SCHAEFFLER

AT THE BEARING WORLD CONFERENCE

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Schaeffler is one of the main sponsors and supporters of the Bearing World conference, since they attach a lot of importance and value for a meeting of international experts in order to exchange ideas.

We tried to reveal why Schaeffler, one of the global bearing suppliers and leading company in bearing research and technology is sponsoring the Bearing World Conference during an interview with Dr. Arbogast Grunau, Corporate R&D Competence and Services at Schaeffler AG, Germany.

Why is Schaeffler supporting the Bearing World conference?

As the bearing business is a global and international business, a meeting of international experts should be supported by one of the leading bearing manufacturers like Schaeffler.

What is your role at the company?

Bearings are needed in each of Schaeffler's three divisions: Industrial, Automotive and Automotive Aftermarket. For this reason, bearing development is conducted both centrally and in the divisions. My responsibility is to support this development with specific development expertise and services.

On what R&D activities are you currently working?

We are currently carrying out research in several fields because Schaeffler's strategic goal is "mobility for tomorrow," and bearings are used nearly everywhere motion has to be facilitated. Materials, surface technology and the simulation of system behavior are still research topics. Coating is becoming more and more important, and with our coating know-how we offer our customers various kinds of coating, i.e. to reduce friction or the sensitivity to white etching cracks (WEC). Additionally, the role of bearings in components for Industry 4.0 and electromobility are main points of current research.

Can you tell us more about your presentation topic at the Bearing World?

We have several presentation topics, but let me give you two examples. We will talk about the development of a new asymmetrical spherical roller bearing for wind turbine applications, and give an insight into the complex simulation and design verification work that is necessary for successful product development. Another topic is the prediction of bearing noise. We all know that noise is becoming more and more important, even with the electrification of drivetrains. So it's very important to be able to predict the noise behavior of bearings. This can typically be done with expert simulation tools like very specialized multi-body simulation. But it's also necessary to be able to get an initial feeling for the noise behavior of different bearings in an early stage of product development. For this reason Schaeffler has developed the Schaeffler Noise Index. It allows a quick rating of the noise emitted by a bearing at reference conditions, and is thus a hands-on rating during application engineering. Schaeffler is the first bearing manufacturer to provide noise information for bearings in the catalog.

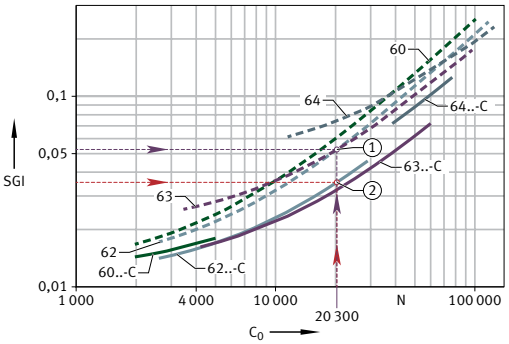


Figure 1: SGI diagram for deep groove ball bearings. GenC bearings have a lower SGI than standard bearings.

What is the impact of Industry 4.0 on bearings and applications?

Bearings determine the performance of an application in a substantial way, and therefore they are ideal for obtaining data for process control and machine monitoring. In this way, Schaeffler's sensorized components and mechatronic products are becoming fundamental "enablers" for digital services and Industry 4.0. So, Schaeffler is offering consistent hardware, software, and IT infrastructure that encompasses all stages of digital added value.

What will be the challenges of drive technology for bearings in the future?

While in the past bearings were rated by static or dynamic load rating, today they are distinguished by the friction momentum. In the future,

bearings will have to perform by load rating, but low friction momentum and noise will be the real performance indicators.

It seems that electric cars require a lot fewer rolling bearings and no plain crankshaft bearings at all. How will this affect the future of the automotive bearing industry?

Named trends are given and inescapable due to technological transformations. This will be a long-term change. Nevertheless, Schaeffler has been dedicating efforts to expand the product portfolio towards the requirements of the electromobility market. Even if the bearing content might shrink, the technological excellence of Schaeffler offers possibilities to extend business.

Is it true that the use of bearings with ceramic balls will increase in electric cars?

The importance of insulation will increase because bearings are usually not made for conducting currents, and parasitic currents may occur more frequently due to the increased use of mechatronic components. Ceramic balls are one of the well-established methods to avoid damage due to electric current in rolling bearings.

In addition to this, insulating of the rings is well established and some other solutions are topics of our research.

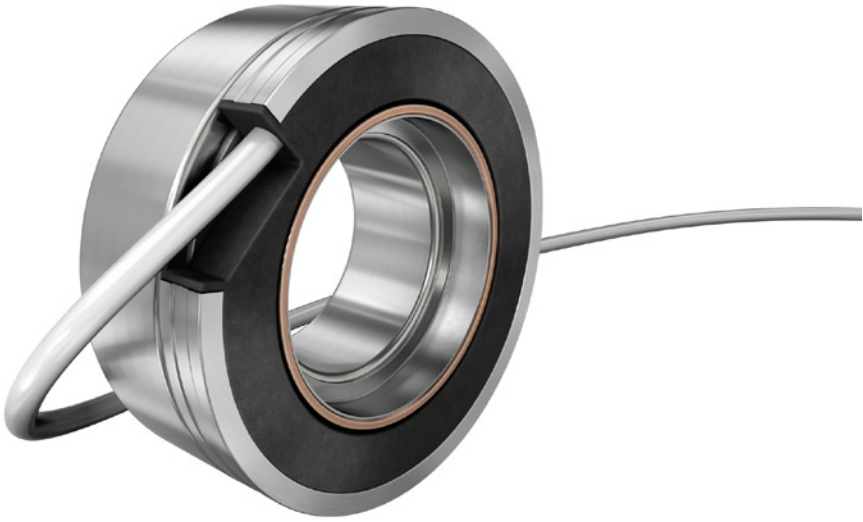
Electric cars include fewer small parts and especially precision ones. Does this mean that manufacturers will use fewer grinding operations and grinding spindles with high speed super-precision bearings?

Indeed, purely electrical cars show a reduced number of named high precision components. Today, motors and components of complex gearboxes in particular lead to high machining efforts, which will be reduced in a long-term view with the transition to e-motors. Concurrently, speeds of motors and transmissions are increasing, and high-speed as well as high precision is partially shifted to these applications.

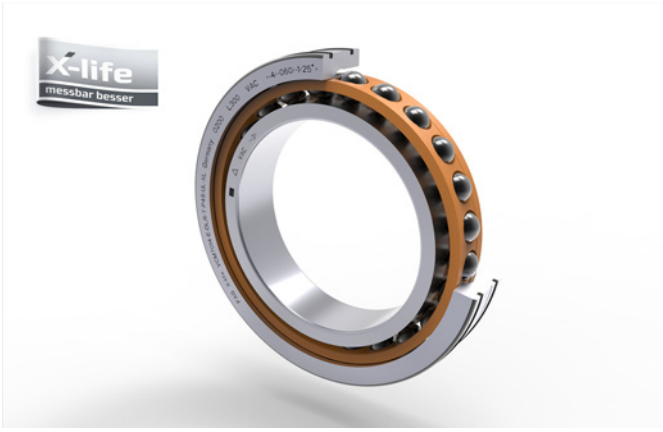
In your opinion, what are the main challenges for the bearing industry in the future?

As bearings are needed nearly everywhere motion occurs, the scope of applications will increase. One of the main challenges will be to handle this wide range of applications in an effective and competitive manner.

In many applications, the bearing is the place where all information such as speed, load, and temperature of the device is available, and therefore the additional purpose of bearings will be to act as an information generator. The bearing of the future is more than just a bearing, it will also become an integrated sensor. Therefore, the importance of bearings will increase in the future with digitalization and Industry 4.0



The FAG VarioSense is a rolling bearing system that is based on standard products and can be configured in a modular fashion using a range of different sensors, which allows virtually every desired bearing position to be equipped with sensors. Schaeffler is thus paving the way towards a future in which even simple assemblies and machines will have access to digitalization and the Internet of Things.



FAG spindle bearing VCM in X-life quality: With Vacrodur, extraordinarily robust spindle bearings can be created, that can make a significant contribution toward reducing unit costs in comparison to existing spindle bearing solutions.

In the Schaeffler cloud, Schaeffler's rolling bearing domain expertise is made usable in the form of digital services. For example, automated rolling bearing diagnosis and remaining useful life calculation can be used to provide precise information on the condition of the bearing and thus of the machine being monitored, which in turn allows specific actions to be recommended.