

# In the Groove



The bulletin of Lebus International Engineers GmbH

Issue 10: 2014

## Returning to Montreal for a special project

In the summer of 1976 the Canadian city of Montreal played host to the Olympic Games. An engineering feature of these games was the iconic leaning tower that inclines at 45° above the stadium.

At 165 metres high, the Montreal Tower is said to be the world's tallest inclined structure. A cable car carries sightseers to a viewing platform at the top of the tower, taking just two minutes.

In 1986 Lebus Germany supplied equipment for the huge winch that moves the cable car up and down. And 27 years later, in 2013, Lebus returned to this famous landmark to renew the spooling equipment.

The hoisting system is supplied by Swiss specialist Garaventa, which was Lebus' customer on both occasions. Lebus supplied grooved split sleeves for bolting onto the drum, as is usual, but in this case there were some unusual features.

As the rope spools onto the drum in a single layer, it was not necessary to use the special Lebus parallel grooving geometry for guiding the rope. Simple helical grooving is just as perfect in such applications.

More unusual was the material of which the sleeves have been made: a synthetic Becorit composite material that is designed to create less wear on the wire rope than regular steel drum sleeves.

However, after 27 years of continuous daily commuting up and down the tower, the cable system had started showing its age. Even this special material is not totally immune.

The original sleeves were supplied by Lebus in 110 different segments. Advances in production technology meant that for the renewal it was possible to make the outer casing from just nine segments, each running the full 1338mm length of the drum and covering 40° of the drum circumference.

Lebus expects the new sleeves to be good for at least as long as the old ones. And when the time comes to replace them, it will be a simple job to lift off the old and bolt on the new – such is the benefit of the Lebus system.



The old sleeves (above) have now been replaced with new ones (above right)

The cable car (left and right) takes sightseers up to a viewing platform on top of the 165m-high tower



50 years:  
see p3

## Customer focus

# Fratelli Righini



Fratelli Righini is an engineering and manufacturing company based in Ravenna, Italy, that has been operating in the offshore market since 1985.

It is a well-known brand in the offshore industry with a large portfolio of products and solutions, including rotary winches for riser pull-in operations and mooring of floating production, storage and offloading (FPSO) units.

With its in-house engineering, manufacturing and testing facilities, F.lli Righini's is able to meet the most severe requirements of the offshore industry. 3D modelling and finite element analyses are carried out on a regular basis for weight optimisation and project reliability.

All equipment goes through functional and load testing prior to delivery. Facilities for static and dynamic load testing are available up to 600 tonnes, depending on the application.



F.lli Righini winches all have the Lebus spooling system

F.lli Righini has delivered rotary winches for several leading FPSO operating companies, including SBM Offshore, Technip and Saipem. To date it has manufactured winches ranging from 25-tonne line pull (installed on davit cranes, operating in two-fall or four-fall) up to 350 tonnes in single fall for riser pull-in applications. Its winches are usually driven by hydraulic motors through planetary gearboxes and optionally equipped with emergency band brakes.

Every winch that F.lli Righini has delivered has been equipped with Lebus grooved sleeves for improved spooling. It says that the Lebus shells are of paramount importance in accurate reeving and layer change for rope spooling.

F.lli Righini's engineering department usually works in close co-operation with Lebus Germany during the design phase to define the exact dimensions and key features of the drums, such as flange distance, and the number of turns and layers. The company's engineers understand that this sort of technical support is crucial in the design stage of the winch as proper wire rope spooling is at the heart of machine reliability and performance. And these are the core features that F.lli Righini wants to deliver through its equipment.

## Lebus at Marintec China

Lebus International Engineers GmbH was at the Marintec China trade fair, held in Shanghai from 3rd to 6th December 2013.

Lebus Germany exhibited at the fair through its local partner Powertech (China) Ltd.

Cris Seidenather, managing director of Lebus, joined Powertech managing director Brian Yam to explain to visitors the benefits of genuine Lebus wire rope spooling technology.

Lebus already has a good market presence in China, supplying leading manufacturers of dockside cranes and ship cranes such as ZPMC. Lebus technology is also increasingly in demand from the manufacturers of the new generation of super-heavylift construction cranes that are beginning to emerge in China.

"Several Chinese manufacturers have tried producing their own versions of the Lebus system and run into spooling problems," says Cris Seidenather. "By working with us and using original Lebus technology they are able to make much faster strides with their crane designs."

There were more than 1,700 exhibiting companies at Marintec China 2013 and close to 58,000 visitors from 88 countries – a steady 13% increase on the previous Marintec in 2011.

"Marintec 2013 was a very success event for Lebus," says Mr Seidenather. "It was certainly worth the trip for us."

## Smooth spooling for Happy Sky

Lebus customer Huisman is a world leader in building cranes for heavylift vessels.

One of the latest of these is BigLift Shipping's new flagship, *Happy Sky*. Her first assignment last year was to transport three huge modules from a fabrication yard in Shanghai to Cape Lambert, Australia, where they will be installed as part of Rio Tinto's port expansion project. The modules will form a structure to convey extracted minerals. Even the lightest weighs 777 tonnes, while the heaviest is 935 tonnes.

This vast cargo is well within *Happy Sky's* capacity, however. She is 155m long and has a 18,680-tonne dwt.

The two massive cranes on board, built by Huisman, each have a 900-tonne lift capacity.

Lebus supplied Huisman with cable drum technology to ensure that *Happy Sky's* transportation operations will never be let down by wire rope spooling problems.



# Lebus celebrates 50 years in Germany

Lebus has celebrated the 50th anniversary of its operations in Germany with the official inauguration of a third production hall at its factory in Bavaria.

Lebus International Engineers GmbH began life in 1963 as a subsidiary of the US spooling systems pioneer LeBus. It moved to its current premises in Finning, near Munich, in 2002 to facilitate expansion. A second production hall was added in 2009 and the third was built in 2012, taking the total production area to 2800m<sup>2</sup>.

The half-centenary celebrations were suitably loud, thanks to the performance of a brass band from the nearby village of Entraching. Several local dignitaries were also present. Managing director Cris Seidenather welcomed county chief-administrator Walter Eichner and mayors Fritz Haaf of Finning, Walter Graf of Windach and deputy Siegfried Weißenbach, as well as numerous councillors, neighbours, friends and guests.

Mr Seidenather gave a brief overview of the development of the company, from its foundations in Hannover and relocation to Duisburg, Inning and Gilching, and finally to Finning. "After a long tour through Germany, we finally found a home here – a permanent one," he said.

Lebus' commitment to its home in Finning is shown by the construction of two new production halls in the past four years. The newest hall is used for warehousing and assembly, and is equipped with a pair of 10-tonne overhead cranes. It also houses a new test centre to analyse the behaviour of



From left to right: Lebus production halls 1, 2 and now 3



Cris Seidenather welcomes the guests

different types of wire rope under different operating conditions.

"This should make Lebus Germany 'future-proof', enabling us to give our customers an even more complete service with less reliance on subcontractors and outsourcing," Mr Seidenather said.

Lebus also continues to invest in new product in machinery, including a new CNC lathe capability of machining drums sleeves up to 2.5m diameter and 5m long – for the type of giant winch drums increasingly required by customers in the offshore sector.

"We have seen particular growth in the offshore sector, in deep sea exploration and cable laying, especially in Asia," he said. "The equipment gets more and more sophisticated, as longer and stronger wire ropes are required. So here at Lebus we must keep moving to keep up with the times."

## Offshore crane has built-in versatility

The new Liebherr RL-K 7500 Heavetronic knuckle boom crane, designed for offshore applications, has been future-proofed with the help of Lebus split sleeves on its winch drum.

If you want to lift loads off the sea bed you need strong muscles, and this crane has those. It can lift up to 270 tonnes above the surface of the water and 200 tonnes from a depth of 2km under the sea. It has active heave compensation (AHC) technology and has diesel-hydraulic power, with closed loop hydraulic systems for precise hoisting and slewing.

It joins a series of ram luffing offshore cranes that already includes the straight boom RL types 650 and 850, but the RL-K 7500 is the first knuckle boom model in the series.

It uses Liebherr's ZSW 2400 winch, which at 180 tonnes is the heaviest winch in the Liebherr product range.

The winch was designed and built by Liebherr-Components in Biberach, Germany. The crane itself was produced at Liebherr-Werk Nenzing in Austria.

Lebus has supplied Liebherr with two interchangeable sets of sleeves. One set has been engineered for use with 3000m of 96mm diameter wire rope, spooled onto the drum in 11 layers. The second set is for use with 82mm-diameter wire



rope, 3800m in length, spooled in 12 layers.

Because the Lebus sleeves are fixed onto the face of a smooth drum, they can be replaced should the crane be used for another application in the future, or should even greater lifting depths be required. New Lebus sleeves can be engineered and fabricated for other wire rope specifications and spooling configurations. They can be delivered to site and retrofitted in situ quite simply, saving the expense and downtime of getting a whole new winch.

# Engineers' Corner

## Lebus secrets that no one can copy

We here at Lebus are often asked: "Why does my wire rope not spool properly?"

There might be all kinds of good answers to that question. First we need to find out a little more.

"Do you have a Lebus drum?" we ask.

"Yes," they will often reply. "Or so our equipment supplier told us when we first bought the machine."

Naturally we explore further, and more often than not we discover that actually it is not a genuine Lebus drum but rather it has been designed and made by some other company, copying the basic principles originally developed by Lebus.

This is fair enough. It is well understood that the basic patents originally held by Lebus have long ago expired. The parallel grooving concept with two crossover zones is now open source technology. However, what is not widely understood is that genuine Lebus drums – drums that are either directly produced by Lebus or are fitted with genuine Lebus grooved sleeves – are different from those made by our imitators.

And here is why genuine Lebus drums continue to be different.

Although Lebus no longer has sole ownership of the parallel groove pattern, it retains proprietary know-how of optimum groove dimensions. No one else knows the precise dimensions and calculations that we use in our groove designs.

There are no European, ANSI or ISO norms that set out the rules for how rope drum grooves should be dimensioned for multi-layer spooling. The only norms that exist to guide drum manufacturers concern single layer spooling, which is an entirely different concept, and one for which normal helical grooving should usually be adopted, not the Lebus parallel groove geometry.

The Lebus system is designed specifically for spooling rope in multiple layers. It is completely inappropriate to take the existing norms and tolerances for single layer spooling and apply them to multi-layer spooling. But many people do this, and it is one of the



big reasons that their systems perform less than perfectly.

The optimum layout of a Lebus multi-layer spooling system depends on several factors, including rope construction, D:d ratio and the application. Other producers do not have access to the Lebus methodology which has been optimised over more than 50 years of our spooling history.

Lebus drums are also different because of the special care and precision that we take in production. Others simply cast their grooves onto their drums and think they have a finished product. However, smooth multi-layer spooling requires grooves to be precision carved to tolerances within one tenth of a millimetre. This cannot be achieved simply by casting; it is necessary to precision machine the grooving by hand after casting to finish it off. The last 2% of every Lebus drum is made by hand.

Any dimensions that are even fractionally out of tolerance on the bottom layer will be exponentially multiplied on upper layers, causing insoluble spooling problems and system breakdown. It is even better if the drums are cast without flanges in situ. Instead flanges should be put on after casting. Forming the grooves is very specialised work. It requires old-fashioned artisans who understand craftwork.

That is why genuine Lebus drums come with a perfect spooling guarantee. We stand behind our products for life. We can do this because Lebus drums are not only designed differently; they are also made differently.

High-tech engineering knowhow combined with old-fashioned craftsmanship; that is the secret of the genuine Lebus spooling system.

### 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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