2018 YEAR FULL OF NEWS

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Dear Employees and Business Partners,

We have a nice season of spring and then summer months in front of us, which is a time full of activities drawing on the energy accumulated in winter months. We enjoy cycling, walk in the nature, and I think that also our work enthusiasm gets better.

Due to the fact that we have the tasks of the ZKL Group, we are using the growing demands for our products, which is composed of general economic growth in the Czech Republic, in Europe and in the world. Currently we register economic growth in the Czech Republic, in our products, which is composed of general economic growth, as Spain, Germany and also France. China and Western European countries such as Italy, Germany and also France. The first months of the second quarter of 2018 shows an improvement that we achieved in the EBIT of all ZKL enterprises and assure you that we will continue to support our business partners for their work and cooperation with the ZKL enterprises and assure you that we want to be your reliable business partner.

Ing. Jiří Prášil, CSc., General Manager of ZKL, a. s.

Recertification of the Quality Management System in ZKL Klášterec nad Ohrí

Our company has the ISO 9001 Quality Management System established since 1999 and the ISO 14001 Environmental Management System since 2014.

In the context of the revision of those international standards, an intensive preparation for recertification took place during the year 2017 in our company. The basic step was training of the whole management in both the CSN ISO 9001:2015 standard and the CSN ISO 14001:2015 standard by Delta Consulting Praha. Subsequently, all the changes and expansion of the requirements of the above-referred to standards have been implemented across all segments and processes.

In November 2017 the certification body SGS confirmed that the company ZKL Klášterec nad Ohrí, a.s. has met all the requirements of the revised standard CSN ISO 9001:2015, similarly, in February 2018, it was certified by the certification company TOV SIE Slovak s.r.o that the new standard CSN ISO 9001:2015 has been complied with.

Due to the demanding requirements of the standard and the short transition period for the implementation of the new requirements, we will take advantage of vocational training to upgrade the skills of workers conducting the implementation of the requirements of that standard into the management system.

It can be concluded that a very good result has been achieved there. The design of that bearing would like to thank all our employees and business partners for their work and cooperation with the ZKL enterprises and assure you that we want to be your reliable business partner.

Ing. Ondříč Martinek
Director of Quality and Technology, ZKL Klášterec nad Ohrí, a. s.

ZKL Brno’s powerful weapon – split bearings

In the first quarter of this year, ZKL Brno again demonstrated their high technical level in the manufacturing of cross-split bearings for major international customers. The proof is mainly the two new representatives of split spherical roller bearings. The first is a 720 kg weighing PLC_512-37.33 with outer diameter of 1,000 mm. It is a split double row spherical roller bearing with a classic design, in which the inner ring is contrasted with tightening bandages. Another representative is a 403 kg weighing PLC_62-13.14 with an outer diameter of 899 mm. The design of that bearing was adjusted to customer request so that it lacks the tightening bandages and the shaft ring is drawn directly through reinforced outer collars. Both new types of bearings are designed in operations where the axial mounting is difficult or even impossible and a longer shutdown of the equipment would cause major disruptions in the operation.

The assortment of these bearings has been continuously extended, and puts ZKL among the prominent world manufacturers.

David Káloňa
Process Technology of ZKL Brno, a. s.

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Opening speech

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ZKL NEWS May 2018, Issue No. 58
**Comprehensive business education in ZKL Klášterec**

At the beginning of 2017, grant projects CZ.03.1.0.0/00.016/03000478 titled Comprehensive business education in the company ZKL Klášterec nad Ohří and CZ.03.1.0.0/00.016/03000477 titled Education in ZG. Group were approved by the MŠMT (Ministry of Labour and Social Affairs). The projects are being implemented within the Operational Programme Employment and Social Affairs. The implementation of the project in Klášterec started in January 2017 and will last until the end of 2019. In Brno than by mid 2019. The training plan is designed for 24 to 36 months. The aim of the project is to increase the level of knowledge and skills of employees to ensure the compliance with their qualifications and competencies with the requirements for the work activities performed.

**Modern methods of research and development: New generation of NEW FORCE axial spherical roller bearings**

The ZKL Group places great emphasis on the technical development of products and technologies and related investments with an impact on the competitiveness of the company. In addition to extensive investments of previous years in the manufacturing technologies, this includes the development of tools for research and development as well as modern and innovative tools of the test equipment and implementation of software for design, analysis, calculations, simulation and product lifecycle management. Those advanced tools enable speeding up, streamlining and reduction of the cost of the very challenging evolutionary part of introducing new products into the market.

Spherical roller bearings, both radial and axial, are among the key production programme of the ZKL Group. Therefore, the successful upgrade of technical radial spherical roller bearing performance category triggered the implementation of innovation of axial spherical roller bearings. With their geometry, these bearings are among the most demanding rolling bearings in terms of the manufacture.

**SLM Method**

The SLM (Selective Laser Melting) method is among the technologies that produce the final product by gradual adding of layers (SLM - Additive Layer Manufacturing). The principle of SLM is melting of metal powder, which is applied in a high-level working chamber in layers of a certain thickness, and its subsequent sintering by laser beam. The instrument used to manufacture the cage prototypes described herein has a "LRP-Tribe" system with an output of 400W with a 3D optics for scanning. The chamber in which the melting of metal powder occurs has dimensions 218x218x350mm. The chamber can be filled during the SLM process with argon or nitrogen. The device has, among other things, a system for layer quality control (its thickness etc.), which automatically evaluates its quality and is able to fix or stop the entire process in case of defects. The chamber is equipped with a fire extinguisher, which starts automatically in case of fire, and a system for recycling the unused powder.

Prototypes of innovative bearings were tested in the testing laboratory of the ZKL - Výzkum a vývoj, a s., with very positive results of the operating parameters (generation of heat, vibration and noise) and of the increase in the lifetime of bearings compared to the original version. During 2018, next operational tests of innovative bearings, designs and verification of the technology of additional type dimensions of the SLM series will continue.

**Acknowledgment**

The results presented in this paper are related to solving the project of the Technology Agency of the Czech Republic No. RVOZ10300047 "Research and Development of Design and Technology of the New Generation of Axial Spherical Roller Bearings".

Ing. Libor Nohál, Ph.D.
Head of Design Department
ZKL - Výzkum a vývoj, a.s.

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**Cylindrical roller bearing production line – 5S**

In line with the long-term company strategy aimed at the upgrade and expansion of the production capacities, we have successfully launched the production of cylindrical roller bearings.

Another important step for us in connection with the production and activities associated with it, is the price reduction, achieving the required quality, shorter production times, achieving a secure efficiency and more pleasant working environment for continuous improvement. For that reason we decided to introduce the 5S method in order to move the manufacturing process again a bit further. The intention is to create a lasting clean, clear and organized workplace and employees to focus on continuous improvements. Further, to develop a productive manufacturing system based on organized workplaces, change the attitude of employees to workplaces and machines that will be able to contribute to improving the organization of the processes and increasing the uptime of machinery and equipment.

Another goal is to focus on increasing work safety, i. e. simplified workplaces, and having dangerous places clearly labelled. Employees can thus avoid dangerous situations. In the event such a situation occurs, they need to know and see where they can find everything they need to solve it.

We are also improving the flexibility of the company’s response through shortening the production time and reducing inventories. We strive to ensure faster production changes, faster reaction to the requirements of both internal and external customer. To improve the technology we have introduced a satisfactory arrangement of materials, tools, simplified logistics and integrated storage. This also helped us achieve reduction in costs that we see in the elimination of idle times that were produced by tracing and complicated recalculation.

We also focused on cleaning and maintenance. Everything that obstructed the smooth flow of production was removed. Great emphasis is also placed on the regular cleaning of machinery and equipment and thorough checks are carried out. Conducted are systematic reviews of locations. There was a distinct identification of functional zones and storage locations.

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**Long-term cooperation of ZKL Brno, a.s. and the Technical University in Brno**

It has been a rule for several years now, that our students are given space for discussion with the manager of the quality department.

My desire is, in fact, the desire of all of us, is to share experiences with students and potential new colleagues in the field. We believe that such cooperation is not only mutually beneficial, but essentially for maintaining the right quality, reducing the delivery times, increasing productivity and reducing the period of working time, etc.

We decided to Koziol students about the cooperation, such a cooperation was important for us.

Ing. Libor Nohál, Ph.D.
Head of Design Department
ZKL Brno, a.s.

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**New crane runway ZKL Tech – Tools**

In ZKL Tech - Tools, a s., a crane track was manufactured and installed by FANAK s.r.o. last May in order to improve the handling of bulky and heavy parts. The crane track is located in the premises of the Development Centre for press tools.

**Technical data:**

- **Carrying capacity:** 3,200 kg
- **Track width:** 8,765 m
- **Runway length:** 9,275 m
- **Height up to the rail head:** 47.7 m

For better comfort, the crane runway is equipped with radio control. We believe that this crane runway will soon be followed by further investments into ZKL Tech - Tools, a s.

Vítězslav Celý
Head of Business Section of ZKL Tech – Tools, a.s.
Training in correct mounting and dismounting of bearings

In the context of improving the quality of customer support a new training room – an assembly workshop was established in 2017 in the well-equipped workshop of the technical support department (OTPP). As a supplement, short assembly and disassembly videos are currently being prepared that very clearly step by step describe each of the above referred to assembly/disassembly methods. Those videos will be available in 2018 on ZKL’s youtube channel.

In addition to the training in the correct mounting and dismounting of bearings, ZKL – Výzkum v a. vývoj, a. s., offers other types of training, too. Those are general trainings in the principles such as those regarding the design and proper arrangement of bearings, lubrication of bearings etc., as well as special product trainings that are already focused on specific types of bearings (e.g. sealed spherical roller bearings etc.). Upon customer request we are able to organize a special training for the specific needs of customers.

In the assembly workshop, it is possible to demonstrate and try the assembly and disassembly of various types of bearings on both cylindrical and tapered pin using both mechanical and hot methods. Training participants can thus try their hands at the following: mechanical mounting of ball bearing using a fitting tool, mounting of spherical roller bearing with a tapered bore onto tapered shaft using a drive-up method, hot mounting of spherical roller bearing with a cylindrical bore using induction heating and mounting of an adapter and withdrawal sleeve. Analogously the bearings can then be dismounted, either by using of pullers, lock nuts, or using an oil injection method.

Statistical evaluation of premature bearing failures indicates that 14% of the bearings do not reach their calculated life and fail prematurely due to a damage of bearings during the assembly. Training of service and technical workers in proper mounting and dismounting of bearings is therefore very important.

ZKL, training workshop contains 1 assembly cells, where the trainees can try different methods of mounting and dismounting of bearings.

An example of that assembly stand is shown in the following figure:

The training room has already held several customer trainings, e.g. for the company Pcloa (manufacturer of band saws, Brno), ČKD Turbo Technics (manufacturer of small hydroelectric turbines, Rajec Jilemník) or for a Spanish distributor of ZKL bearings - company ITS (manufacturer of screws, in Lugo, Spain, based in San Sebastian). Assembly / disassembly is always led by an experienced assembly technician of the technical support department (OTPP).

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ZKL – Výzkum v a. vývoj, a. s. – appointed an Expert Institute

In June 2015, Ing. Karel Kottán, Ing. Miroslav Schöll and Ing. Libor Vymazal, the employees of the ZKL – Výzkum v a. vývoj testing laboratory were appointed legal experts in the field of general law to the Department of Justice. As a result of that sort of activity conducted by ZKL – Výzkum v a. vývoj, a. s., those conditions were fulfilled.

In June 2016, an application was submitted by the Director of ZKL – Výzkum v a. vývoj, a. s., to the Department of Justice, to have the company enrolled in the list of expert institutions. That increased significantly the credit of ZKL – Výzkum v a. vývoj, a. s., and in particular of its workplace – the testing laboratory, which now issue judicial expert opinions under an expert institute.

Customers in the field of rolling bearings accepted that information relatively early and did not leave us idle for long.

Already last year we processed a total of six expertises with a variety of themes, such as confusion of bearing materials, impurities from bearings in aircraft oils for aero repair shops and more. This year we have already drawn up two quite extensive and in terms of the issue very interesting surveys concerning special materials for balls.

Enrolling the above named employees and the expert institute on the list of experts and expert institutions means not only recognition for ZKL, but also confirms the proper qualification of the bearing testing laboratory employees to our customers. Not only the expertise, but also all other outputs from our workplace earned through the enrolment into the list of expert institute a credit much higher than they had prior to that act.

ZKL’s 2018 participation in trade fairs

The participation in trade fairs, both in the Czech Republic and especially abroad, continues to be of great importance for ZKL. In addition to the possibility of the presentation of the constantly expanding range of products and services to the existing customers, it is very important and valuable for us gaining contacts to new customers and distributors. At some fairs, ZKL participates independently through its own exhibition, at other fairs under the joint exhibition of the Ministry of Industry and Trade of the Czech Republic, or in a joint stand with a local distributor. The latter cooperation is developing successfully, for example in Latin America, and is dedicated a full article of this issue of the ZKL NEWS.

The main goal of our participation in trade fairs is to introduce the brand, products and services of ZKL, and support the subsequent sales of bearings in those territories. The focus of the fairs is then crucial for the selection of suitable exhibits. In addition to the standard range, you can see at fairs also special ZKL bearings manufactured for different sectors, such as mining industry, railway transport and others.

This year we have already participated in the following fairs:

- 5.–8. 3. 2018 ESS – Chennai, India
- 20.–22. 3. PFTEAIR - St. Petersburg, Russia
- 23.–27. 4. EXPOMIN - Santiago, Chile
- 26.–30. 4. VESA – Delhi, India
- 12.–16. 5. EXPOMINA – Lima, Peru
- 18.–21. 9. InnoTrans - Berlin, Germany
- 1.–5. 10. 2018, CHINAPLAS – Guangzhou, China
- 6.–9. 11. 2018 PTC Asia – Shanghai, China

Ing. Hana Luzová, marketing ZKL Bearings CZ, a. s.
We are introducing an authorised dealer of ZKL bearing products in the Czech Republic: MATEZA, spol. s r. o.

With nearly twenty-seven-years’ old history, MATEZA is among the leading suppliers of machine parts in the Czech Republic. It was founded in 1991 by two partners in Havlíčkův Brod. Over time, successful activities spread from the home Vysočina (Highlands) all the way to the territory of South Moravia.

The name of the company consists of an acronym of its intention and that is to provide - Material and technical support to all its clients. Since the outset, the company has been offering a standard range of domestic and foreign manufacturers of the highest quality. Its aim is to gradually expand the product range and offer so that customers can buy everything they need “under one roof”. The company’s central warehouse regularly supplies its branches so that required goods are always available at all MATEZA shops. Among other things, it offers e-shop purchase with the possibility of a next-day delivery through a parcel service.

Mateza relies on steadily trained staff that helps solve customer requirements, or consult with a particular technical application. Extensive inventory at three outlets in the Czech Republic, namely in Havlíčkův Brod, Brno and Jičín, allows to cover customers’ requirements immediately. The company’s principles include the speed of deliveries, the quality of products, reliability and forthcoming negotiations.

Direct cooperation between ZKL and MATEZA has been running since 1993, when Mateza became one of the first authorised dealerships of the ZKL brand in the Czech Republic. Recently, the cooperation between the two companies has expanded, as well as publicizing of the ZKL brand at the premises of MATEZA.

Jaroslav Kammerer
Head of Sales Group OS35
ZKL Bearings CZ, a. s.

Joint activities in Latin America in 2018

An affiliate of ZKL, company Rodamientos S.A., which is responsible for managing sales activities in Latin America, launched in March, together with official distributors of the ZKL brand, various activities to further develop the business in this territory. The first event is a joint presentation at the EXPOAGRO 2018 fair where ZKL accompanies its authorised distributor - the company TOTTIS S.A.

EXPOAGRO is considered the most important agro-industrial exhibition in Argentina, which has been held regularly since 2007. After ten years, when the event took place at various locations, this year’s exhibition was held in a permanent building. It is located on the 225th kilometre of highway No. 9, near San Nicolás, a province of Buenos Aires, in the very heart of the Argentinean pampas and a few kilometres from the main urban centres in the country.

On this occasion, by our presence at the fair we supported our authorised distributor, company TOTTIS S.A., which has over 50 years of experience in the Argentinean market of bearings and which maintains business relationships with major customers in the country in the agro-industrial sector. Thousands of visitors not only from Argentina but from around the world participated in this great meeting of businessmen and companies operating in the agricultural industry. For four days they could exchange information with our employees and associates of the company TOTTIS S.A.

The said joint participation significantly publicized our presence in the Argentinean agricultural market, which is the most important market in this country, for its worldwide highly acclaimed products. In that sector, ZKL in Argentina is an active part of the original plants and equipment of many companies – customers’ OEM - producers of agricultural machinery.

This will certainly not be our only involvement during 2018. Our presence in the Chilean market will be highlighted by the presentation at the EXPOMIN Fair, held in April in Santiago de Chile in the form of our own exhibition stand. EXPOMIN is considered the largest mining fair in Latin America, during which there is an exchange of information, knowledge and experience, and technological innovations and products are demonstrated that contribute to the innovation and increased productivity of extractive and mining processes. We will use this excellent opportunity for the official presentation of our exclusive distributor in Chile - RODAMENDEZ LTDA that has many years of experience and a perfect overview of the local market and is a supplier to major companies from the mining, timber and steel industry. The company RODAMENDEZ LTDA became our strategic partner in the country at the end of 2016 after a visit to our headquarters in Brno and subsequent negotiations in Prague. Thanks to our experience and technical and commercial support we are able to step by step strengthen and expand our business activities in that territory.

And finally, in terms of our trade fair participation, in September we will have our own stand in the sixth annual EXPOMINA – PERU fair. After the five successful years, that international mining fair, which specializes in products and services related to this industry, opens for three days, as it will gather a large number of entrepreneurs and suppliers of the mining industry. It will be an excellent opportunity to establish and deepen business relationships, as well as review and plan new business for ZKL in that region. On this occasion, and given that this is a fair that will be also attended by representatives of international industrial and mining chambers, our stand will offer general information on the commercial and technical services that we can offer in each country in Latin America.

And this is just a brief overview of our major activities planned for 2018. Our goal is to occupy increasingly important positions in those industries where ZKL is able to demonstrate all its skills as a major European manufacturer and supplier of bearings and solutions for the current and future technologies. Partnerships and exchange of information between our authorised distributors, end users and ZKL, as a bond offering real field experience, will be the key for us to move forward and meet the needs that the challenging Latin American market of bearings requires.

Pablo Méndez
President ZKL Rodamientos S.A.