

ZKL NEWS

September 2018, Issue No. 59



ZKL GROUP

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Opening speech



Dear business partners,

Let me greet you in the end of the Indian summer, i.e. during the period where our summer holidays are over, and we are back and working hard again to cope with the 2018's work tasks. The tasks are not easy, and in particular ZKL Brno, a.s. strives for increasing of the production in the second half 2018, i.e. 20% and 35% increase in the third and fourth quarter 2018, respectively, when compared to the

production volume in the first half of 2018. The increases are astounding that we more or less handle by increasing of the working productivity with current employees. The positive is that we are successful in winning the employees, who left us in the past and return back after experience with other employers. However, many companies have to cope with the lack of qualified staff and therefore, the only thing we can do is to improve the management and organization of work with our staff.

In addition to the production increase-related tasks the positive is conclusion of a contract with an important customer from the field of wind energy for delivery of the bearings for setting of the main shaft for 3.3MW and 4.2MW wind power plants.

This project is also associated with the planned construction of building No. 19 for operation of tempering room for large-scale rings up to 2,000mm at ZKL Brno, a.s. with budgeted capex of CZK 77 million.

Similar situation can be seen at ZKL Klášterec nad Ohří, a.s. where reconstruction of the warehouse of basic material started at projected costs about CZK 11 million. We also purchased technology in order to innovate the process of grinding of the rings up to 400mm. The pro-

ject with the budgeted capex CZK 42 million is co-funded by the structural funds under the Operational Programme Enterprise and Innovation for Competitiveness.

Besides the development of the production of bearings we have started the project preparation of the construction of the accommodation facility and the reconstruction of the production hall for engineering production in the former premises of the state enterprise ZKL Klášterec nad Ohří, s.p. If we can manage all building permits, the real building works will start in the first quarter of 2019. The development of the premise is under the control of our specialized company ZKL Reality s.r.o. focusing on the real estate management.

In view of the fact that we release this issue of ZKL News on the occasion of the International Engineering Trade Fair in Brno, I would also like to invite you for visiting of our booth in the hall F, booth 73 where you can meet the representatives of ZKL companies, and to see interesting exhibits from the wide range of the bearings produced by us.

Looking forward to see you there.

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

A new help for grinding of large-scale bearings

In June this year, high activity in the reconstructed part of hall of building No. 5 aroused attention.

A new machine intended to grinding of the bearing rings up to 1,300mm became a new member of our machine fleet. This is the RVU 1250/125 carousel grinder from BERTHIEZ, France.

The grinder was purchased for CZK 33 million based on the subsidy project CZ.01.1.02/0.0/0.0/15_014/0001097 Implementation of Developed Technology for Production of

Separated and Multi-Component Bearings. Experience both from Berthiez technicians and ZKL Brno's staff was used in the machine configuration and implementation. Thus, a machine was created that allows grinding productively while keeping all quality requirements.

Worth of noting is the tool magazine, which can house six grinding wheels, and which change automatically in a cycle according to the program and current operation to be performed by the machine. Only this function reduces additional times for machining to a maximum

level. Highly sophisticated control system has programs already prepared for grinding of all bearing rings being produced at ZKL Brno.

I firmly believe that the machine will help us to achieve the set goals and become an indispensable help in production of all bearing types.

Ondřej Mágr
Grinding Process Technologist
ZKL Brno, a. s.



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Modernization of metallographic laboratory

ZKL – Výzkum a vývoj, a. s. operates a metallographic laboratory used both within the ZKL concern and for commercial works for external customers. Considering the increasing requirements for metallographic works and aging of our current equipment, the devices used in the



Automatic hot mounting press Opal 410

metallographic laboratory were renewed. Considering the workload of each device and its indispensability, the mounting press for mounting samples before polishing were renewed first followed by polishing device for metallographic spacemen preparation. Specifically, they included the automatic hot mounting press Opal 410 and automatic twin wheel grinder and polisher SAPHIR 530. Through purchasing the devices for preparation of the metallographic spacemen, the quality of spacemen improved that is now less dependent on human factor. Owing to automatic modes for spacemen preparation in the purchased devices, time spent by highly qualified experts of the metallographic laboratory in ZKL – Výzkum a vývoj, a. s. by preparation of the spacemen was reduced, and more expert activities may be pursued.

Another important device purchased in the course of renewal of the metallographic laboratory is a laboratory furnace for heat treatment of samples PKE 18/12R. This furnace allows easier research in the field of heat treatment of various types of materials.

For the future, continuation of the renewal of the equipment at the metallographic laboratory is expected in the field of cutting of material required for production of the metallographic spacemen, and renewal of current hardness measurement devices.

Ing. Karel Kotlán
Head of Testing Laboratory
ZKL – Výzkum a vývoj, a. s.

Conference of the authorized distributors

On 16 May 2018, the annual conference of the authorized distributors of the ZKL brand took place at ZKL premises. The partners from the Czech Republic, Slovakia, Poland, Hungary, Germany, and Spain accepted the invitation to the conference. During the conference, the 2017 business results were presented, the distributors were informed about ZKL's business strategy, news in the field of logistics and sales support. The representatives from the production plants ZKL Brno, a. s. and ZKL Klášterec nad Ohří, a. s. informed the distributors about the innovations in the production range, investments in the production technologies, and quality management. ZKL – Výzkum a vývoj, a. s. focused on presentation of the offered services, and invited the conference participants for excursion to the training room and mounting room where the workshop for proper mounting/dismounting of the bearings took place.

Following the official part, which took place in Brno in the company headquarters' building, the participants moved to Southern Moravia in Bořetice. The informal evening event took place here in the atmosphere of a wine cellar. Generous refreshment and tasting of local Moravian wines were prepared here. Dulcimer



music band performed and a small surprise was arranged for the guests. The surprise was the performance of the fastest caricaturist in the world recorded in the Guinness Book of Record Mr Lubomír Vaněk, who tirelessly made portraits of all people interested all the evening.

The fact this year's conference was successful is demonstrated by the emerging co-operation in the field of training of our business

partners. Immediately after the conference our application engineers trained a couple of people interested in proper mounting and dismounting of the bearings in our training rooms or during a visit at a customer. Also the partner section of ZKL's website, which allows direct ordering of ZKL's stock material, peeping into the production plan, or the summary of fulfilment of the customer purchase orders, is being increasingly used by our customers.

We are very happy for the interest of our customers and according to our motto, it is a continuous "challenge for the future". Therefore, we will continue in striving for bringing the improvements and news in the customer services. We thank all participants of the conference for their involvement and looking forward to the future meeting.

Ing. Hana Luxová
Marketing of ZKL Bearings CZ, a. s.



New packing line for Ø 32-115mm bearings

In connection with long-term strategy of ZKL Klášterec nad Ohří, a.s. focused in particular on modernization and expansion of production capacities, we have successfully launched the steps to enter into an important deal with a foreign manufacturer in the area of full packing of the production. In particular, an important factor for the investment was satisfaction of

the needs of our customers, of which packing requirements successively include, among others, a wide range of technologically demanding precision and quality parameters for us.

The new packing line will be delivered by IMANPACK to replace its originally installed and obsolete machines. The packing line will consist of two basic technologies – foil

packing on MOONLIGHT machine, and box packing on MCTN 2000 machine. The machines will follow the existing technological workflow, i.e. laser inscription, conservation, and description of the packed production and dispatch at the output.

Total capex amounts to about CZK 9.4 million and included is, among other, training of five operators abroad.

The scheduled pre-acceptance at the manufacturer and in Czechia is planned for November 2018 and early December, respectively. The pre-acceptance and acceptance of the packing line will be made on re-defined samples (TPRM) with exactly defined quality and performance parameters.

When all defined acceptance procedure criteria is met, 14-day trial will start followed by the release for continuous operation.

We believe this step will be a significant benefit for meeting our customers' expectations, reducing time and expert demands for operation, re-settings and adjustments, which will improve the workplace of our employees.

Josef Jánoš

Head of Administration and Investments,
BOZP and PO
ZKL Klášterec nad Ohří, a. s.



Transition from the IRIS standard to ISO/TS 22163:2017

Based on impulse from coaches producers and UNIFE (The Association of the European Rail Industry), ISO/TS 22163:2017 international standard for railway applications was created in 2017. It aims at achieving higher quality level across the supply chain, or at helping the manufacturers to review their suppliers.

The ISO/TS 22163:2017 standard replaces the existing IRIS standard according to ZKL Klášterec nad Ohří, a. s. was certified in 2016. The successful certification was also supported during the audit by sales company ZKL Bearings CZ, a.s. and design organization ZKL – Výzkum a vývoj, a. s.

The new ISO/TS 22163:2017 standard contains a lot of important changes and improvements. The content of the ISO/TS 22163:2017 standard complies with joint structure of ISO standards and reinforces the areas specific for rail industry. The key changes to the content of the new standard relate in particular to the change of basic schema with focus on mandatory/recommended processes and KPIs, improvement of process approach, or risk review concept. The standard contains all requirement of ISO 9001:2015.

The organizations certified according to original IRIS standard must switch to the new ISO/TS 22163:2017 standard not later than 14 September 2018 when validity of the original certificates expires. Should the organization be audited after 14 September 2018, no valid certificate period would apply automatically.

The transition audit verifies preparedness of the organization in connection with the transition to the ISO/TS 22163:2017 standard. The organization must have available documented information on meeting of the new requirement of the QMS for at least three months before the transition audit. Considering the subject of the certification, the organization must provide the proofs on implementation of all requirements of the standard. All separated supporting centres and detached offices are also included in the transition process according to the rules of certification. Successful completion of the transition audit ends upon issue of a new certificate valid for 3 years.

Under the transition to the new standard, successful transition audit was performed in the production plant ZKL Klášterec nad Ohří, a. s., sales organization ZKL Bearings CZ, a. s., and design organization ZKL – Vý-



zkum a vývoj, a. s. Hence, the ZKL concern complied with the condition for transition to the ISO/TS 22163:2017 standard by 14 September 2018.

Ing. Jaroslav Kalábek
Application Engineer
ZKL – Výzkum a vývoj, a. s.

Family Day



Our assistants Katka, Iveta, and Miša took care about the kids during the event.

On Saturday 23 June 2018, traditional event full of fun for employees and their family members, in particular kids, took place at the premises of ZKL Brno, a.s. Mr Roman Zouhar, managing director of ZKL Brno, a.s. welcomed all arriving visitors. He thanked to all employees for work well done and wished them a nice day full of fun. A rich refreshment program was prepared for all visitors.



Rodeo bull – fun not only for adults.



Not only the youngest enjoyed the Capri Sun wheel of fortune.



Parents cheered the little “fishermen” during fishing.

Our company organizes the Family Day regularly and we are happy that the interest in the event is huge among the staff. This year, we had 230 colleagues enrolled who had a chance to spend pleasant time together and meet each other better outside the workplace. The company management prepares the event as an acknowledgement for all-year-round work and with an intention to introduce the responsible work to the family members of our employees who are the core element of our goals, whose work allows us to invest in the development as we do today.



All onlookers assist in selection of an airbrush tattoo image.

The youngest kids were attracted most by the jumping castle with a slide, and a clown with balloons. Older kids and adults had a chance to tame a rodeo bull, or have airbrush painting applied on their skin. Everybody loved the wheel of fortune where Capri Sun drinks awaited to everybody and intended not only to the youngest visitors. Various competition stations were prepared where both kids and adults had a chance to check their skilfulness. They were rewarded with souvenirs for their effort. Those interested also attended the visit to the production areas and watched how's the production process occurring. During the excursion the visitors had a chance to try to assemble the bearings.

Despite of the weather the event was successful and we look forward to seeing you next year.

Dagmar Vymazalová
Assistant of Managing Director of ZKL Brno, a. s.

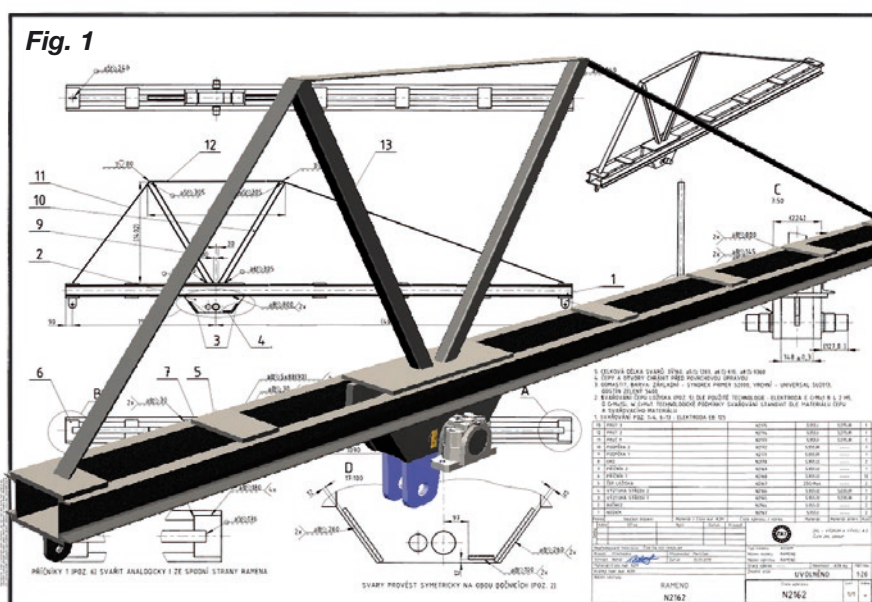


Almost all moms waited for their kids until hell freezes over in front of the mustn't-leave jumping castle.



Also adults participated in the competitions.

Engineering services of ZKL



The research and development activities are provided within the ZKL Group by company ZKL – Výzkum a vývoj, a. s. incorporated for this purpose. The fundamental know-how of the company comes from the former company Výzkumný ústav pro valivá ložiska Brno, which was established in 1953 as the development and technological base for the needs of former Czechoslovakian bearing industry.

Of course, the mission of ZKL – Výzkum a vývoj, a. s. first and foremost focuses on the development and innovation of rolling bearings produced by ZKL Group companies and related R&D activities in the fields of design, tribology, material engineering, contact mechanics, numeric simulations, and testing. The expertise and devices of the bearing testing laboratory is also used by many external companies from the field of production and sale of bearings, assembly and use. Since incorporation of the company the technical consultation services focused on bearing life calculation, bearing arrangement recommendation, mounting procedures and bearing quality review have been provided.

In addition to the activities and services related to bearings and their mounting the technical capacities of ZKL – Výzkum a vývoj, a. s. have been long used for the engineering services in general engineering. The activities include: technical consultancy – owing to the status of the expert institute, the expertise may be processed as output from sworn experts; in

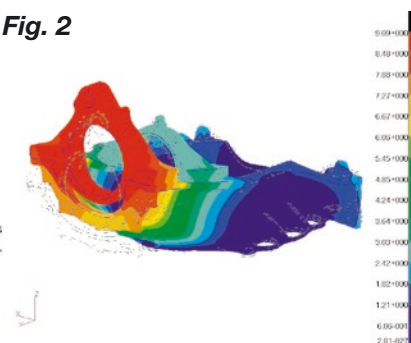
addition, production of drawing documentation, design drafts of machines, strength calculations, numeric simulations, or e.g. optimization of geometry of machine components.

In process of the creation of drawing documentation, the team of experienced designers will take care of creation of the full CAD models and drawings, wherein CAE simulations are used to find an optimum and safe structure. An example of a similar project may be creation of the design drafts and full drawing documentation including strength calculation using the finite elements method of a loading arm of the experimental device, refer to Fig. 1.

Offered are also the CAE strength calculations alone performed by the employees experienced in the field of the finite elements method (FEM). The most often performed simulations and strength calculations include:

- stress-deformation analysis of mechanical components,
- transient analyses (impact breach of mechanical components),
- stress distribution and contact pressure analysis,
- calculation of stiffness curves (bearings, machine components),
- complex analysis of machine units,
- bearing analysis with flexible housing model,
- analysis and optimization of bearings arrangements including proposal a design modification.

Fig. 2



Owing to stochastic character of the loading forces, the demanding tasks include the analysis of flexibility bearing housing effect on loading for the main rotor shaft bearings of wind power plant, refer to Fig. 2. The output of the analysis is used to rating life calculation of the main rotor shaft bearings and subsequent certification of the same.

ZKL – Výzkum a vývoj, a. s. can cooperate at various level of a new product development from a design draft, strength calculation, implementation of the functional samples or prototypes, up to testing and optimization of the resulting technical solution. An exemplifying example is the design of new bearings for axle mounting for Škoda Fabia R5 sports car including their production and series deliveries. During the project, cooperation in evaluation of the operation test results and optimization of the bearing seats based on the operation parameters aimed at increasing the bearing's service life, refer to Fig. 3.

In addition, ZKL – Výzkum a vývoj, a. s. focuses on the fatigue of the machine components: the company is experienced in the field of the contact fatigue of various types of materials and rolling bearings. Based on the comparison tests of the contact fatigue we can evaluate the benefits of a new material, heat treatment, or surface treatments on durability of the contact-loaded components.

Our technical specialists will in cooperation with you offer a suitable technical solution of your problem and will arrange the background for optimization of the processes, structure, and production of successful products. Send your queries or demands related to the services above to: support@zkl.cz.

Ing. Miroslav Vaculka
CAE Engineer ZKL – Výzkum a vývoj, a. s.

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

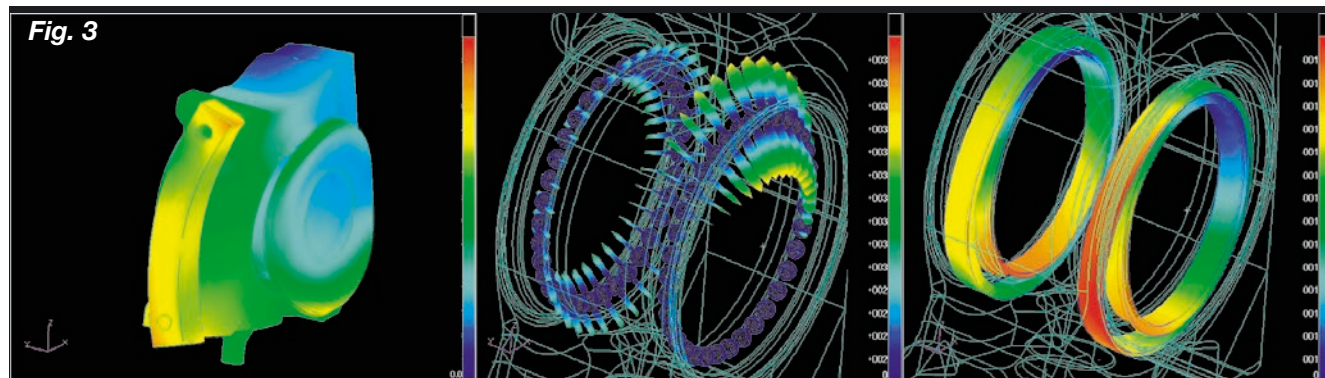


Fig. 3

We are introducing the authorized dealer of ZKL bearing products in the Czech Republic: LOŽISKA ISKALČUK, s. r. o.



LOŽISKA ISKALČUK, s. r. o. has been operating steadily in the engineering field for more than 23 years. It holds a solid place on the Czech market as a reliable supplier of machine components.

The company was incorporated in 1995 in Černčice near Louny. At that time the name of the company was Jiří Iskalčuk. Due to successful development, it transformed in 2004 into today's LOŽISKA ISKALČUK, s. r. o.

Already since 1995, it provides its customers with standard products from domestic and foreign manufacturers of different brands. Main emphasis is put on comprehensiveness and immediate delivery of required products to the customers. This is possible due to quality and extensive stocking. A stable and trained team of employees takes care of immediate and precise supplies of products and customer requirements. 24/7/365 emergency is a commonplace.

A continuous effort into development and approaching the needs of in particular domestic customers, direct cooperation between ZKL and LOŽISKA ISKALČUK, s. r. o. was concluded in the form of authorized representation. At the same time the company moved to newly constructed business and warehousing facilities. This step improved the service for customers of LOŽISKA ISKALČUK.

We will intensively nurture and develop the cooperation in the future.

The aim of the company is achieving a state that not only domestic customer, who contacts LOŽISKA ISKALČUK, s. r. o. in reliance, will have the full range of ZKL products of the highest quality as fast as possible. Based on this goal, the customer will in reliance return satisfactorily for the purely Czech brand.

Lukáš Walter

*Managing Director and Sales Representative
LOŽISKA ISKALČUK, s. r. o.*

Overview of Czech Raildays 2018 fair

From 19 to 21 June 2018, the 19th International trade fair of the railway technology, products and services for the rail and city transport Czech Raildays took place in Ostrava. Though the fair is narrowly specialized, the exhibitors and public are still interested in it, and has been popular over the years. This is demonstrated this year's numbers. The 19th year was attended by 203 exhibitors, and total gate achieved 6,365 persons, of which 82% was the experts.

ZKL Group traditionally presented here as long-term producer of a complete range of ZKL bearings for railway coaches. In addition to standard products for railway industry, the booth visitors had a chance to see special bearings as well. The axle bearings - TBU units PLC 810-15 and PLC 810-13 - attracted the visitors most.

From the point of the business negotiations we can consider the fair in a positive way. Some deals were made right at the booth, some were pre-discussed and finished after the return from the fair. Our technicians also registered huge

interest in the technical information about the structure and use of our bearings for specific applications. Finally, we can say that the interest of our customers in the ZKL railway bearings

is continuously growing, which demonstrates our strong position in this industry.

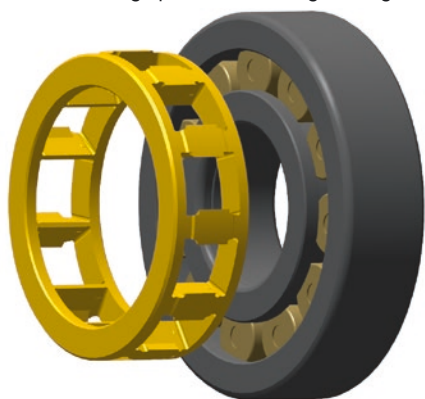
Ing. Hana Luxová

Marketing of ZKL Bearings CZ, a. s.



Special bearings for traction motors

The bearings for traction motors are generally designed to comply with the requirement for cost-saving operation with long bearing life



and reliability under operation conditions with high load and rotation speed. Inner design of the bearings generally provides their high axial load carrying capacity. Both, deep groove ball bearings and cylindrical roller bearings are mostly produced with the machine brass cage radially centred on the rolling elements or on the outer ring.

A development project for a couple of cylindrical roller bearings was made upon request of a foreign customer involved in production of diesel-electric locomotives. This is a new type of technologically demanding cylindrical roller bearings for traction motors. The design of the bearings uses a "EMP" type cage – one-piece massive brass cage centred on the rolling elements. The cage and rolling surfaces design is

made to achieve an optimum lubrication of the bearings and low heat production. These cage types are intended for medium and large-sized bearings of traction motors and for high loads including shock loads. A special cage window design provides optimum guiding of the rollers and avoids their undesired downswing during bearing assembly. Another advantage of the brass cages is that they may not be influenced by common lubricants including synthetic oils. At present the prototype bearings are subject to in use tests, and the series production will be launched following validation of their parameters.

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

ZKL Golf Cup 2018

On 23 June 2018, Kloster Kamp golf club in Germany hosted the golf tournament of ZKL called ZKL Golf Cup 2018.

The 120 players from among business partners in Germany attended the tournament. The evening event held in traditional Czech spirit - grilled piglet served and Czech beer drawn - attracted 150 guests.

During the tournament and the evening event the guests were highly interested in ZKL Group and our products. In conclusion, the event was a huge success, and many guests were already interested in the next year's tournament.

ZKL thanks to all involved for their active participation and interest in our brand.

Heiko Rothe
Head of Business Development ZKL Deutschland



Introduction of the new methods for productivity improvement

Each year, the ZKL Brno production plant sees the increase of number of workplaces with the lean production system implemented. This is the 5S method for which a review of the tools, devices, and documentation needed for the workplace is conducted. They are renewed, employees re-trained for use, maintenance, and storage of the tools followed by documentation. The whole team is involved in this process, from the production operators, foreman, and production manager, up to quality department staff. This procedure reduces reject rate and downtimes of the production process. In 2018 it is planned to implement the 5S system to five up to ten new workplaces.

Stanislav Kozel
Head of Quality Control Department
ZKL Brno, a. s.



Sport teambuilding of ZKL

In June during a bike trip, the ZKL staff had an opportunity to meet outside the plant premises. High participation and enthusiasm of colleagues proved that we're a big family. Those without a bike hiked from Dolní Loučky while the bikers started from ZKL's headquarters building in Brno Líšeň. Regular refreshment stops were prepared along the way and everybody made it successfully to get to Šafránkův mlýn in Drahonín, over 50 km from the start point, in the afternoon.

Upon arrival, some participants enjoyed cooling down in the swimming pool but everybody loved the supper served with a great speech of ZKL's CEO. Following the supper some put together the rests of energy and played football, while the others decided to rest during the evening with their colleagues.

The teambuilding was a huge success – not only all survived but enjoyed it very much.

We thank to all for their participation and looking forward to the next event.

Bc. Kateřina Brodecká
Event coordinator



Heading from the company's headquarter building in Brno Líšeň.



Tourists checking the itinerary on the map.



Following the sport activities, the promised reward awaited to all.



We still played football not to cheat the sport.



We enjoyed dinner in the form of grilled specialties.



We thank to all for their participation!

ZKL in Latin America

As we have already informed you earlier, the activities of our affiliate were in par with the set up plan in the first half of this year. We participated a couple of branch fairs and in cooperation with our distributors we pursue in a lot of business visits and business and technical negotiations always with establishing a mutual cooperation among ZKL, distributor, and the end users in mind.

In January Mr Edson Almeida, the manager of our technical department for Latin America region, visited our distributor Rodamendez Ltda in Chile. Together with the staff of sales and technical department of our distributor, he attended a lot of visits and negotiations with the end users from among various industries, e.g. forestry, mining, metallurgy, and paper industry. The results of the negotiations assume successful development of further activities in this territory.

Further in March, we have attended EXPO-AGRO 2018 exhibition being regularly visited by all main customers from all farming branch-



the field of agriculture industry organized in Argentina each year. This time, the venue of the fair was Armstrong city in Santa Fe province with 250,000+ participation of the fair. In this case ZKL was invited for

with other European companies. With its participation in the fair ZKL confirmed its significant activities in the field of the agriculture industry in the country.

And finally, still in June, a business trip to Uruguay was made in order to support our local distributor - Mayfer S.A. Together, we presented the ZKL brand before more than 50 local end users, who had an opportunity to exchange information and ask questions to our technical staff.

Of course, there is a lot of to do - more visits of customers, exhibitions, negotiations... New challenges!

There will be another mining fair EXPOMINA PERU 2018 in September, which ZKL will attend with its own booth. At every occasion and during each presentation we introduce the production and development possibilities of ZKL to customers, availability of products and stock reserves of single origin, which is a great advantage, and of course excellent quality of our products, which allows perceiving of our brand as one of the world's prime bearing producers. This intensified by joint teamwork with our official distributors assumes that ZKL is not limited by borders and, on the contrary, to cross the ones.

Pablo Méndez

President of ZKL Rodamientos S.A.



es across Argentina. In this case we presented in a joint booth with our distributor Tottis S.A. from Casilda - Santa Fe province - Argentina.

In April, we attended one of the most important fairs of mining industry in the world with our own booth. This is EXPOMIN 2018 fair held in Santiago de Chile and attended by 70,000+ visitors. We have grasped the opportunity to introduce our official Chilean distributor - Rodamendez LTDA.

One month later in June, we participated AGROACTIVA, which is another fair in

participation by the embassy of the Czech Republic in Argentina, which provided under its activities to support the Czech industry the space for presentation of the products and services of ZKL during the fair together



Innovation of 29468EM NEW FORCE bearing

The last issue of ZKL News mentioned the development of a new generation of thrust spherical roller bearings including target group of the bearing innovation, series 294 with sheet steel cage. The innovations of these bearings are scheduled one by one for the customers to have a complete range of products. The selection of specific bearings and the order of their innovation are tied to the analysis of market potential, the medium-term outlook for sales, and the taking into account of the economic and technological aspects of the production.

In addition to gradual innovation of the thrust spherical roller bearings with sheet steel cage primarily focused on the bearings with external diameter up to 400mm, individual innovations of dimensionally larger bearings with a massive brass cage are made. The impulse for design of such a bearing in NEW FORCE standard is in particular the direct requirements of our OEM customers. An exemplifying example is the innovation of 29468EM NEW FORCE bearing when our long-term customer is standing behind the design and production of the new bearing. This is a company acting in the field of development and production of oil and mining industry equipment. Technical requirements for a new bearing were specified based on a visit of the ZKL's application engineers at the customer on the test site and completion of the equipment. In addition to the demanding operation parameters each bearing must pass the run-in tests under loads and revolutions reaching far behind normal operation parameters.

The new 29468EM NEW FORCE bearing can withstand the required operation conditions thanks to optimization of internal geometry of the contact surfaces using the finite elements method and own physical model of the bearing. This optimization in particular applies to contact ellipses on the raceways and the rolling element geometry and inner

ring rib geometry. With the simulations the contact stress has a better distribution and the lubrication effect between the rolling element and the inner ring rib is maximized. At the same time the NEW FORCE thrust spherical roller bearing has reduced the permissible tolerances of the bearing parts and the functional surfaces are machined using the new technologies to ensure lower vibrations and higher reliability of the bearing in use.

Ing. Libor Nohál, Ph.D.

Head of Design Department ZKL – Výzkum a vývoj, a. s.

Final surface finish

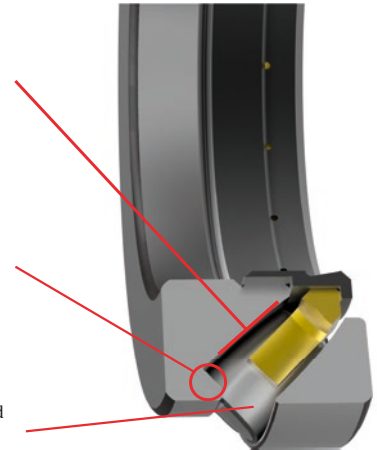
Improved final surface finish for all ZKL thrust spherical roller bearings produced in NEW FORCE generation provides improved lubrication, smoother operation and longer bearing lifetime.

Optimized inner geometry

Optimized geometry of roller ends and flange provides improved lubrication, reduced friction and consequently lower operating temperature.

Higher accuracy

Higher running accuracy provides reduced vibrations and greater bearing reliability



Training of authorized ZKL distributors

During 2018, ZKL – Výzkum a vývoj, a. s. organizes a training cycle for its Czech and Slovak authorized distributors. The purpose of the training is to deepen knowledge of

authorized distributor's staff about the ZKL bearings, and to inform them about the services ZKL can provide to its customers. Today, it is very important to provide not only the

product but also product-related services to the customers. The services of ZKL include the basic services associated with the bearings – calculations of bearing rating life, recommendation of correct bearing arrangement and bearing fits, of correct lubrication, of correct assembly and disassembly process, and more.

In addition to the basic services, the company can also offer design services focused on general engineering – consultations with customers, design draft of components or full devices, up to production and delivery of production documentation of a product. Among others, the component design works include strength calculations made by the finite element method.

Thus, the main goal of the training is expanding of awareness of services the company ZKL – Výzkum a vývoj, a.s. can provide to its customers, first and foremost among its distributors and then among the end customers so they may use the services offered. If you are interested in more information, please contact us at support@zkl.cz.

Ing. Jan Křemen

Head of Technical Consulting Services
ZKL – Výzkum a vývoj, a. s.



ZKL in Hebei steel Group (China)

HBIS Group Co., Ltd ("HBIS") is one of China's largest iron and steel material manufacturers and comprehensive service suppliers. HBIS was announced by American magazine Fortune 2018 as the top 500 enterprises of the world that ranked 239 with its revenue of 45.39 billion US dollars. ZKL China started cooperation with HBIS since 2014, and market share increase 15% every year. From five years marketing development, ZKL China has supplied ZKL bearings to its seven biggest subsidiary companies. ZKL bearings apply in various production lines including continuous casting plant, hot rolling trains for flat production, cold rolling mills, stainless production lines, section lines, straighteners and etc. The high quality of ZKL bearings and professional services have won the high satisfactions of HBIS. ZKL China always consider the customer need, every quarter we hold technical training or technical meeting with the end users, helping the end users solving their production questions. With the



further cooperation, ZKL brand reputation are well known in HBIS, from Deep grooves ball bearings, Spherical roller bearings, Needle bearings, Cylindrical bearings, ZKL bearing take over HBIS nearly 25% market share. In the past years, there are almost no quality claims, and ZKL bearing lifetime are always higher than the end user expectation 20%-30%, even the end user highly appreciated that "ZKL bearings are reliable as European quality, we trust ZKL".

Over the last few years, ZKL in China has developed the distribution network, of which HBIS is also its part, thanks to Mrs. Fan Zhiying. This distributor was announced the best distributor of ZKL in China last year at the annual Conference of ZKL Authorized Distributors.

Crystal Xu
Executive Director of
ZKL Bearings CZ, a. s.
Tianjin Representative Office

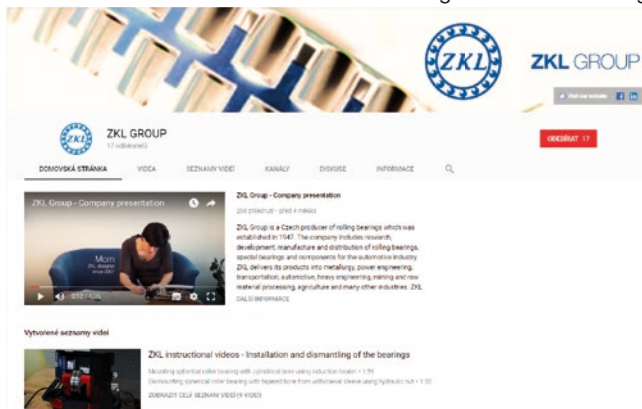
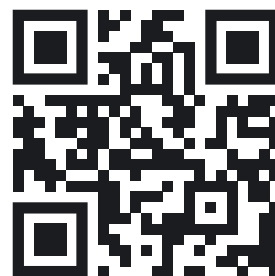
ZKL presents mounting and dismounting videos on YouTube

The ZKL Group is continuously devoted to improvement of quality of the services provided. Among others, this year's conference of the authorized distributors presented news in the field of customer service. In addition to the training of correct mounting

and dismounting of the bearings offered by ZKL - Výzkum a vývoj at the ZKL premises or directly at the customer, short mounting and dismounting videos were presented as a new service. If you are too busy to attend our training sessions in person, you may at least view our videos primarily intended for the technical and service staff. Nine mounting videos, which stepwise describe various mounting and dismounting methods, are available with Czech and English subtitles from official ZKL's profile on YouTube: www.youtube.com/channel/UC3_fTFszjIF0v4kC2oU2Ecw.

Do not hesitate to subscribe the feed because the list of videos will expand. In autumn, we will present you a video from production of railway bearings.

Ing. Hana Luxová, Marketing of ZKL Bearings CZ, a. s.





MSV 2018

INVITATION CARD

We would like to invite you to the exposition of ZKL at the **International Engineering Fair in Brno**. The fair takes place **from 1st to 5th October 2018. Hall F, stand no. 73.**

ZKL, a. s. | ZKL Bearings CZ, a. s. | ZKL - Výzkum a vývoj, a. s.
ZKL Brno, a. s. | ZKL Klášterec nad Ohří, a. s. | ZKL Tech-Tools, a. s.



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