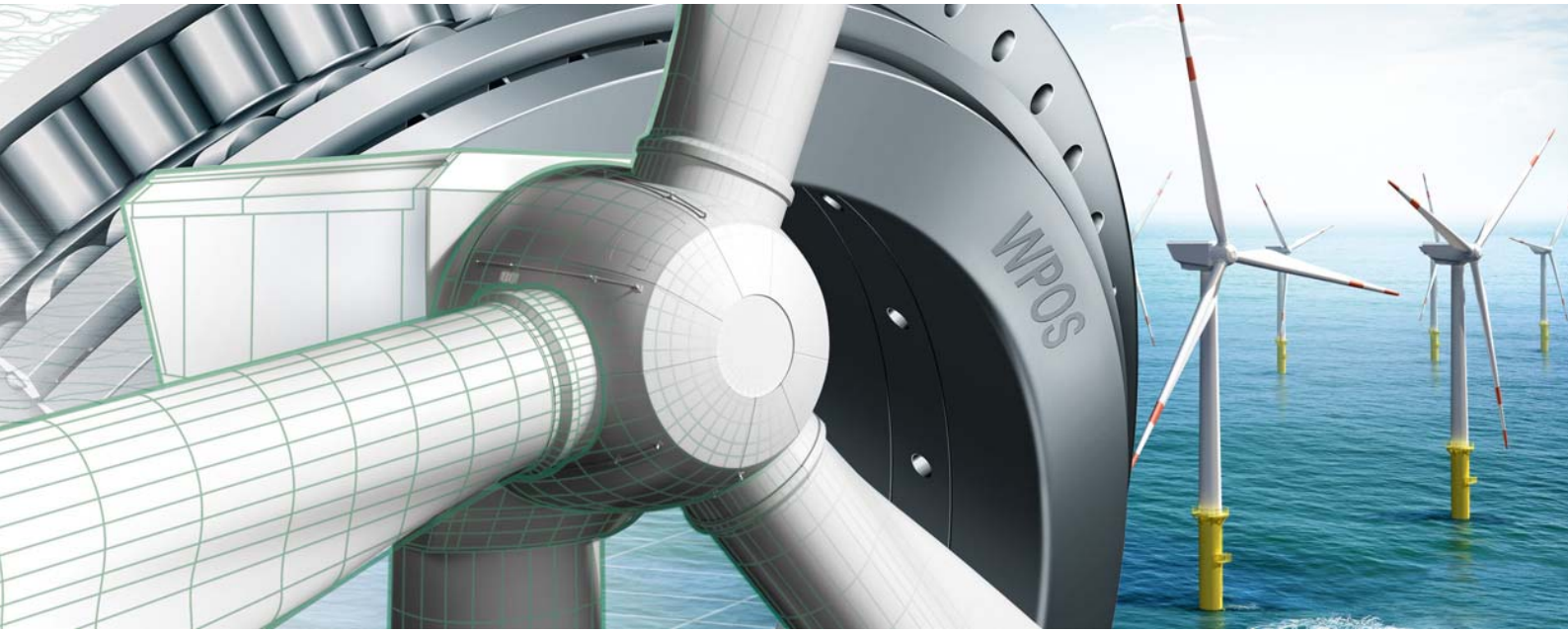
SCHAEFFLER



EWEA 2015

Press Kit

LuK INA FAG

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Press release

Schaeffler at EWEA 2015 in Hall P02-3

Reliability – Made by Schaeffler: higher reliability for wind turbines

PARIS/SCHWEINFURT, *17 November, 2015.* Cost-effective wind turbines need reliable components. As one of the world's leading rolling bearing manufacturers and development partners to the wind turbine industry, Schaeffler has been producing bearings for wind turbines for over 30 years. With its extensive expertise, Schaeffler offers the right bearing solution for every wind turbine and a comprehensive concept which will further increase the reliability of wind turbines.

Rolling bearings play a key role in wind turbines. Both in on-shore and off-shore wind power, the demands for reliability in the components have increased greatly in recent years. The growth of the systems to multi-megawatt power plants leads to higher forces and torques, which puts stronger and stronger demands on the components. At the same time, downtimes and maintenance work on off-shore systems produce ever higher costs.

Schaeffler Wind Power Standard (WPOS)

With the wind power standard (WPOS), Schaeffler meets the increasing demands for reliability in wind power systems and components. This highest standard for products and processes means Schaeffler is ensuring optimum quality and reliability in wind power and is offering the same high standards of quality as it is already successfully offering in the automotive, aviation, and aerospace industries.

In order to ensure the high standards, Schaeffler relies on coordinated and transparent processes, defined change management, strict quality monitoring, and extensive documentation across the entire process chain in close cooperation with customers and suppliers. Targeted supplier development ensures the highest quality level right from the start, for example in the quality of the steel used. In this way, Schaeffler develops the optimum solution for every bearing position together with the customer. The FAG and INA products in accordance with the Schaeffler Wind Power Standard receive the WPOS label.

"Reliability – Made by Schaeffler" means even more. Along with the Wind Power Standard, Schaeffler offers more measures to increase the reliability of wind turbines.

Optimum design with state-of-the-art calculation and simulation programs

Along with many years of experience and extensive system expertise, the specialists at Schaeffler ensure the optimum design of wind power bearings with especially state-of-the-art calculation and simulation programs. Schaeffler takes the entire system into account, from individual rolling bearings and their components to the adjacent structures and the complete drive train, which is depicted and optimized with multi-body simulation programs developed in-house.

Realistic tests on Schaeffler ASTRAIOS

The calculations are enhanced and validated on powerful test rigs. Bearings up to 3.5 meters in outside diameter can be tested on one of the most state-of-the-art and biggest large-size bearing test rigs in the world. ASTRAIOS simulates the real loads and torques which occur in a wind turbine. Thus, Schaeffler contributes decisively to a faster and more reliable design of wind turbines and increases their cost-effectiveness and safety.

Asymmetric FAG spherical roller bearings for increased axial load carrying capacity

Asymmetric FAG spherical roller bearings feature a larger contact angle on the bearing row subject to axial loads and a smaller contact angle on the bearing row subject primarily to radial loads. The asymmetric contact angles reduce sliding movements in the drive train through an even higher axial rigidity of the bearing. Triondur C, a lamellar, amorphous hydrocarbon coating, additionally provides the bearings with reduced friction and high wear protection under mixed friction conditions.

Innovative solutions against white etching cracks (WEC)

Schaeffler has extensive testing options to create WEC, investigate their causes, and develop solution concepts for reducing the danger of WEC. These could, for example, be an optimized design of the bearing, the selection of a WEC-resistant material, or even an improved lubrication concept. The product solutions recommended by Schaeffler are through-hardened, black oxide coated rolling bearings. Along with other advantages, the Durotect B coating offers increased protection against WEC, which is statistically proven through extensive field experience.

High system availability thanks to condition monitoring

Schaeffler offers comprehensive services and products for condition monitoring, for example remote monitoring and diagnosis, offline measurements, endoscopy, thermography, and torque measurement. In this way, the costs for maintenance measures can be reduced and the availability of wind turbines increased.

* * *

The Schaeffler Group is a leading global integrated automotive and industrial supplier. The company stands for the highest quality, outstanding technology, and strong innovative ability. The Schaeffler Group makes a decisive contribution to "Mobility for tomorrow" with high-precision components and systems in engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The technology company generated sales of approximately EUR 12.1 billion in 2014. With around 84,000 employees worldwide, Schaeffler is one of Europe's largest companies in family ownership. It has a worldwide network of manufacturing locations, research and development facilities and sales companies in approximately 170 locations in 50 countries.
The Industrial division supplies components and systems for around 60 industrial sectors via its worldwide organization with market proximity and its application support service. The range includes miniature bearings only a few millimeters wide through to large-size bearings with an outside diameter of several meters.

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Images: Schaeffler



With the Schaeffler Wind Power Standard (WPOS), the highest quality standard for products and processes, Schaeffler ensures optimum quality and reliability worldwide and is offering the same high standards of quality as it is already successfully offering in the automotive, aviation and aerospace industries.



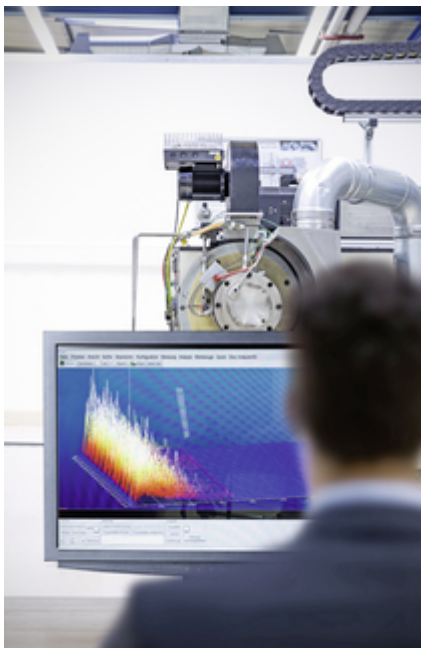
State-of-the-art calculation and simulation programs ensure the optimum design of wind turbine bearings



ASTRAIOS, one of the most state-of-the-art, biggest, and most powerful large-size bearing test rigs in the world, simulates the real loads and torques which occur in a wind turbine.



The spherical roller bearing is the conventional bearing type for the main rotor shaft in wind turbines. Thanks to an asymmetric spherical roller bearing design, the axial load carrying capacity has been significantly increased.



Schaeffler has extensive testing options to create WEC, investigate their causes, and develop solution concepts for reducing the danger of WEC.



With online condition monitoring, the costs for maintenance can be reduced and the availability of wind turbines increased.



The mobile FAG WiPro$_M$ device from Schaeffler enables vibration monitoring of the entire wind turbine drive train and provides high quality, meaningful data at an economic price.

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Press release

Schaeffler at EWEA 2015 in Hall P02-3

Effectively avoid early failures due to white etching cracks – WEC-resistant rolling bearings for long-lived wind turbines

PARIS/SCHWEINFURT, *17 November, 2015.* It is an expensive scenario for the operators of off-shore wind parks: A gearbox bearing in a turbine at sea fails early. Now service technicians must go out to the facility in a special ship, land safely, and exchange the faulty gearbox for a new one using a crane. The resulting costs are significant, usually in the range of over one million euros. When a gearbox bearing fails early, despite the current designed operating life of 20 to 25 years, it is in many cases the result of white etching cracks (WEC). These are changes in the material structure which form under the bearing raceway. Over time and under the influence of external loads, micro cracks spread to the surface and appear in the typical damage pattern as cracks or flaking, primarily in the raceway of the bearing inner ring. If the damage continues, it can lead to a tearing or fracture of the ring and thus to an early failure of the entire gearbox. That is why Schaeffler develops simulation processes to research the causes of WEC and to use that knowledge to significantly increase the resistance of the bearing.

Reproducing WEC damage on the test stand

The causes for the formation of WEC are not fully understood. In order to research them further, it is important to develop effective test procedures. Schaeffler is the first bearing manufacturer to reproduce the feared WEC damage on a test stand. That is why the Schaeffler operates a wide range of WEC test stands in which the engineers apply additional loads through friction, dynamics, and electricity which could cause the occurrence of WEC damage. As a result, they are able to validate the simulation processes, analyze the causes, and develop suitable countermeasures. These could, for example, be an optimized bearing design, the selection of a WEC-resistant material, or even an improved lubrication concept.

Hydrogen hypothesis the most plausible explanation

Previous studies indicate that the so-called hydrogen hypothesis is the most plausible explanation for the occurrence of WEC. It describes the following chain of events: Molecular hydrogen is found in the bearing environment, for example in the lubricating oil. Initially, this cannot diffuse into the steel of the bearing. However, electric fields or chemical processes can split the hydrogen molecules into individual atoms. Then the hydrogen can enter the steel and, among other things, accumulate

in non-metallic inclusions. This lowers the yield point of the material, i.e. the maximum load at which a material permanently deforms. When external forces then exceed the yield point, changes occur in the structure of the material. These appear white in the etched finish, which is why the damage pattern is called white etching cracks. Further external loads cause stresses between the areas with a changed structure and then cracks, which spread to the surface and can lead to the failure of the bearing.

Reduce additional stress

Fundamentally, there are two solution approaches. One consists of reducing the additional loads. For example, the friction can be reduced using a precisely balanced volume and viscosity of oil, the dynamic loads on the bearing caused by vibrations and torsional vibrations can be reduced, or the electric fields, which have an influence on the bearing, can be shielded. This requires the cooperation of all partners who manufacture the components for the wind turbine drive train.

Coat the bearings

The other solution approach consists of increasing the WEC resistance of the bearing. Based on the hydrogen hypothesis, that means using a suitable coating to prevent the hydrogen from entering the material of the bearing. The technology recommended by Schaeffler and statistically proven to permanently prevent WEC damage consists of treating the bearing with the Durotect B coating system. This is a further development of conventional black oxide coatings with increased performance. The coating developed by Schaeffler not only increases the protection against WEC, it also reduces the risk of slippage damage, improves the running-in behavior, and offers protection against corrosion. WEC occurred in fewer than 100 bearings of the roughly 550,000 through-hardened bearings coated with Durotect B which were produced and delivered by Schaeffler in the last ten years for use in wind turbines. That corresponds to a failure rate of less than 0.02%.

Carbonitrided bearings for higher load ratings

If a higher load rating with simultaneous high WEC robustness is required, Schaeffler offers carbonitrided rolling bearings made from the material Mancrodur coated with Durotect B. In carbonitriding, the bearings are subjected to a special heat treatment in which the component surface is enriched with carbon and nitrogen. The bearings thus receive a higher surface hardness and wear-resistance.

Special steels prevent WEC damage

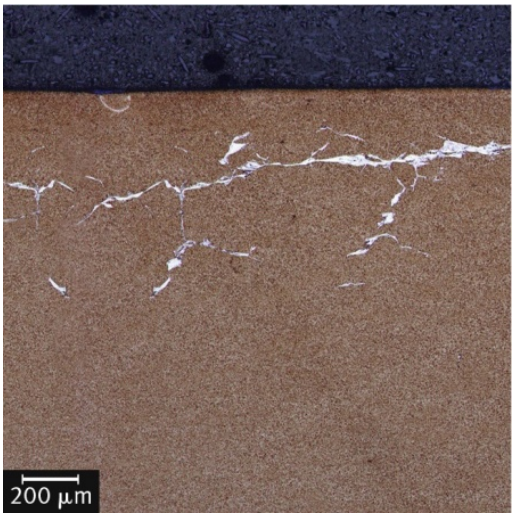
Thanks to the use of the special steel Cronidur 30, which has a high chrome content, the occurrence of WEC can be completely excluded according to the current state of knowledge. To date, no case of WEC is known in bearings made from Cronidur 30, which has been on the market in this application for five years. The use of this material also permits a load rating increased by up to 70 percent and thus a longer operating life and better corrosion protection.

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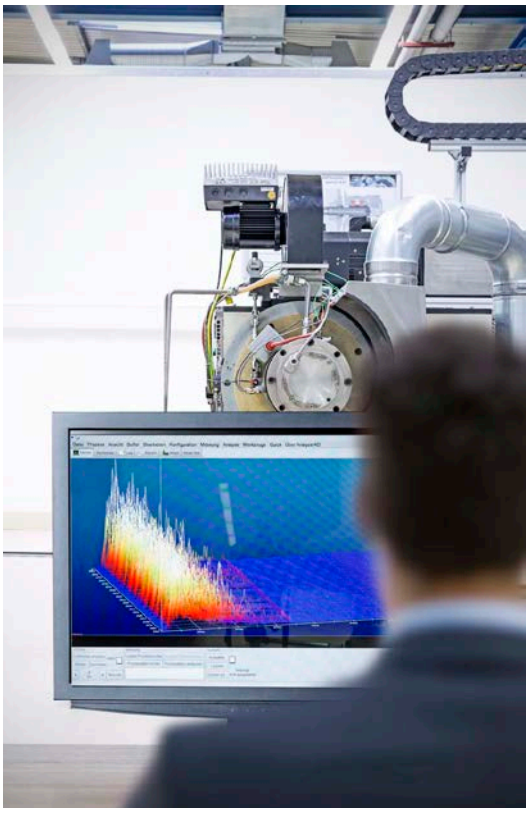
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The Industrial division supplies components and systems for around 60 industrial sectors via its worldwide organization with market proximity and its application support service. The range includes miniature bearings only a few millimeters wide through to large-size bearings with an outside diameter of several meters.

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Images: Schaeffler



White etching cracks under the bearing raceway surface



Schaeffler is the first bearing manufacturer to have simulated the feared WEC damage on a FE8 test stand on a reproducible basis.



Schaeffler’s Surface Technology Competence Center develops new processes all the way to the start of volume production. The coating of volume-production parts on an industrial scale is another focus.



Schaeffler offers all bearing solutions for use in wind turbine gearboxes with a black oxide coating. The Durotect B coating system reduces the risk of slippage damage, improves the running-in behavior, and offers protection against corrosion and white etching cracks (WEC).



FAG high-capacity cylindrical roller bearings with Durotect B coated rolling elements and inner rings for planetary gears. In this bearing, the raceway is integrated into the planetary gear.



FAG spherical roller bearing with Durotect B (here: asymmetric roller bearing)

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Press release

Schaeffler at EWEA 2015 in Hall P02-3

Faster to reliable rotor bearings –

Schaeffler combines simulation with large-size bearing test rig

PARIS/SCHWEINFURT, *17 November, 2015.* The global expansion of wind energy is not slowing down. Stronger systems, more and more versatile system concepts, and tremendously short innovation cycles also demand new solutions for rotor bearings. In order to develop those bearings with the necessary robustness and reliability in the shortest possible time, Schaeffler combines simulation and calculation methods with measurements obtained using the large-size bearing test rig Astraios, which went into operation four years ago. “Over the past few years, we have validated the results from the simulation and calculation of wind turbine bearings on the test rig,” reports Andreas Mangold, Manager of Strategic Engineering at Schaeffler. “As a result, we have been able to significantly reduce the risk of possible failures first occurring in the field.”

Data from several years of test rig operation

Schaeffler tests rotor bearings for wind turbines of the multi-megawatt class on the Astraios large-size bearing test rig. These large-size bearings have an outside diameter of up to 3.5 meters. As one of the largest and most state-of-the-art test rigs in the world, Astraios is able to apply the changing load conditions which are created by the wind, weight, and dynamics from real operation to the test bearings – and in a variable speed range. In comprehensive test runs with a variety of concepts for rotor bearings, engineers have obtained extensive data on the behavior of large-size bearings, which sometimes differs significantly from that of small rolling bearings.

Measurements for optimizing the simulation models

The data are used in a variety of ways by Schaeffler. “On the one hand, we are able to ensure with the measurements that the newly developed bearing solutions leave the production hall are robust and reliable,” explains Mangold. “On the other hand, we validate and optimize the simulation models with the data. We test in practice and use the results for the continual further development of our simulation tools.” Although the calculations for the operating life of smaller rolling bearings can be applied to large-size bearings, this does not apply for other parameters, such as kinetics or friction torque. Therefore, simulations in these areas must be validated based on test results. The measurements obtained with Astraios are used by the developers of the simulation models to adjust and refine their calculations for the

respective bearing types. Based on previous knowledge gathered in this way, engineers at Schaeffler are able to develop new bearing concepts for wind turbines in a very short time and design them optimally for any requirements. Using the verified simulation models, they are also able to validate their results from the currently tested diameter of a large-size bearing to even larger bearings and whole platforms.

Simulation of complete wind turbines

With the new process, Schaeffler is also able to develop integrated solutions for new wind turbine requirements, for example for the use of completely new bearing types. For an application-oriented test, it is important first to define the correct parameters so that the loads and deformations agree with the operating situation in the field. Using the Simpla software for multi-body simulation developed by Schaeffler, the engineers are able to map a complete wind turbine and examine it from the wind field down to the rolling contacts. As a result, they are able to discover the correct parameters for validation on the test rig. The measurements are then incorporated in the simulation models in a multistep process which then calculates the loads and kinematic behavior of a large-size bearing. If, for example, deformations are found, their effects on the function of the rolling bearing can be calculated and validated on the test rig. One practical result from this could be the adjustment in the design or coating of a bearing, but also, as an example, recommendations for lubrication for various operating conditions. This could be a great advantage particularly in off-shore wind turbines, because maintenance work at sea is usually very expensive and complicated.

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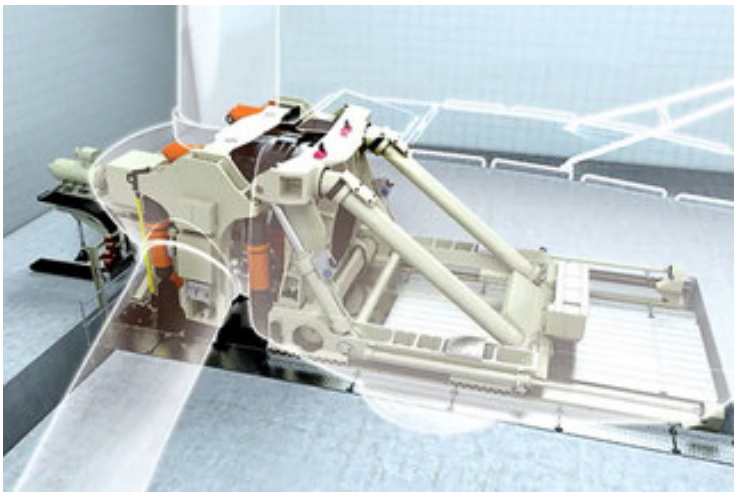
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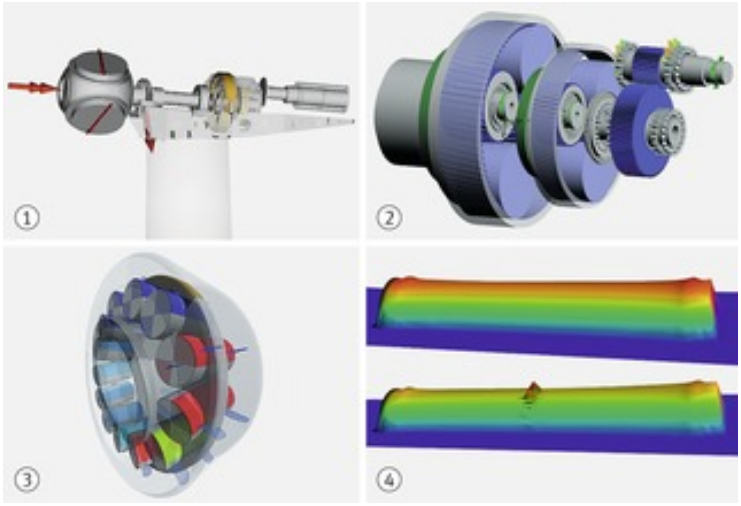
Images: Schaeffler



With Astraios, one of the most state-of-the-art and biggest large-size bearing test rigs in the world, Schaeffler contributes decisively to a faster and more reliable design of wind turbines and increases their cost-effectiveness and safety.



With its realistic force and torque simulation, Astraios has been providing valuable results since 2011, which are used for the new development of bearing solutions and for the optimization of the simulation and calculation models.



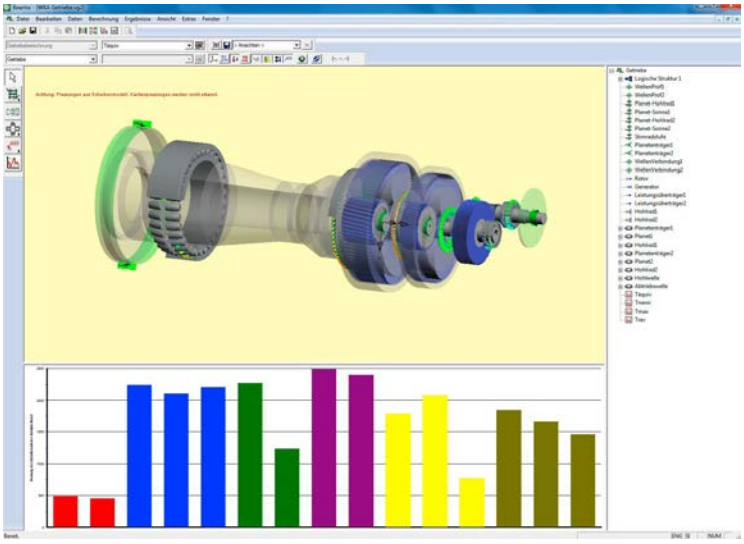
From the whole system down to the rolling contacts: The Schaeffler calculation chain offers comprehensive analyses for optimum bearing design:

1 SIMPLA: System simulation

2 BEARINX: Bearing design with an understanding of systems

3 CABA3D: Rolling bearing simulation

4 TELOS: Rolling contact simulation



Thanks to Bearinx, Schaeffler is able to make conclusions about bearing behavior in complex transmission systems under specific operating conditions when designing critical bearing positions (here: drive train of a wind turbine).

SCHAEFFLER

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Press release

Schaeffler at EWEA 2015 in Hall P02-3

Enhanced performance in wind turbine gearboxes with bearing and system expertise

PARIS/SCHWEINFURT, *17 November, 2015.* Highly dynamic forces with extreme peaks and minimum loads, sudden load changes, and strongly varying operating temperatures are the challenges faced by bearing technology in wind turbine gearboxes. With the most up-to-date calculation and simulation programs, Schaeffler offers extensive system expertise in the design of gearboxes and thus bearings with high static safety and safer dynamic design. One current example is the high-capacity bearing, which allows high load ratings with low friction thanks to a newly developed cage geometry.

High-capacity in the gearbox: higher load rating with less friction

Planetary gear bearing supports are extremely challenging bearing positions because of the high radial loads that occur. Only a limited amount of space is available for this bearing support, and the planetary gears, which have comparably thin walls, tend to distort leading to rotation of the bearing outer ring in the planetary gear.

Due to the particularly streamlined design of the cage, the high-capacity cylindrical roller bearing from the FAG brand combines the advantages of full complement bearings with those of cage bearings. Thus, there is room for at least one additional rolling element in the bearing. That increases the load rating. Due to the bearing cage, the high-capacity bearing has significantly less friction than full complement types.

When fitted as a direct bearing support, the FAG high-capacity cylindrical roller bearing in X-life quality allows significantly improved use of the design envelope compared to a comparable standard bearing support. With a direct bearing support, there is no outer ring and the raceway is integrated directly into the planetary gear. Thus the risk of the outer ring moving can also be avoided.

Cylindrical roller bearing with MPAX cage

Cylindrical roller bearings with a single-piece MPAX brass cage are often used in the output or intermediate shaft of a wind turbine gearbox. The bearings in these positions must support very high speeds compared to high-capacity cylindrical roller bearings, which are exposed to high loads and load ratings in the planetary gear stage at comparably low to medium speeds.

The MPAX brass cage is a development of the FAG MPA and MP1 cage types and is gradually replacing them. It is more resistant to impact loads and vibrations than its predecessors and therefore is well suited to heavy load applications. The advantages of the MPAX cage are its significantly higher radial rigidity, its higher load carrying capacity for radial centrifugal forces, and its lower stress maximum on the pocket corner radii.

Cylindrical roller bearing with optimized rib contact

The use of torus-crowned cylindrical rollers with optimized contact geometry between roller end face and rib surface enables a significant increase in the axial load capacity of the bearing. A more stable build-up of lubricating film is responsible for this – the end face and rib are separated by the lubricant. The rollers then glide on the lubricant under axial load. The risk of mixed friction is thus significantly reduced. This optimization reliably prevents wear on ribs and roller end faces. The cylindrical roller bearings with optimized rib contact are able to accept higher axial loads. In these cases, the frictional torque and the bearing temperature are greatly reduced in operation. This increases the efficiency, and at the same time fewer demands are placed on the lubricant.

Bearings in X-life quality – optionally with additional improvements in performance

Schaeffler is steadily expanding its range of large-size bearings in X-life quality. In the future, single or multi-row tapered roller bearings with an outside diameter greater than 635 mm and cylindrical roller bearings with an outside diameter of 320 mm to 1,600 mm will be offered as X-life products when requested by customers. With their improved product characteristics and an approximately 20 percent higher load rating, they allow performance to be improved, the design envelope to be optimized, and weight to be reduced in machines and systems.

The operating lives of the X-life cylindrical and tapered roller bearings can be further increased with carbonitriding. In this special heat treatment, the surface layer of the bearing rings is enriched with carbon and nitrogen. Particularly under extreme operating conditions such as contamination and particle overrolling, mixed friction, and borderline lubrication conditions, carbonitriding results in a higher surface hardness and thus an improved wear resistance, which leads to a significantly higher system robustness, depending on the application.

Protection against white etching cracks with Durotect B

Schaeffler offers all bearing solutions for use in wind turbine gearboxes with a black oxide coating. The Durotect B layer system reduces the risk of slippage damage, improves the running-in behavior, and offers protection against corrosion and white etching cracks (WEC). As the result of a consistent development of conventional black oxide coatings, Durotect B has an increased performance potential. Thus, WEC occurred in fewer than 100 bearings of the 550,000 through-hardened bearings coated with Durotect B which were produced and delivered by Schaeffler in the last ten years for use in wind turbines. That corresponds to a failure rate of less than 0.02%.

* * *

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Images: Schaeffler



Schaeffler offers extensive system expertise in the design of gearboxes and thus bearings with higher static safety and safer dynamic design.





Due to the particularly streamlined design of the cage, the FAG high-capacity cylindrical roller bearing combines the advantages of full complement bearings with those of cage bearings. As a direct bearing, it allows an optimum utilization of the installation space.



The single-piece MPAX brass cage for cylindrical roller bearings is more resistant to impact loads and vibrations than its predecessors and therefore is well suited to heavy load applications.

X-life is the quality seal for Schaeffler products which are characterized by a significantly longer operating life at the same load and unchanged installation space, based on higher dynamic load ratings.

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Press release

Schaeffler at EWEA 2015 (Hall P02-3)

Bearing solutions for main rotor shafts: Asymmetric spherical roller bearings for increased axial load carrying capacity

PARIS/SCHWEINFURT, *17 November, 2015.* FAG spherical roller bearings are suitable for extremely high loads and can compensate for alignment errors and shaft deflections. Schaeffler has consistently developed this proven bearing solution for main rotor shaft bearing supports according to customer requirements in order to increase robustness and service life even further. Along with an optimized internal geometry, the axial load carrying capacity has also been significantly increased thanks to an asymmetric bearing design. The asymmetric spherical roller bearing has a larger contact angle on the bearing row subject to axial loads and a smaller contact angle on the bearing row subject primarily to radial loads. The asymmetric contact angles reduce sliding movements in the drive train through even higher axial rigidity of the bearing. Triondur C, a lamellar, amorphous hydrocarbon coating, additionally provides the bearings with reduced friction and high wear protection under mixed friction conditions.

Optimized internal geometry for greater robustness

The rolling bearings for the bearing support of the rotor shaft are subject to highly-dynamic loads and operating conditions, because all the forces created by the wind affect them directly. Schaeffler develops solutions for all versions of modern wind turbines, from 220 kW to the multi-megawatt class.

Both the conventional FAG spherical roller bearings and the asymmetric roller bearings are characterized by an adjusted internal clearance, close osculation, contoured rolling elements, and a fixed central rib. In FAG spherical roller bearings, the optimized internal geometry provides an overall reduction of contact pressure and wear characteristics, increasing the robustness of the bearing.

It is possible to use an inner ring adjusted to suit the shaft. This simplifies the professional bearing replacement and helps to reduce costs. This way, the rotor shaft can be reused after an overhaul. An additional material application is not necessary.

Protection against white etching cracks with Durotect B

The Durotect B layer system, used in the conventional bearing type, reduces the risk of slippage damage, improves the running-in behavior, and offers protection against corrosion and white etching cracks (WEC). As the result of a consistent development of conventional black oxide coatings, Durotect B has an increased

performance potential. Thus, WEC occurred in fewer than 100 bearings of the 550,000 through-hardened bearings coated with Durotect B which were produced and delivered by Schaeffler in the last ten years for use in wind turbines. That corresponds to a failure rate of less than 0.02%.

Greater Reliability with the Schaeffler Wind Power Standard

For the INA and FAG brand wind power bearings, Schaeffler has introduced a wind power standard (WPOS), which makes allowances for the increasing reliability requirements for wind power systems and components. This new standard for products and processes means Schaeffler is ensuring outstanding quality and reliability in wind power and is offering the same high standards of quality as it is already successfully offering in the automotive, aviation, and aerospace industries. The appropriate products will be labeled with WPOS.

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The Schaeffler Group is a leading global integrated automotive and industrial supplier. The company stands for the highest quality, outstanding technology, and strong innovative ability. The Schaeffler Group makes a decisive contribution to "Mobility for tomorrow" with high-precision components and systems in engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The technology company generated sales of approximately EUR 12.1 billion in 2014. With around 84,000 employees worldwide, Schaeffler is one of Europe's largest companies in family ownership. It has a worldwide network of manufacturing locations, research and development facilities and sales companies in approximately 170 locations in 50 countries.
The Industrial division supplies components and systems for around 60 industrial sectors via its worldwide organization with market proximity and its application support service. The range includes miniature bearings only a few millimeters wide through to large-size bearings with an outside diameter of several meters.

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Images: Schaeffler



The spherical roller bearing is the conventional bearing type for the main rotor shaft in wind turbines. Thanks to an asymmetric spherical roller bearing design, the axial load carrying capacity has been significantly increased.



The asymmetric spherical roller bearing has a larger contact angle on the bearing row subject to axial loads and a smaller contact angle on the bearing row subject only to radial loads.



The black oxide coating with Durotect B, used in the conventional bearing type, reduces the risk of slippage damage, improves the running-in behavior, and offers protection against corrosion and white etching cracks.

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Press release

Schaeffler at EWEA 2015 in Hall P02-3

Mobile monitoring concept for wind turbines – economic and safe

PARIS/SCHWEINFURT, *November 17, 2015.* The FAG WiPro$_M$ is an innovative mobile device for vibration monitoring of the entire drive train of wind turbines. The FAG WiPro$_M$ provides high-quality, meaningful data at an economical price. A patented GPS function automatically recognizes the location, making the assignment of the wind turbine fast and safe. Installation requires no special expertise and can be done quickly. Thanks to the design of the device, secure communication with the monitoring center is provided, even under unfavorable conditions. Data cannot be lost thanks to local temporary storage. The mobile measuring device directly displays the current status of the connection as well as the operating status to safeguard the installation.

Mobile Use for high data quality

Based on the FAG WiPro$_S$ online monitoring system for permanent monitoring, the FAG WiPro$_M$ was developed for mobile use. It monitors the entire drive train of wind turbines – consisting of the main bearing, drive unit, clutch, and generator. Especially in larger wind farms with plenty of systems, the high acquisition and installation costs of a permanent vibration monitoring system often scares off many operators. Nevertheless, they need an overview of the status of their systems. Compared to standard handheld devices, the FAG WiPro$_M$ provides significantly more reliable and more comprehensive data. With its robust design, the device was developed especially for use in the wind power sector. Its easy installation, which does not require any specialist assistance, and the option of monitoring several systems with one device in a relatively short time show how cost effective it is.

With the FAG WiPro$_M$, Schaeffler offers a new, efficient solution which is ideally suited for the surveying of wind farms, inspecting at the end of a warranty, or observing damaged turbines. With the associated data analysis and reporting, customers promptly receive vital information about the status of their systems. This has also been confirmed by successful use in the USA, where some 2,000 systems have already been measured using this solution.

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Schaeffler Industrial Aftermarket
The Schaeffler Industrial Aftermarket (IAM) is responsible for the replacement parts and service business with end customers and distributors in all major industrial sectors. With innovative solutions, products and services relating to rolling and plain bearings as well as by consistently considering Total Cost of Ownership (TCO), the IAM reduces maintenance and operating costs, increases plant availability and thus the business success of the customers. The Schaeffler Group with around 84,000 employees at 170 locations and sales of approximately 12.1 billion euros (FY 2014) is a leading global integrated automotive and industrial supplier.

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Pictures: Schaeffler





The portable FAG WiPro$_M$ provides high-quality data about the condition of wind turbines.



The portable FAG WiPro$_M$ enables economic use even in large wind farms.

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