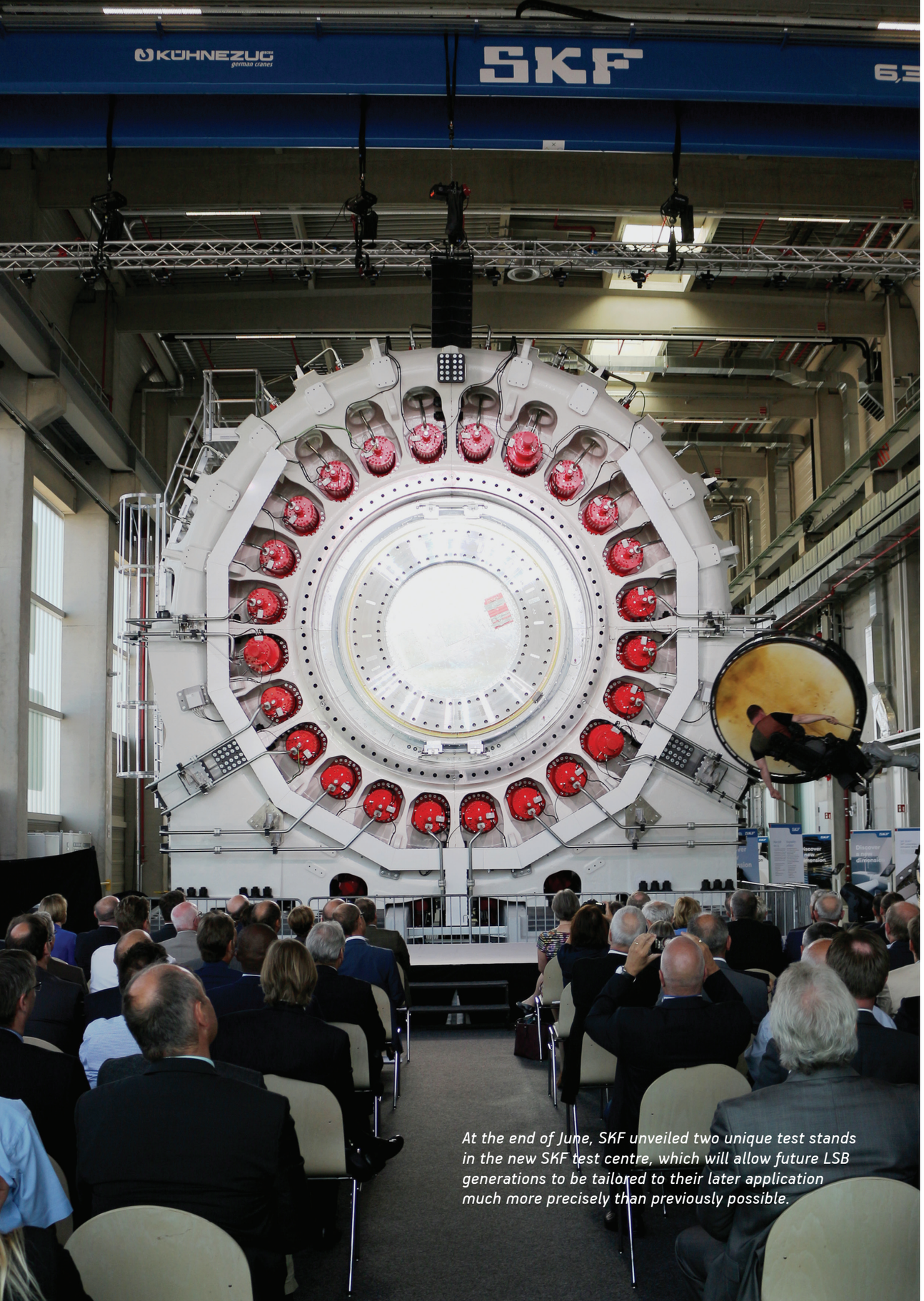
AFTER 110 YEARS, BASIC RESEARCH IS STILL GOING STRONG AT THE SKF LARGE-SIZE BEARING TEST CENTRE

Just a few weeks ago, SKF has opened its “Sven Wingquist Test Center” – the world’s most powerful large-size bearing (LSB) test facility. In an interview, Martin Johannsmann, CEO of SKF GmbH explains the motives for the 40 million euro investment at the company’s Schweinfurt site and how SKF customers can profit from it.

SKF’s new Sven Wingquist Test Center in Schweinfurt houses the world’s most powerful LSB test facilities.



At the end of June, SKF unveiled two unique test stands in the new SKF test centre, which will allow future LSB generations to be tailored to their later application much more precisely than previously possible.

Mr. Johannsmann, you have said that your new large-size bearing test centre has no equal anywhere in the world. What makes it so unique?

The two new test stands that we have installed in this facility amount to nothing less than technological pioneering work. They represent the continuation of our state-of- the-art test centre's innovation tradition, which our company's founding father Sven Wingquist established 110 years ago with the invention of the double-row self-aligning ball bearing: a product that remains indispensable in many industrial applications to this day. Of course, we have continually developed and innovated bearing technology since those days, but there is still further optimisation potential. It is exactly this potential that we want to tap into for the benefit of our customers, and that is why we need the new test stands.

After 110 years, the technology in this field has presumably reached a high level of maturity. What further findings do you expect to gain with the new test stands?

This is, of course, a justified question. But to understand the full implications, we must first consider the following: In the course of our company's long history, we have acquired an enormous know-how in development, design and practical applications. By now, this knowledge has been distilled into highly complex simulation programs, which we use to calculate the best possible bearing design for various applications with a fairly high level of accuracy. Simulation also allows us to accurately predict the lifespan of any bearing in any specific scenario. But bearings with unusually large dimensions continue to hold a few "secrets", if you like. In practice, unexpected problems still occur with bearing that have been meticulously calculated and were even designed to include reserves of safety. I should stress that this is a universal issue in designing large bearings. Put another way, in real life there are phenomena that occur in LSBs that are not yet sufficiently taken into account by the cause-effect algorithms of the currently available simulation models. These phenomena are one aspect that we want to investigate with our new test stands. We are conducting fundamental research here, even if bearings of this size and of various makes have been around for a while.

And how exactly will SKF conduct this research in the Sven Wingquist Test Center?

The LSBs that will be tested on our new test stand will mostly be used in wind energy installations. The stand is the first of its kind that is capable of testing a complete bearing unit, including the customer's own components, whereas previously it was only possible to test single bearings under particularly relevant conditions. It has been sized for bearing designs that we expect to see, for example, in future turbines with an output of 10 MW and more. With a kind of "adapter", the stand can hold bearings with an outer diameter of up to six metres.

It can also apply forces in all directions to these huge bearings that, in combination, are several times higher than those of the previously most powerful test stands. The new test stand is also capable of much higher test speeds than were previously possible. In short, it allows all conceivable loads that act upon this kind of bearing in the space of 20 years to be applied much more realistically than is possible with any current simulation program – and that within just a few weeks or months.

"Thanks to the findings of our new test centre, users of future LSB generations will be able to minimise overall lifecycle costs, thereby boosting their competitiveness."

Martin Johannsmann, CEO of SKF GmbH

And what are the special characteristics of the second test stand?

Compared to the larger stand, the smaller addition to our test centre may look less impressive, but appearances can lie: It is capable of running large-size bearings for applications such as ships, mining, the paper industry, the cement and the steel sector to their absolute load limits. It does this by applying forces of at least six meganewtons. To bring this into perspective: That's about as much as a single rocket engine of the Saturn V moon rocket produces. And it does this at rotational speeds of up to 200 r.p.m. It can also be used to test bearings under poor lubrication conditions. By analysing the resulting operating states, we will be able to better understand the tribological interactions between various lubrication conditions, bearing designs and materials under highly dynamic loads.

That sounds like a lot of effort. How do your customers benefit from all this?

First of all I should point out that it has environmental benefits. The findings from our tests will, of course, be used in the development and design of future generations of LSBs. From the environmental point of view, this means that we will be able to use the test results to design future LSBs such that their production requires fewer resources despite their higher robustness and durability. In addition, the new test stands allow us to run load tests on LSB prototypes more energy-efficiently; not only because of the short test durations but also because both test stands have been equipped with an energy recovery system. This is also why we have been awarded funding of about 1.9 million euros from the Bavarian Ministry of Economic Affairs and Media, Energy and Technology for our larger "stress tester" and of about 1.6 million euros for the test stand for other heavy industry applications through the Environment innovation Programme of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.

OK, understood. And the benefit for your customers?

To continue with the wind energy example: The LSBs used in wind turbines should ideally last for 20 years or more, so that the operator's investment in the plant pays off. These bearings, then, are a key element in maximising profitability for the operator. In other words: less maintenance equals lower running costs equals high return on investment. The same formula can, of course, be applied to other branches of industry. The test centre's findings will help us optimise the next generation of LSBs for different sectors to maximise their durability and minimise their weight and friction in each application scenario. All in all, customers' installations will become more efficient, regardless of their industry segment, allowing users of future LSB generations to minimise their overall life cycle costs and thereby boost their competitiveness.

Why has SKF chosen to build its new test centre in Germany? After all, your company also produces similar bearings abroad ...

That's true, but there were several good reasons for choosing Germany: For one thing, we have been building LSBs for the wind industry in Schweinfurt since 1990. This means that we already have the required "XXL infrastructure" here, for example the production technology, the on-site materials and large bearing transport facilities, the packaging and dispatch logistics, and so on. Other technical facilities, such as those required for overhauling used LSBs, and the metallurgical laboratory with the capabilities of meeting the special requirements of LSB engineering are also based here. All this is the result of the 120 million Euros that we had already invested in a state-of- the-art LSB production plant in Schweinfurt up until 2009.

Production is one aspect; and where does the engineering take place?

Also mainly here in Schweinfurt. The expertise gathered here plays a major role within the Group when it comes to choosing a location: Key functions such as product development and design, customer advice and application engineering for many LSB types and customers are already located here. Of course, we also foster international cooperations with developers and engineers, for example in Sweden, where the responsibility for the self-aligning roller bearings that we have already mentioned lies. You can look on the test centre as the "last piece of the puzzle" for Schweinfurt, which now completes our strategy of bundling our customer-oriented LSB expertise at this site: We now have everything here that is needed for producing LSBs. If you like, SKF has created a kind of "LSB metropolis" in this part of Germany that is unrivalled anywhere on earth.

You have mentioned that the two new test stands have been supported with German public funds. Was this a further argument in favour of the Schweinfurt site?

The new LSB test centre completes the engineering and production capabilities that SKF has concentrated at its Schweinfurt site. The findings from the new test centre will also be used to optimise the large self-aligning roller bearings (right picture) produced in Göteborg, Sweden.

Absolutely. These funds were a major factor in favour of this site. The Bavarian and federal governments have supported us with a total of about 3.5 million Euros and I am very grateful to both of these institutions that they have enabled SKF to realise this pioneering achievement in Germany. We welcome Germany's political aim of promoting energy-efficient future technologies in-country that have a global sales market.

Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit

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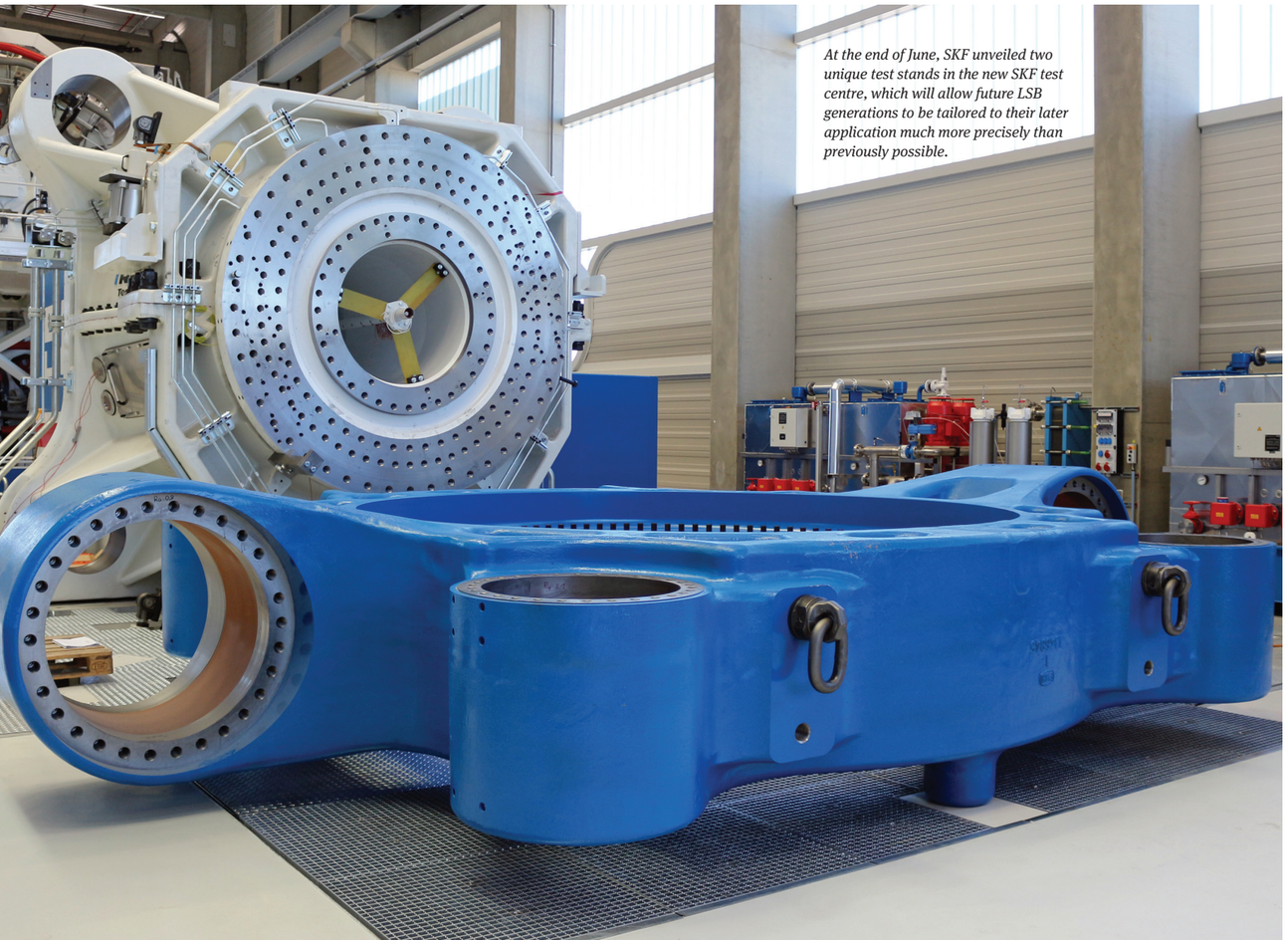
Construction of the larger of the two test stands was supported by the Bavarian Ministry of Economic Affairs and Media, Energy and Technology with funding of about 1.9 million euros, while the test stand for other heavy industry applications received about 1.6 million euros through the Environment innovation Programme of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.



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