

Enormous legs for a ship

Liebherr LR 13000 in operation for the first time with PowerBoom

May 2014 – The Lloyd shipyard in Bremerhaven was the arena for the largest conventional crawler crane in the world this April and May. Following its first job in 2012/13 in the USA, the Liebherr LR 13000 crawler crane has just completed its impressive European premiere. Mighty jack-up legs 87 metres in length, each weighing 940 tons, were installed in the "Aeolus" jack-up vessel. The parallel boom of the LR 13000, referred to as "PowerBoom", was used for this for the first time.

Take the most powerful crawler crane in the world, an enormous floating crane and add one of the largest jack-up vessels which has to be equipped with enormous stilts, and you have the ingredients for a superlative construction site. This is what was on offer to the numerous crane fans who visited the quayside opposite the shipyard during the past few weeks in order to observe the exciting events up close through binoculars, telephoto lenses and with photographic drones.

At anchor was the 140 metre long "Aeolus", a new working vessel from the Dutch Van Oord marine engineering group, and one of the largest jack-up vessels in the world. The special ship for building offshore wind farms was awaiting completion at Lloyd. Built in Hamburg, it had been towed to Bremerhaven in order for the four enormous jack-up legs to be installed. The challenging task of installing these enormous stilts was entrusted by the shipyard owners to the Dutch heavy load and crane specialists, Mammoet, with its Liebherr LR 13000 crawler crane. The crane with a maximum load capacity of 3000 tons is regarded as the world's most powerful crawler crane of conventional design.

This was the second time that the Dutch company had assembled its gigantic crane. However, this was the first time that the LR 13000 had been equipped with the "PowerBoom". This means the double lattice mast booms extend over a length of 48

metres, in parallel to one another. This makes the large crane even more stable and with the boom in a steep position as shown here, increases the load capacity by about 50% compared to the standard boom, out to a reach of about 35 metres.

The ten-strong team from Mammoet had planned that it would take four weeks to set up the crane on the shipyard premises. The work proceeded smoothly with assistance by Liebherr service engineers from the crane factory in Ehingen. The crawler crane was standing 130 metres tall after only 12 days, however, ready for lifting. "The crane can be set up like a larger LR 11350," commented crane operator Jouke Bruin describing the setup work. "Quite a few things about it have got better," praises Bruin, who was also at the controls when an LR11350 was used for the first time, incidentally.

The actual craning work on the jack-up vessel started with the most technically challenging lift. The first leg had to be installed through the structure of the heavy-load crane on the "Aeolus". Together with the impressive floating crane, "Matador 3", the LR 13000 lifted the enormous steel tube off its transport barge, aligned it vertically and transferred it all the way across. With its 65 ton hook block and fastening equipment, the crawler crane was lifting a gross load of more than 1000 tons here, with a reach of 23 metres.

First of all, the LR 13000 had to lift its load to the maximum hook height of 125 metres in this setup configuration. It was not possible to lift in with the high cables of the ship crane, as a result of which the steel cylinder was first suspended above the deck of the ship. Using deck winches as tall as a man, the "Aeolus" was slowly shifted until the jack-up leg was located directly above the opening and the complicated procedure of threading it in could be started.

Installation into the complex and extremely large hydraulic system of the jack-up vessel took about four hours. Using large pulley blocks, the pipe was turned into the correct position whilst being lowered. The lifting gear referred to by insiders as a jacking system will subsequently raise the "Aeolus" well above the waves even in water as deep as 45 metres. The gigantic jack-up platform will thus be able to operate irrespective of the sea state.

Mammoet had a hydraulic fastening system developed especially for this order. By means of a hydraulic hand pump, the pins of the fastening equipment of enormous size were released within minutes under control from the operating after lifting in. There was no need for fastening devices on the load – four holes in the steel cylinder were sufficient.

Once the stilts had been installed, the "spud cans" were fitted; these huge feet are intended to allow the working vessel to stand securely on the seabed later on. These elements weigh 180 tons and were lowered onto the base of the dock basin before the ship was positioned over them. Industrial divers then secured the feet to the bottom ends of the pipes using fastening equipment pulled upwards by the crawler crane through the jack-up legs.

Work in the shipyard proceeded round-the-clock on this project. The lifts of the following day were prepared overnight, and if possible the load was attached already. Then, the actual installation work took place in daylight. Following one week, all four jack-up legs of the special ship were already towering upwards.

A previous order of this kind involving installing somewhat smaller jack-up legs in a jack-up vessel was undertaken using two crawler cranes of a smaller lifting capacity working in tandem. "At the shipyard, we didn't have enough space to set up to crawler cranes even higher," explains Remco Zandstra, Mammoet's project manager on site. "Furthermore, this gives us better load handling and greater safety compared to a tandem lift."

At the end of the work in Bremerhaven, the Dutchman also has words of praise for the crane used: "The LR 13000 is an excellent concept and design. Ease of installation and high safety standards show that Liebherr has put all its experience with crawler cranes into this machine." Crane operator Jouke Bruin sums it up somewhat more laconically: "It's a good thing to work with. Really nice to drive!"

Crane: Liebherr LR 1300 (setup status: P-132m D-54m)

- Main boom	132 m + rooster sheave
- Derrick boom	54 m
- Superstructure ballast	400 t
- Suspended ballast	700 t
- Total weight of crane	2.950 t

Job data:

- Load / reach	1010 t with 23 m reach max.
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"Aeolus" jack-up vessel

Special working vessel for building offshore wind farms

- Shipping company/group	Van Oord, Niederlande
- GRT	14.800
- Length	140 m
- Width	38 m
- Usable deck area	3.200 m ²
- Load capacity ship crane	900 t bei 30 m Ausladung
- Transport capacity	5.600 t
- Max. depth of water	45 m

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