With several years of valuable work experience to support him, 25-year-old Christoph will start a degree course in engineering in September 2010. He will study in Munich in the evenings while continuing to work for Lebus by day.

### Learn more about Lebus from our new company DVD

Lebus has produced a new promotional DVD that introduces the company to new customers and shows the fabrication facilities and processes in the factory in Finning.

The film also demonstrates the wide range of applications for the Lebus spooling system and features the Ligertz funicular railway, high up in the Swiss Alps. This application beautifully demonstrates the smoothness of the spooling on the winch in its machinery house at the top of a mountain.

To obtain your free copy, please email:  
[info@lebus-germany.com](mailto:info@lebus-germany.com).

# Total's FPSO winches

French oil company Total has ordered a pair of floating production, storage and offloading (FPSO) vessels for its Pazflor field project in Angola. The vessels are being manufactured in Korea by Daewoo Shipbuilding & Marine Engineering Co.

Each vessel has two 400t capacity winches. These are being produced in Le Creusot, France by NFM Technologies. Lebus has supplied NFM with parallel grooved sleeves for these winch drums.

Each winch will hold 450m length of 118mm diameter wire rope in four layers. Pitch circle diameter is 2.7m and the



length between flanges is 1.7m.

Located about 150km off the coast of Angola and 40km northeast of Dalia, in depths of 600m to 1200m, the Pazflor development covers 600 square kilometres. It involves bringing four fields into production – Perpetua, Hortensia and Zinia (Upper Miocene), and Acacia (Oligocene) – which were discovered between 2000 and 2003. Oil production is scheduled to start in 2011.

Pazflor will incorporate several technological advances in bringing difficult deep offshore fields into production, in particular seabed gas/liquid separation, right next to the production wells. This technology is a world first, Total says.

## Shipping out Siemag's sleeves



As reported in the last issue of *In the Groove*, Lebus is supplying several sets of parallel grooved sleeves to German mining equipment producer Siemag M-Tec<sup>2</sup>. The end-user is Siberian mining company Norilsk Nickel, for a skip hoisting machine.

As these photos show, transporting the 5m and 6m diameter sleeves is itself a major undertaking. They are shown here leaving the Lebus factory in Finning, on their way to Siemag, based in Netphen, 550km away.

## Drill rig refurbishment

Lebus does not just produce new winch drums and sleeves. Much of its work involves refurbishing and upgrading existing equipment – sometimes because of a change of use, sometimes for an upgrade, and sometimes just because of wear and tear.

For example, Lebus has recently refurbished the winch drum of a Wirth B12 drilling rig, owned by a company that specialises in drilling for geothermal energy. Dortmund-based Wagenknecht GmbH, a well-known wire rope dealer, is supplying a new rope for the rig and turned to Lebus to refurbish the drum.

Lebus fitted new sleeves to the drum, replacing ones that it had originally fitted approximately 30 years ago.

The drum carries four layers of 26mm diameter wire rope and has a pitch circle diameter (PCD) of 540mm. The length between the flanges is 686.5mm.



Lebus is refurbishing the drums of this Wirth B12 drilling rig

# Engineers' Corner

## The Lebus Fleet Angle Compensator

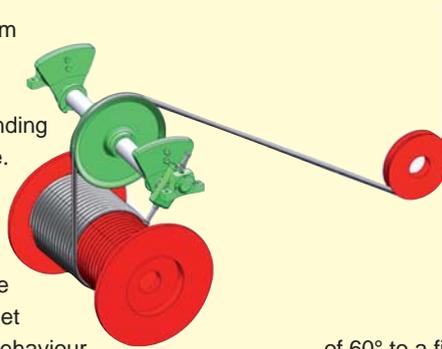
Aside from the design of the drum there is probably no function of the layout which has a more important bearing on the proper winding of the wire rope than the fleet angle. The fleet angle is the angle of the rope between the first sheave and the drum flange, relative to the centre line of the drum. With all type of drums the rope is subject to a fleet angle which directly influences its behaviour and impacts on its service life. If the fleet angle is too big, the wire will tend to break away from the flange at the layer changes, spool towards the centre and leave gaps. If it is too small, it will cause the rope to climb up the flange and bang down, damaging the rope and the equipment.

Ideally, the fleet angle should be between  $\frac{1}{4}^{\circ}$  and  $1\frac{1}{4}^{\circ}$ . If this is not possible, an additional spooling device such as a fleet angle compensator (driven automatically by the rope tension) or a Lebus level wind pay on gear (mechanically driven) must be installed to guide the cable along the drum between flanges.

Each of the solutions to solve a fleet angle problem would have to be weighed against the other from a practical as well as from an economical standpoint.

The Lebus fleet angle compensator is driven by the movement of the wire rope as it goes through the crossover sections of the drum. As the rope winds or unwinds, the FAC shaft slowly oscillates, allowing its sheave to slide back and forth across the shaft to maintain an optimum fleet angle and guide the rope smoothly onto the drum.

Certain operating conditions are necessary for the Lebus fleet angle compensator to function properly. The rope must go from the drum over the compensator sheave with a minimum contact angle

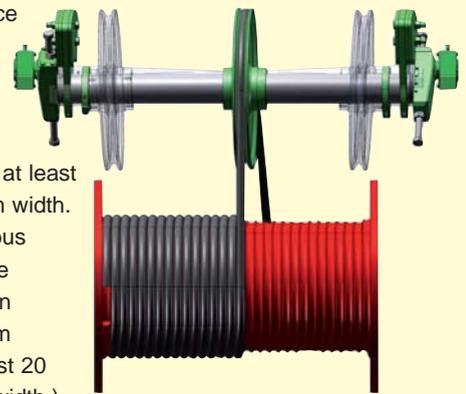


of  $60^{\circ}$  to a fixed point such as a fairlead or fixed sheave

To avoid excessive angles of the rope on the sheaves, the minimum distance

between the fairlead (fixed sheave) and the compensator sheave must be at least 6 times the drum width.

(Without the Lebus compensator, the distance between sheave and drum should be at least 20 times the drum width.)



If spooling in multi layers, the drum must have Lebus grooving. For a single layer, helical grooving will also work.

There must be sufficient tension on the cable during the spooling operation: Recommended minimum tension is 2% of the wire rope's breaking load.

There are three primary advantages of the Lebus fleet angle compensator:

1. There is no mechanical connection between the drum and the compensator.
2. Installation is quick and easy.
3. It is completely automatic and, after initial adjustments when the rope is first spooled onto the drum, only a minimum of maintenance is necessary.

### About Lebus rope drums

In 1937 Frank LeBus, a supplier of equipment to oil fields, 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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