

Press release

Testing makes the difference: new test bench for Liebherr main bearings

- Liebherr constructs a new test bench for the qualification of main bearings for offshore wind turbines
- By modifying the adjacent construction of the test bench, main bearings with an outer diameter of up to six meters can be tested

Liebherr's Components product segment is revolutionising wind turbine technology with the introduction of a new state-of-the-art main bearing test bench. With a maximum electrical input power of 300 kW, a maximum rotational speed of 15 rpm and an impressive test capacity of up to 125 tons, the innovative test bench ensures rigorous testing and validation of main bearings for offshore wind turbines. Liebherr thus underlines its commitment to maximum efficiency and reliability in the generation of clean and sustainable energy.

Nussbaumen (Switzerland), June 28, 2023 – Main bearings are the heart of every rotor in wind turbines. They play a central role in the efficiency of the overall system and must, therefore, pass extensive tests. To ensure that these high requirements are met by main bearings, Liebherr-Components has constructed a new main bearing test bench at its site in Biberach an der Riss (Germany). "With this test bench, we are at the forefront of technology in the wind energy sector. We make a decisive contribution to a cleaner and more sustainable energy supply," explains Andreas Palmer, head of slewing bearing development and design. "We have already been testing and validating main bearings in-house since 2017. The new and larger main bearing test bench enables us to put bearings with a diameter of up to six meters through their paces, and thus move into completely new dimensions."

Testing makes the difference

The new main bearing test bench has a maximum electrical drive power of 300 kW and a maximum bearing speed of 15 rpm. This allows it to accommodate an impressive test weight of up to 125 tons. The test bench is used to carry out a variety of tests, including functional testing of the bearing, checking the lubrication and sealing system and recording the bearing frictional torques as a function of load and operating constellations. Part of the test programme is also the determination of the total bearing service life under specific operating conditions, as well as the bearing heat balance for various operating points.

To perform these tests, two bearings are always required – a test bearing and a counter bearing. The test load is generated by plate weights or hydraulic cylinders, while an electric motor rotates the bearings. "To test a main bearing, we calculate the load on that bearing for a life of, say, six months. The main bearing is then run at overload to simulate the stress it is put under during a lifecycle of 25 years," explains Andreas Palmer. "With these tests, we validate our calculation method, among other things, in order to be able to determine the correct raceway geometry already in the design of such bearings."

The result matters

Inspections and tests are important, because they do not only validate main bearings, but also uncover development opportunities. "This is how, for example, the demand for our superfinish for main bearings came about," continues Andreas Palmer. The superfinish refines the raceway surface. In this process, the surface is rotationally machined, so that the raceway forms an almost mirror-smooth surface. Tribology, i.e. wear, friction and lubrication, are thus optimised. As a result, superfinish ensures high surface quality and increases service life.

Always onward, always forward

"Since 2015, we have been delivering main bearings for wind turbines at Liebherr-Components. Thanks to our new test bench, we are currently able to validate a main bearing for an 11 MW turbine," Andreas Palmer summarises. "Thus, with this test bench, we are optimally positioned for the conditions of the market and further growth in turbine size."

About the Liebherr-Components AG

In this segment, the Liebherr Group specialises in the development, design, manufacturing of high-performance components in the field of mechanical, hydraulic and electric drive and control technology. Liebherr-Component Technologies AG, based in Bulle (Switzerland), coordinates all activities in the components product segment.

The extensive product range includes combustion engines, injection systems, engine control units, axial piston pumps and motors, hydraulic cylinders, slewing bearings, gearboxes and winches, switchgear, electronic and power electronics components, and software. The high-quality components are used in cranes and earthmoving machinery, in the mining industry, maritime applications, wind turbines, automotive engineering or in aviation and transport technology. Synergy effects in other product segments of the Liebherr Group are used to drive continuous technological development.

About the Liebherr Group

The Liebherr Group is a family-run technology company with a highly diversified product portfolio. The company is one of the largest construction equipment manufacturers in the world. It also provides high-quality and user-oriented products and services in a wide range of other areas. The Liebherr Group includes over 140 companies across all continents. In 2022, it employed more than 50,000 staff and achieved combined revenues of over 12.5 billion euros. Liebherr was founded in Kirchdorf an der Iller in Southern Germany in 1949. Since then, the employees have been pursuing the goal of achieving continuous technological innovation and bringing industry-leading solutions to its customers.

Images



liebherr-test-bench-for-main-bearings-in-wind-turbines.jpg

With a length of 28 metres, a height of 8 metres and a width of 9 metres, the main bearing test bench is an extremely impressive structure.



liebherr-main-bearing-test-stand-dimensions.jpg

Testing slewing bearings with a diameter of up to six metres – new dimensions are possible with the new main bearing test bench.

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