

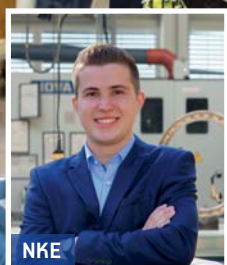
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Bearing NEWS

BEARING INDUSTRY MAGAZINE

SPECIAL EDITION

ISSUE 202131 • P918438



NKE
MICHAEL RÖSSL

Sensor Rollers:
*Raising standards for
collecting bearing data*

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Reliable Technologies Drive the Future of the Bearing Industry

In this new edition of Bearing News Magazine, we will marvel at the capabilities of modern bearings. Whether navigating the surface of Mars or speeding across earth on a newly designed bullet train, high performance bearings are helping to push the boundaries of human achievement. Highlight how companies have responded to the increased demand for improved reliability, and browse the newest product designs helping bearings operate in the most extreme environments.

Further, where there is human ingenuity, there is an infusion of technology. Bearings, especially those supporting critical industries, require innovative technological support, often in the form of advanced data collection. In this edition of Bearing News, I am excited to share a breakthrough announcement in bearing technology. The development of a fully commercial version of SKF's Sensor Roller is a milestone achievement, and one our Bearing News team is privileged to share with readers.

Lastly, as the world continues to navigate the ravaging effects of the Covid-19, online events have provided an outlet for the industry. This past March, Bearing News held the first ever "online" Bearing Expo. It covered multiple time-zones and incorporated

interactive features designed to set the stage for future B2B events. A recap of this year's event is complete with exhibitor details, along with the highly anticipated announcement of Bearing Expo 2022!

What's Rolling..

What's Rolling Further in the Bearing Industry. More details about key companies and trends, product development; a variety of predictive maintenance tools; Q & A sessions with industry professionals, and a glimpse at the China Bearing Industry Directory!

I hope that you will enjoy it!

Kenan M. Özcan
Editor in Chief



The BearingNEWS magazine is published **four times a year** in **March, June, September and December.**

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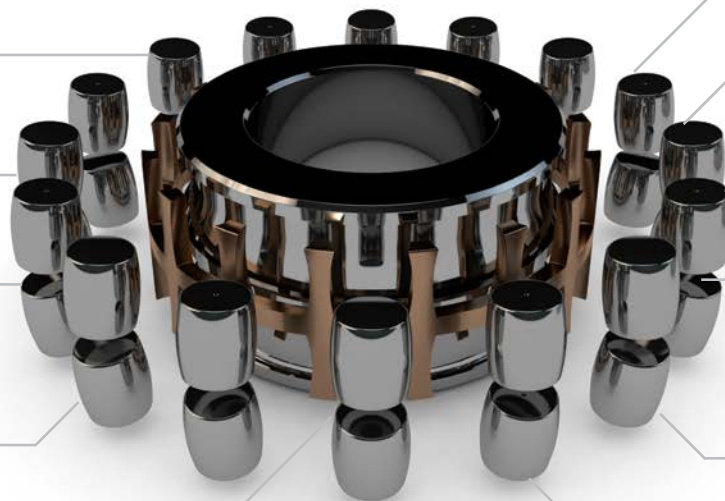
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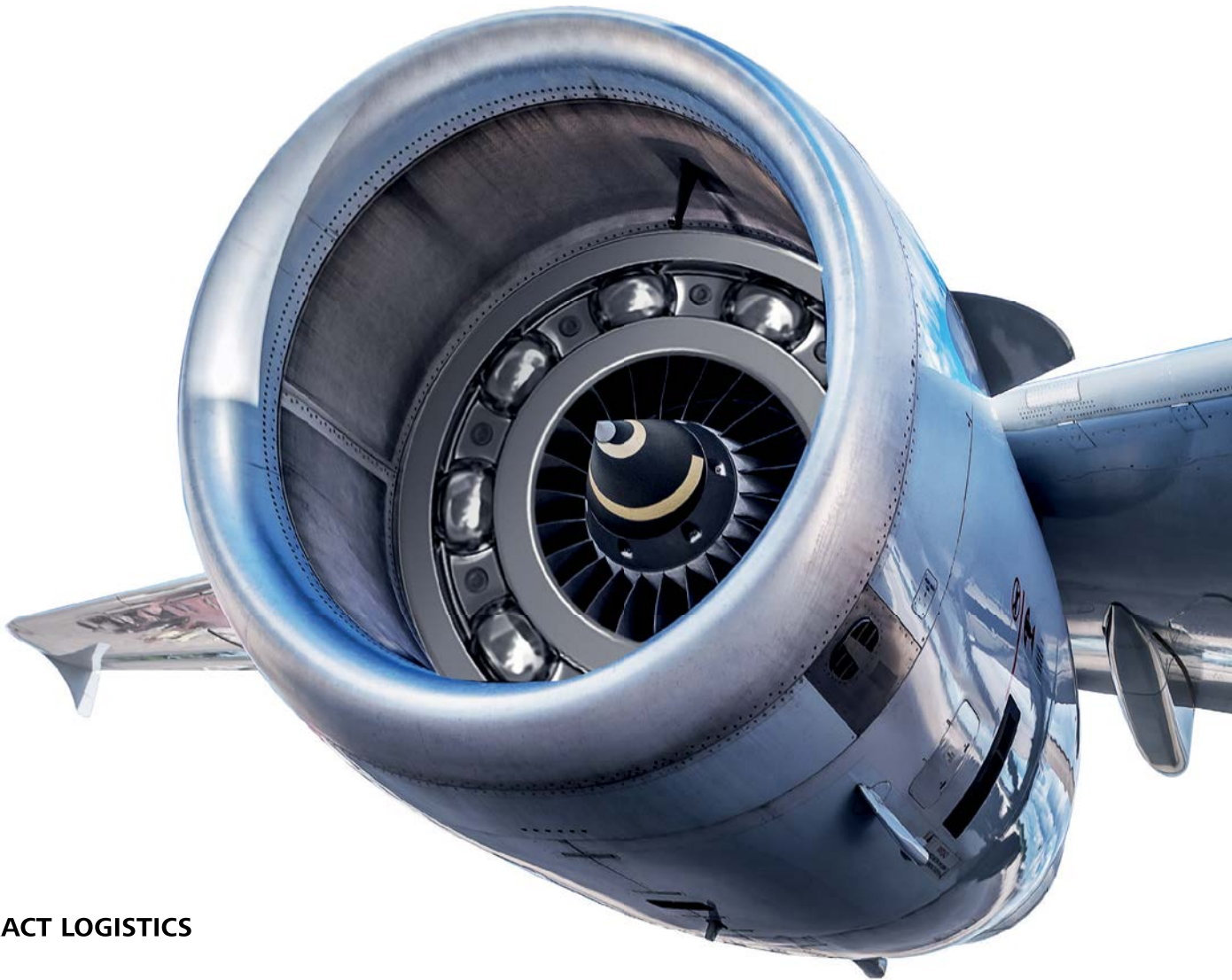
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KAYDON BEARINGS HELP MARS ROVER COLLECT ROCK AND REGOLITH SAMPLES ON THE PLANET'S SURFACE



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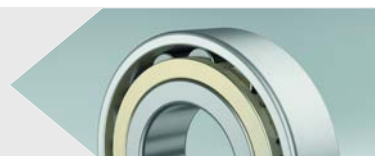
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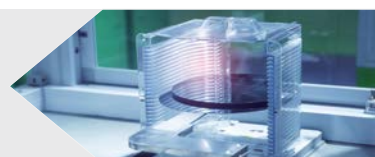


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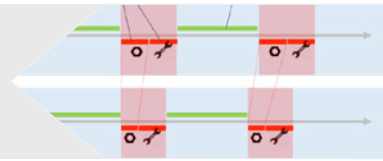


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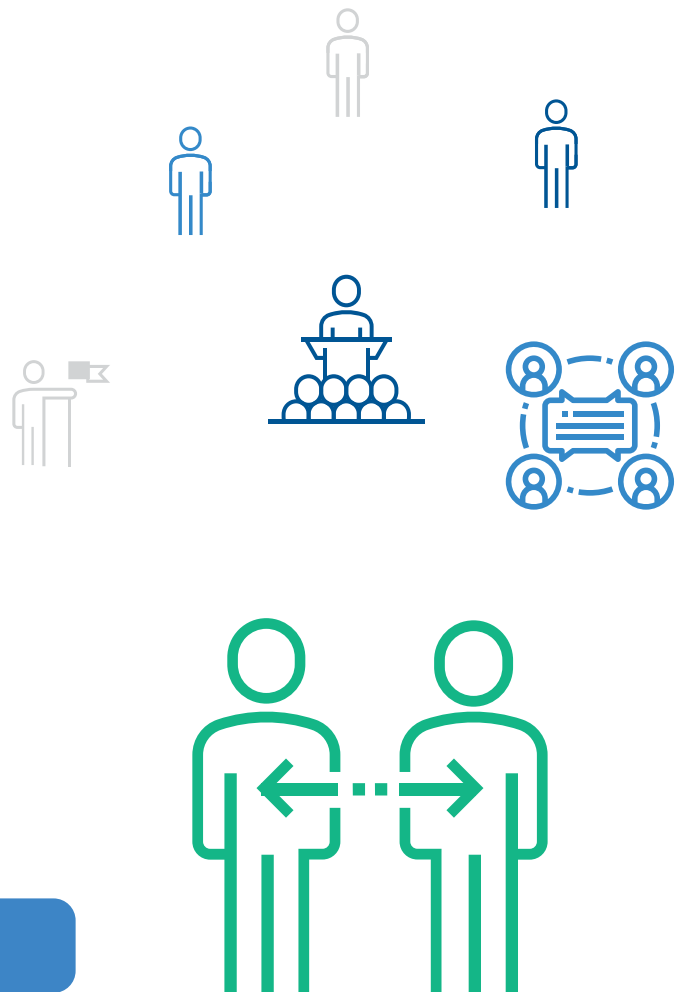
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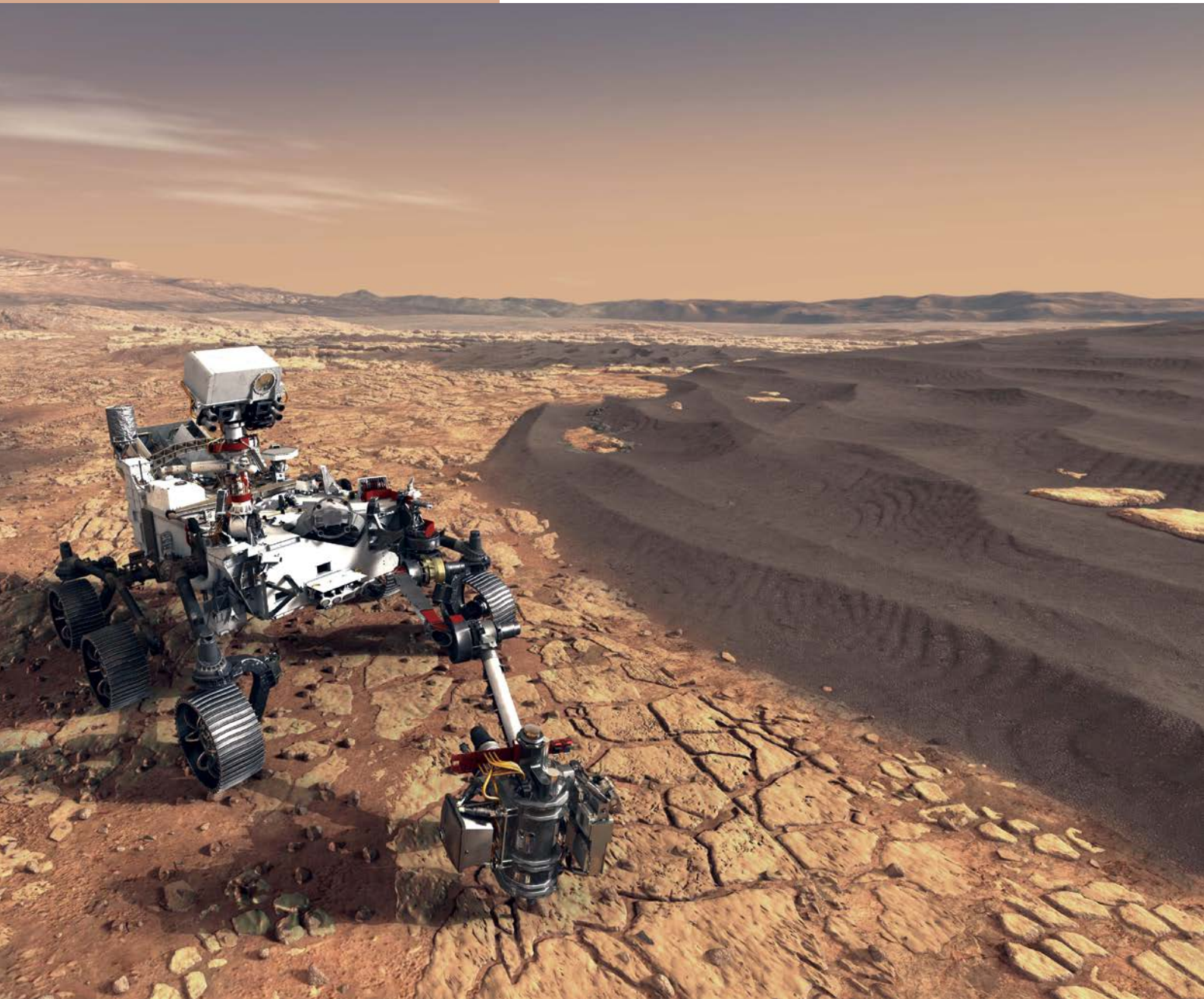
Mars

help

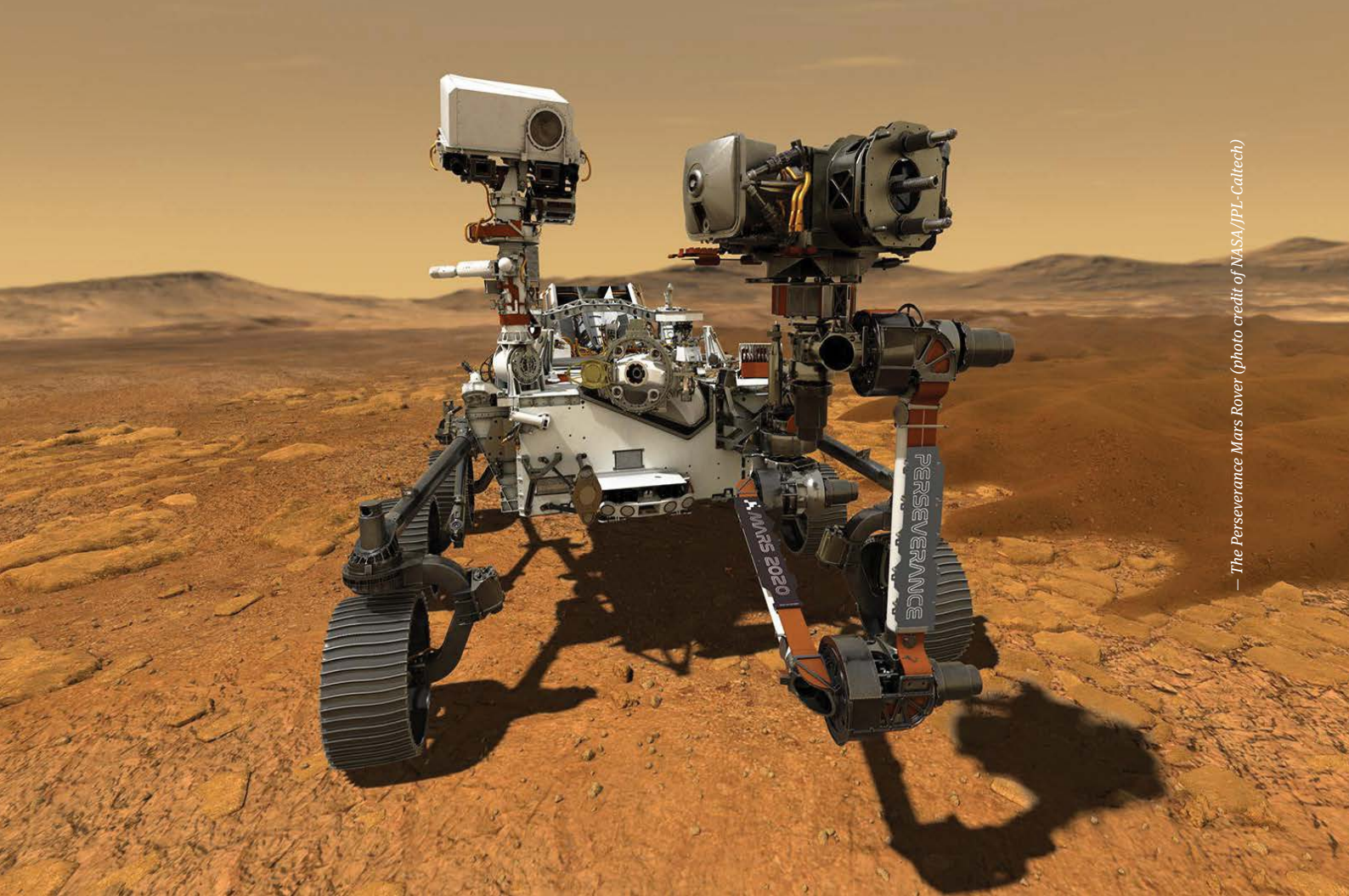
Rover



— The Perseverance Mars Rover with the robotic arm (photo credit of NASA/JPL-Caltech)



collect rock and regolith samples
on the planet's surface



— The Perseverance Mars Rover (photo credit of NASA/JPL-Caltech)

Each time the Perseverance Mars Rover collects or handles rock and regolith samples in Jezero Crater during its multiple-year mission on the surface of the red planet, key components from Kaydon/SKF will facilitate that those

activities successfully take place. Enabling the Mars Rover's core operations in the harsh environment on Mars are Kaydon Real-Slim thin-section ball bearings, designed and manufactured by Kaydon/SKF at the company's global

thin-section bearing engineering center in Muskegon, and its recently expanded manufacturing hub in Sumter, USA.

These highly engineered components contribute to the survival of the rover's

— The Mars Rover's robotic arm (photo credit of NASA/JPL-Caltech)



main robotic arm, sample collecting turret, tool bit carousel and sample handling assembly during a months-long trip through space, and its function as intended on the Mars surface. SKF also supplied critical bearings for the mission's launch vehicle which carried the rover and its lander into space.

The bearings will play an integral role in the vital process of sample collection on Mars. When the rover is ready to begin collecting samples on the surface, the robotic arm will maneuver into place and the tool bit carousel will whirr into action, deploying tools to drill or abrade material, which will then be collected by the sample collecting turret (aka "the hand") and transferred to the sample handling assembly for processing onboard the rover, and eventually a potential return to Earth for analysis via a future Mars mission.

"The bearings we designed and built to help the rover perform its core science activities were based on several models of Kaydon thin-section ball bearings customized by our engineers to minimize weight and save space, while retaining maximum functionality and reliability for a mission where repair or replacement is simply not an option," said Isidoro Mazzitelli, Director of Product Development and Engineering Americas. Space applications must be a small fraction of the weight of standard bearing assemblies.

Kaydon bearing solutions are often customized from baseline models for specific customers and commonly used in applications that require a careful balance between strength, weight, size, functionality and reliability – including robotic surgical equipment, automated precision manufacturing, detailed

painting, aircraft systems, airport security scanners and medical CT imagers.

In addition to the latest mission, SKF has a decades-long history as a supplier to global space programs, dating all the way back to NASA's Apollo 11 mission. "Our company's bearings, seals and other products have helped enable a wide range of spacecraft and missions for more than 40 years," said John Schmidt, President, SKF USA, Inc. "Our parts have flown on the previous space missions, dozens of commercial and government satellites, space-borne telescopes, a wide range of rocket launch vehicles and in astronaut's spacesuits. When conditions become critical and applications demanding, engineering knowledge is the only way to success."

Link to video: <https://youtu.be/grkJ8CYzJNc>

—Kaydon Real-Slim thin-section bearings (photo credit of Kaydon)



Michell Bearings' Unique Capability a Success for Nuclear Station Blackout



Michell Bearings has successfully completed station blackout (SBO) tests on a thrust and guide bearing used within the reactor coolant pump at a new build nuclear power plant.



In what is thought to be one of the world's first successful bearing run downs, the test demonstrated the bearing's ability to survive a station blackout condition without the use of an externally powered high pressure oil injection system.

Failure of the on-site power generators concurrent with the loss of offsite power ultimately results in a station blackout condition as there is no on-site electricity available to power the high pressure oil injection system.

In order to meet testing requirements, the bearing must be able to run down to a stop, under full load, and restart without any subsequent intervention.

As part of the contract to supply six thrust and guide bearings, a custom made test rig was constructed at the Michell Bearings site in order to satisfy the test conditions. The test rig was designed to closely replicate

real world bearing operating conditions such as the possibility of a station blackout, where the bearings are required to shut down safely without the aid of electrical power to drive the reactor coolant pumps.

Paul Bruce, Engineering Director at Michell Bearings, said: "We were delighted to be able to provide a solution to satisfy such challenging conditions. This is testament to the operation of our bearings, along with our high levels of research and development.

"Damage to the working surfaces of the tilting thrust pads is not permitted. The combination of full thrust load and very slow rotational speeds over a sustained period results in the bearing operating under very low oil film thicknesses. Consequently, special design considerations are required to survive such a condition."

The bearings were designed, manufactured and tested at the Michell Bearings manufacturing site based in Newcastle upon Tyne, UK.

This latest success comes after Michell Bearings developed and successfully station blackout tested a set of thrust internals with a leading European reactor coolant pump manufacturer in 2018.

Notes to editor

Michell Bearings designs and manufactures hydrodynamic white metal and PTFE lined bearings for clients across the globe. Founded in Newcastle upon Tyne in 1920, Michell Bearings has celebrated 100 years of manufacturing products including horizontal bearings, vertical bearings and tilting pad bearings for the industrial, commercial marine and naval markets.

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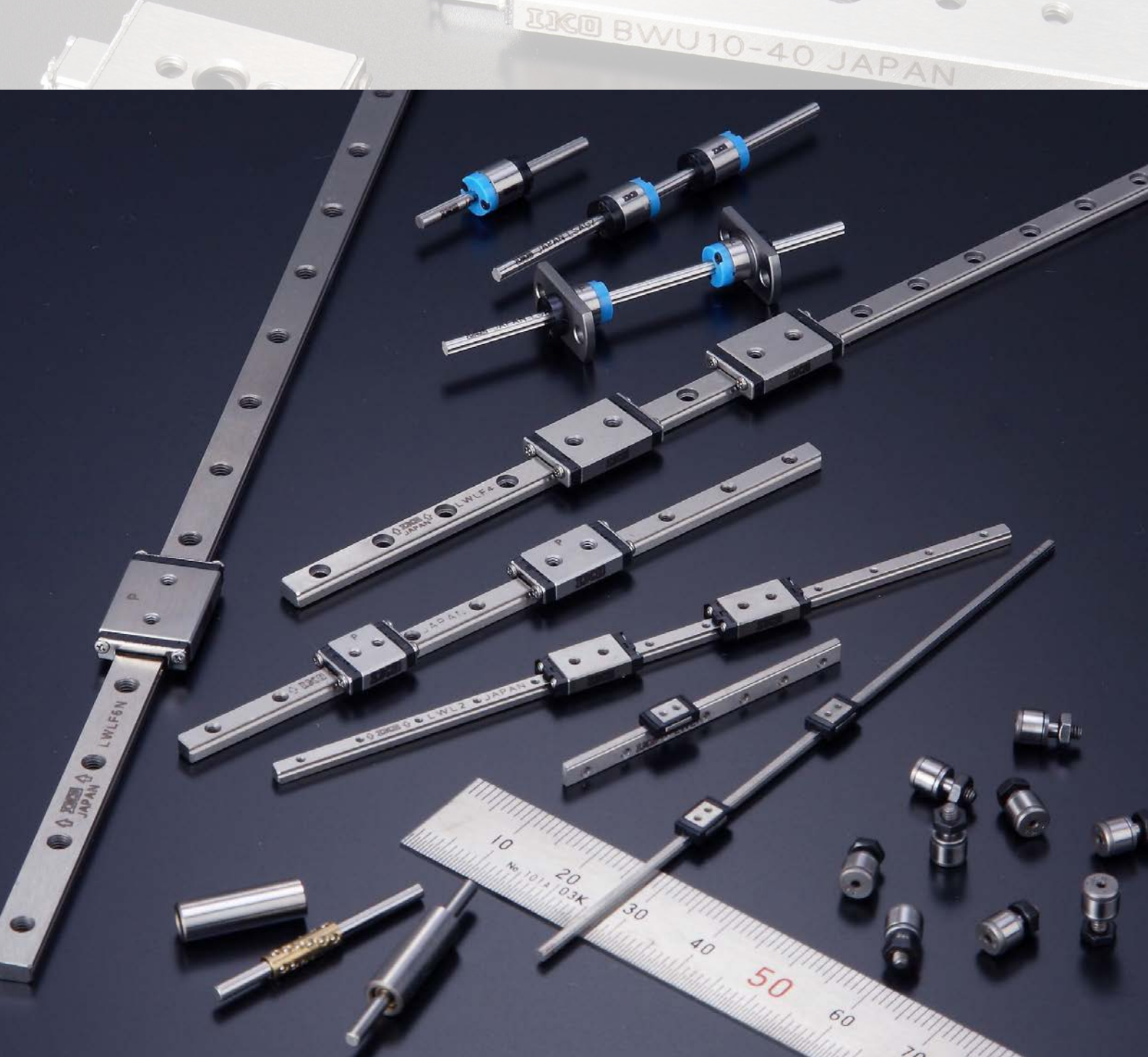
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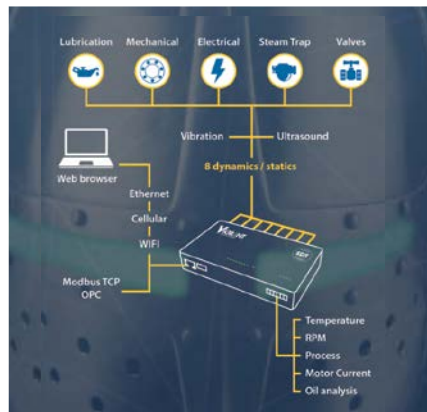
SDT Proudly Announces Vigilant

A condition monitoring solution combining the versatility of ultrasound with the analytics of vibration

SDT Ultrasound Solutions is excited to announce the release of Vigilant, the newest addition to its family of permanent condition monitoring solutions. Vigilant is an 8-channel online condition monitoring solution that combines the versatility of ultrasound diagnostics with the analytics of vibration data. An additional 4 channels allow inputs for more conventional machinery information such as temperature, RPM, and other process data.

Vigilant is a stand-alone solution. With its own embedded software contained within the measurement pod, anyone with network credentials has access to critical asset health via a web browser. Using standard communications protocols like Ethernet, OPC, and Modbus TCP, Vigilant's communication capabilities makes the sharing of asset data to other information systems easy.

"There are many applications where using a single condition monitoring technology to attempt to identify a failure mode doesn't net the outcomes needed by reliability planners," explains Vigilant product specialist Robert Dent. "Vigilant combines insights from two proven technologies to bring conditional data into a common location, while providing industry standard tools to perform analysis."



As assets become more heavily guarded for safety protocol, condition monitoring teams need more creative ways to access collection points. Vigilant solves the accessibility dilemma by mounting low-cost, high-quality permanent ultrasound and vibration sensors to the asset, and then connecting the data directly to the asset owner.

"SDT Ultrasound Solutions has always provided ways to collect and combine Ultrasound and Vibration measurements with our handheld portable systems," said SDT's Benoît DEGROEVE, area sales manager and Vigilant product specialist in Europe.

"Today, we do the same thing with Vigilant, in a safe, reliable and permanent way."

Vigilant is available in two configurations: Mobility and Permanent. Vigilant Mobility comes packaged in a rugged, environmentally protected carrying case and is designed to travel with you to field-level critical assets where temporary 24/7 monitoring is required. Vigilant Permanent installs and remains on an asset for its life cycle. Protected in your own enclosure, Permanent requires a 24V power source and communications connection.

Vigilant manages both Static and Dynamic data, creating an opportunity to establish long-term trending, analysis, and diagnosis at the earliest point in the failure curve.

About SDT

SDT provides ultrasound solutions that help our customers gain a better understanding about the health of their factory. We help them predict failures, control energy costs, and improve product quality while contributing to the overall reliability of their assets.

Web link: <https://sdtultrasound.com/products/permanent-monitoring/vigilant>



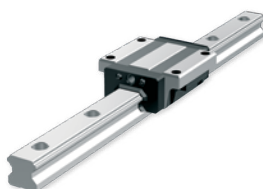
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Couplings



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Hybrid bearings from NKE are suitable for tough industrial applications

Industrial applications in challenging environmental conditions call for special bearing solutions. Bearing manufacturer NKE Austria GmbH has developed hybrid bearings for precisely these applications. Their advantages are presented here.

NKE hybrid bearings consist of ultrapure steel bearing rings and ceramic rolling elements made of bearing grade silicon nitride Si_3N_4 . "At first glance, this material pairing is highly unusual, but it offers many advantages in an enormous range of applications, which significantly increases the reliability of the overall system," says Michael Rössl, Application Engineer at NKE in Steyr, Austria.

The silicon nitride rolling elements are 60 percent lighter than those made from steel and are suitable for very high rotating speeds. "Consequently, NKE hybrid bearings can reach limit speeds that are over 20 percent higher than conventional standard bearings," says Rössl. "Even at these very high and demanding speeds, NKE hybrid bearings demonstrate excellent performance characteristics and minimal running noise. There are therefore particularly well suited for use in high-speed electric motors."

The ceramic rolling elements have high wear resistance and can achieve better results under extremely demanding conditions, such as poor lubrication, thereby extending service life significantly. "The very good 'dry-running properties' of a hybrid bearing play an extremely critical part in substantially enhancing the reliability of an application," adds the application engineer.

The tribological properties of a hybrid bearing are very good due to the special material pairing of ceramic and bearing steel. Very little frictional heat is generated, even at high speeds. "In turn, this also means that there is less power loss at the bearing and by extension in the application as a whole," explains Rössl. "Moreover, a hybrid bearing has a low breakaway torque."



— Deep groove hybrid ball bearings from NKE in various cage designs: with brass cage (top left), steel sheet cage (top right), polyamide cage (bottom right and bottom left)

In addition, the service life of the bearing is extended by the use of ultrapure bearing steel. The rolling elements are corrosion-resistant and have very high rigidity. The raceway and roller geometry of the hybrid bearings have been specially optimised to guarantee perfect contact geometry and high load capacity. "The hybrid bearings can also offer good protection against 'standstill marks', also known as 'false brinelling'," Rössl explains another advantage of the new bearings.






Typical applications for hybrid bearings include electric motors (AC/DC), wind turbine generators, high speed applications or traction motors for railway vehicles. "In fact, hybrid bearings with ceramic

rolling elements are primarily designed for applications in which maximum electrical isolation is required and/or high speeds are involved. Hybrid bearings offer maximum isolation protection because the ceramic rolling elements themselves have an electrically insulating effect and thus prevent a corresponding passage of current," says Rössl. "The use of frequency inverters often causes electrical damage to the bearing. With lower currents, a bearing with an electrically insulating coating among other measures can help to alleviate this. But only a hybrid bearing offers optimum protection against very high currents."

And the service life of the bearing can be

extended substantially in other applications as well through the use of rolling elements made from silicon nitride. The table below provides an overview of the most common hybrid bearing applications and the advantages of the bearings:

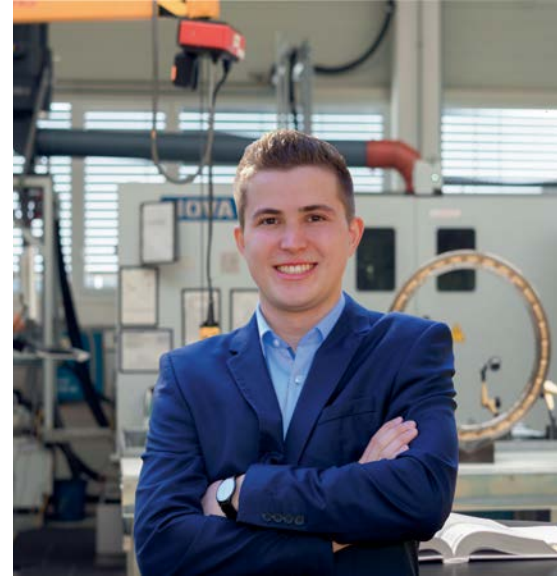
hybrid bearing types include deep groove hybrid ball bearings, which are available from stock or with short lead times. Other bearing types or special designs can be manufactured to customer specifications upon request. Existing bearings can be

ADVANTAGES OF HYBRID BEARINGS WITHIN DIFFERENT APPLICATIONS:		Electrical insulation	High speed suitability	Extended service life	High wear resistance	Low running noise behaviour	Insensitive to false brinelling	Low friction	High rigidity
Electrical Drives - Electric motors - Generators		×	×	×	×	×	×	×	
Wind - Wind Generators		×	×	×	×	×	×	×	
Mechanical Drives - Gearboxes			×	×	×		×	×	×
Railway - Traction Motors		×	×	×	×				
Pumps & Compressors			×	×			×	×	

Depending on the demands of the application and the size of the bearing, the cages for the hybrid bearings are available in steel sheet, brass or polyamide; customised cage designs are also possible at the customer's request. Frequently used

replaced easily: "NKE hybrid bearings can replace conventional standard bearings without any modifications at all," says Rössl. "No additional tools or special skills are required to replace them."

— Deep groove hybrid ball bearings from NKE with ceramic rolling elements and polyamide cage



— Michael Rössl, Application Engineer at NKE in Steyr, Austria

Company information:

NKE Austria GmbH is a bearing manufacturer with headquarters in Steyr, Austria. The company was founded in 1996 by a group of senior staff members of former company Steyr Wälzlager. Spanish bearing manufacturer Fersa Bearings, which is specialised in the automotive sector, acquired 49 percent in NKE in 2016 and completed the acquisition with 100 percent at the end of 2018. NKE offers both standard and special bearings for all industrial applications. Engineering, product development, production and final processing of components, assembly, quality assurance, logistics, and sales and marketing are centralised at its Steyr headquarters. The factory in Steyr is certified to ISO 9001:2008, ISO 14001:2004 and OHSAS 18001. A wide range of standard bearings is available from stock or at short production lead-times. NKE also provides customized products and solutions. In addition to product development and application engineering NKE provides a full range of technical services, consulting, documentation and training. NKE's products are distributed through 12 international offices and more than 240 distribution outlets in 80 countries. Visit www.nke.at for more information



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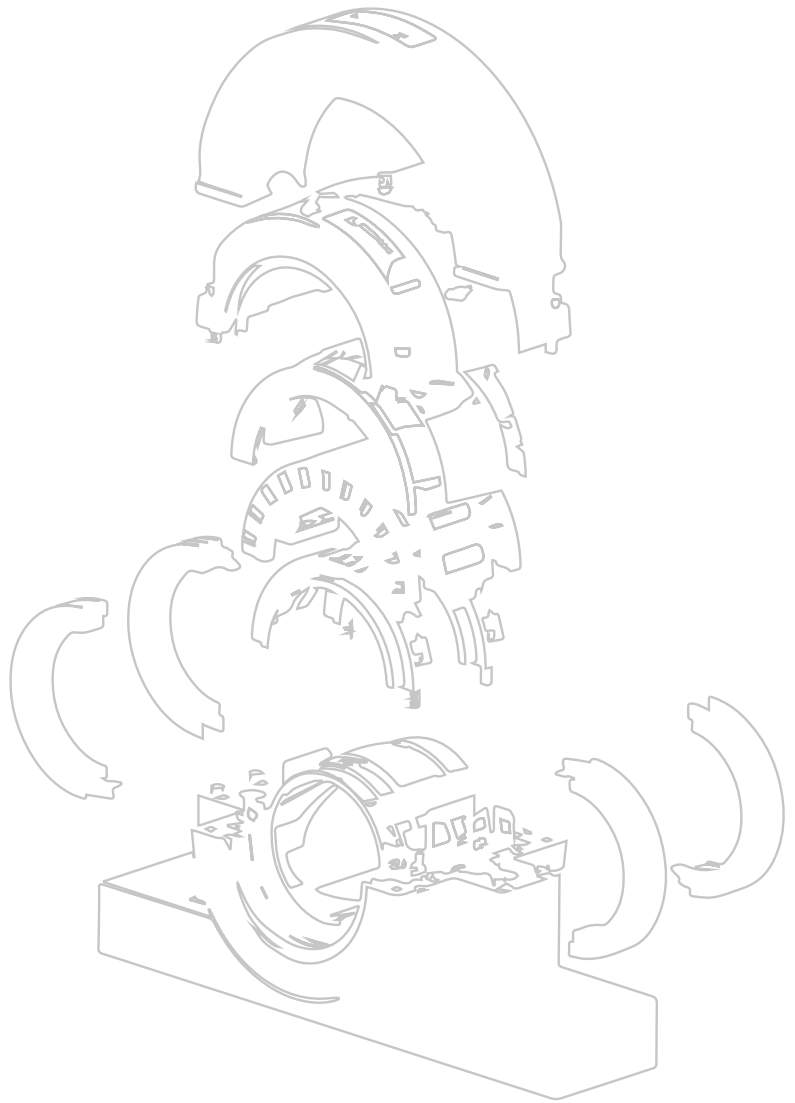
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- HIGHLY DURABLE INVESTMENT

**Higher
Capacity
Split
Roller
Bearing
Set to
Transform industry**



 **BOWMAN**

Global bearings innovator, Bowman International, has launched to market a split roller bearing with substantially higher radial and axial load capacities.



Ideal for applications such as propulsion shafts in ships, screw conveyors in abrasive industrial environments and conveyor drives in the mining sector, the new Bowman Advanced Split Roller Bearing offers up to 75% higher radial load capacity and up to a 1000% increase in axial load capacity in both directions.

Ian Breeze, Technical Director for Bowman, comments on the significance of this innovation: “For the first time, plant manufacturers and maintenance engineers across all heavy-side sectors can specify a split roller bearing that does not rely on race lips alone to accommodate axial force in high-load applications. The new Bowman Advanced Split Roller Bearing comprises two independent 3D-printed axial bearings designed to accommodate greater loads, improving system performance with less maintenance and reduced unplanned machine failure.

In fact, compared to other market-leading split bearings, the Bowman Advanced Split Roller Bearing increases bearing L10 life by up to 500 per cent.”

Meeting the bearing demands of modern industry

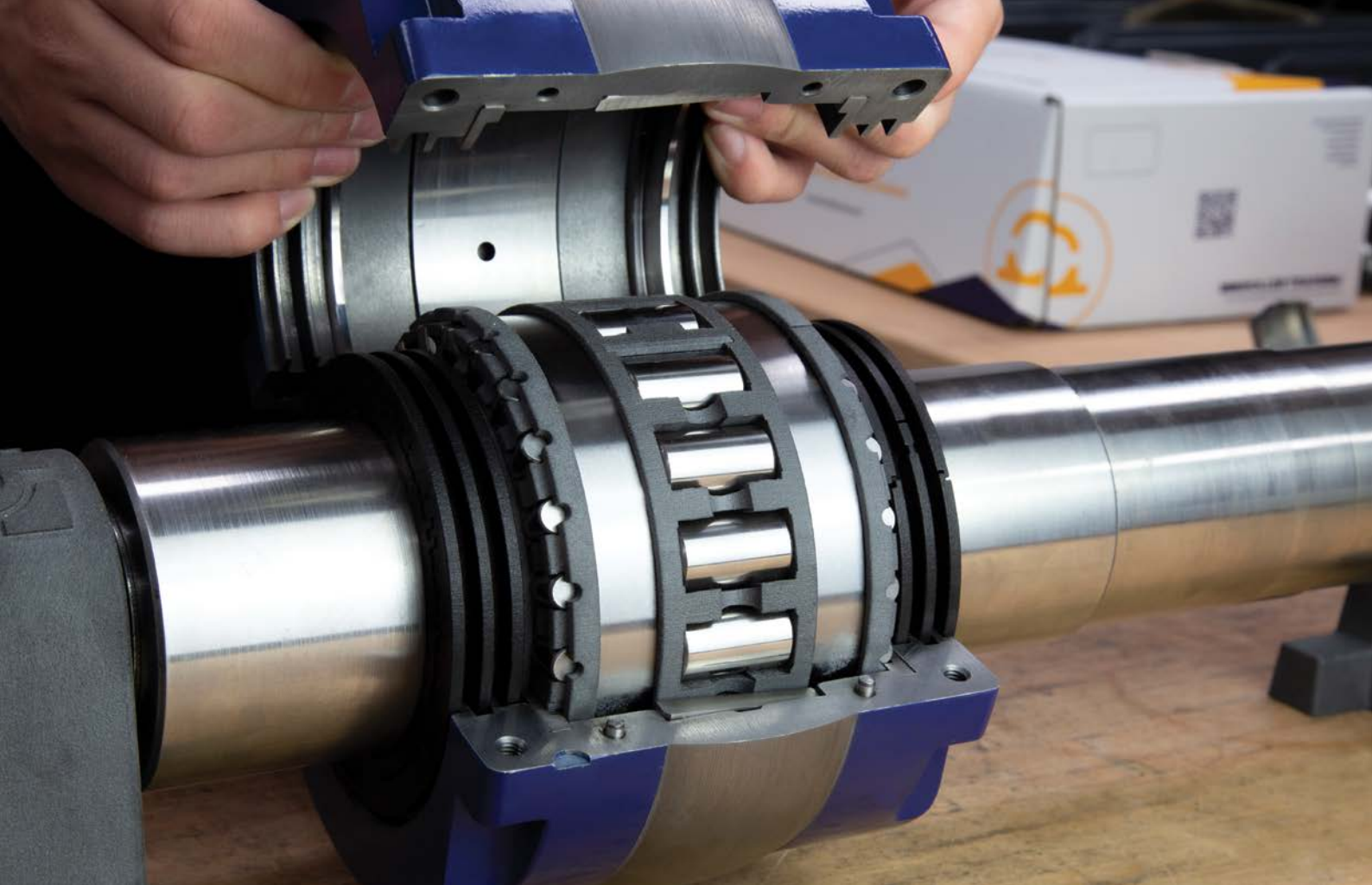
Time and cost pressures affect all sectors and for industrial applications, the need to produce more, faster, takes its toll on machinery, meaning components must be

able to withstand the additional load. For decades, the split roller bearing market has stood still, unable to accommodate the evolving needs of these vital high-load applications, resulting in more maintenance, expensive downtime and lost production capacity.

This is a challenge Bowman tackled head on and now, thanks to the technological possibilities of 3D printing, there is a split roller bearing with

“ When space is limited, engineers often need to disconnect the coupling and move other equipment, such as motors, gearboxes or pumps out of the way before they can slide solid bearings off the shaft for replacement or maintenance ”

Ian Breeze, Technical Director for Bowman



enough thrust capacity and increased radial load capacity to replace solid spherical roller bearings in rotating machinery. The resulting reduction in downtime, quicker maintenance processes and improved machine performance all translate to cost and time efficiencies.

Up to ten times faster bearing changes

Delivering up to ten times faster bearing change times compared to solid bearings, Bowman Advanced Split Roller Bearings have been designed with speed of maintenance in mind.

“When space is limited, engineers often need to disconnect the coupling and move other equipment, such as motors, gearboxes or pumps out of the way before they can slide solid bearings off the shaft for replacement or maintenance,” explains Ian.

“Split roller bearings can be assembled radially around the shaft, eliminating these additional logistical challenges and making maintenance and replacement a lot faster and more cost-effective. To further enhance time and cost savings, the Bowman

“ Split roller bearings can be assembled radially around the shaft, eliminating these additional logistical challenges and making maintenance and replacement a lot faster and more cost-effective. To further enhance time and cost savings, the Bowman Advanced Split Roller Bearing uses the rollers to lock the two cage halves together, eradicating the use of small and easy to lose clips and other locking components

Ian Breeze, Technical Director for Bowman ”

Advanced Split Roller Bearing uses the rollers to lock the two cage halves together, eradicating the use of small and easy to lose clips and other locking components.”

Compatible with existing competitor housings

As part of the Advanced Split Roller Bearing portfolio, Bowman has created a range of dimensionally interchangeable retrofit products that can be fitted directly

into the existing competitors bearing housings to quickly and cost-effectively improve radial and axial load capacities.

These Interchangeable Split Roller Bearings have been designed with equivalent critical mounting dimensions to all other leading bearing brands, so that they can slot directly into other manufacturer's cartridges for instant performance improvements. In fact, retrofitting existing bearings, but keeping the housing in-situ can exceed the

capacities offered by the current market leader by up to 26 percent, resulting in up to double the bearing L10 life, reduced downtime and increased productivity.

The Interchangeable Split Roller Bearings are available in 01/01E/Light series from 30mm to 300mm and 02/02E/Medium series from 190mm to 300mm shaft sizes.

A benefit-rich split roller bearing designed to perform

Further enhancing the performance of this revolutionary split roller bearing is a patented triple labyrinth seal which not only offers a tighter seal than other split bearings, but also reduces the need for costly removal, machining or replacement of worn shafts.

When a shaft becomes worn, engineers can simply fit a new extended seal covering the undamaged part of the shaft, without compromising performance and without the need for extended downtime.

Alongside the significant increase in radial and axial load capacity, this new bearing design offers a range of additional installation and performance benefits, such as larger diameter screw sizes to accommodate increased capabilities for the clamp rings, cartridges and pedestals and roller pockets with cavities to hold the grease against the rollers.

Connectivity and data-driven performance analysis

To support the smart factory evolution and the integration of connectivity into industrial environments, Bowman offer the addition of temperature and vibration monitoring sensors that can gather data in real-time and alert maintenance engineers of pending machine failure.

Real-time monitoring of bearing conditions can assist with predictive maintenance and reducing downtime, alerting the engineer via smartphone or the site's building management system.



“ In fact, compared to other market-leading split bearings, the Bowman Advanced Split Roller Bearing increases bearing L10 life by up to 500 per cent.” ”

Ian Breeze, Technical Director for Bowman

Bespoke adaptations within short lead times

High-load applications often operate in abrasive, unpredictable or complex conditions, and asset owners may require special bearing adaptations in order to optimize the performance of their system.

With inhouse 3D printing capabilities and a team of dedicated innovators, Bowman can offer a full consultation and design service to create bespoke adaptations deliverable within short lead times.

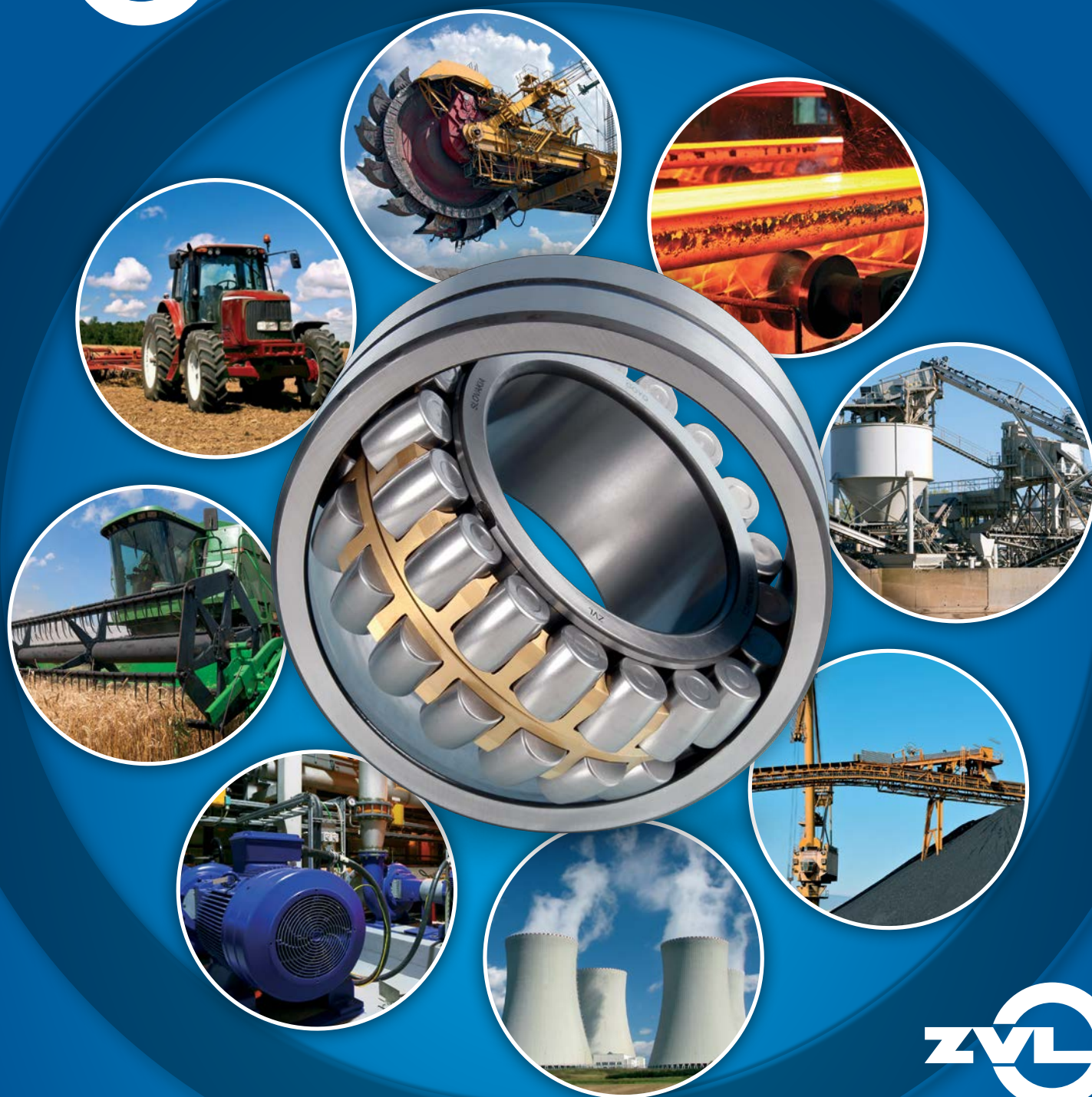
Ian adds: “We have the facilities and the technical design skill to understand any non-standard bearing application quickly and respond to customer needs with innovative, durable and cost-effective solutions. For the heavy-side industries, bearings are not always an off-the-shelf purchase and Bowman prides itself on being the manufacturer of choice, not just for straight-forward, high-volume installations, but for more complex and niche product requirements too.”

Optimised performance at a market-leading price point

When designing the Advanced Split Roller Bearings, Bowman strived to create a product that surpassed all performance boundaries in the split bearing market at a price point that was competitive for OEMs and end users.

Ian concludes: “Bowman is a proud innovator of bearing solutions that solve real industry issues. We are the first manufacturer to create a split roller bearing capable of increasing the lifespan and performance of high-axial load systems and thanks to the production benefits of 3D printing, we have been able to deliver this product to market at a price point up to 20 per cent lower than other leading split bearings. These cost savings were something we were keen to pass on to customers.”

For more information on the Bowman new Advanced Split Roller Bearing, visit www.bowmansplitbearings.com



ZVL SLOVAKIA, a.s.

Na stanici 22 • 010 09 Žilina • Slovakia

Phone: +421 41 707 60 32 • Fax: +421 41 707 60 24 • sales.zvl@zvllovakia.sk • www.zvllovakia.sk



Online & Hybrid Events are here to stay...

2020-2021 has forced extreme changes for ‘in person’ conferences and business events. In the midst of travel restrictions and stay at home orders, members of the global economy have been forced to abandon congregating in large groups. In response, early adopters have taken the necessary steps to host online events. For example, Bearing Expo & B2B Meetings, which has historically been an ‘in-person’ event, occurring in a multitude of countries, has taken place “live” online on 15-18 March 2021. This begs the question; will these events remain online and what type of reception will they get? The answer may surprise you.

It's safe to say that before COVID-19, most businesses were already embracing the advancements in technology in order to save time, effort and money. Video conferencing and online chat options had partially replaced our need to visit each other, and had also become comfortable alternatives to in person meetings. But by no means were these platforms completely replacing or eliminating physical trade shows, until the pandemic that is.

It would seem that the coronavirus has forced us to adapt to online event platforms. We don't have the luxury of

judgement to decide whether we want to use them or not. We are dependent on them for international event hosting until

the threat of the coronavirus subsides. This circumstance will undoubtedly create comfortability, ease of use, and

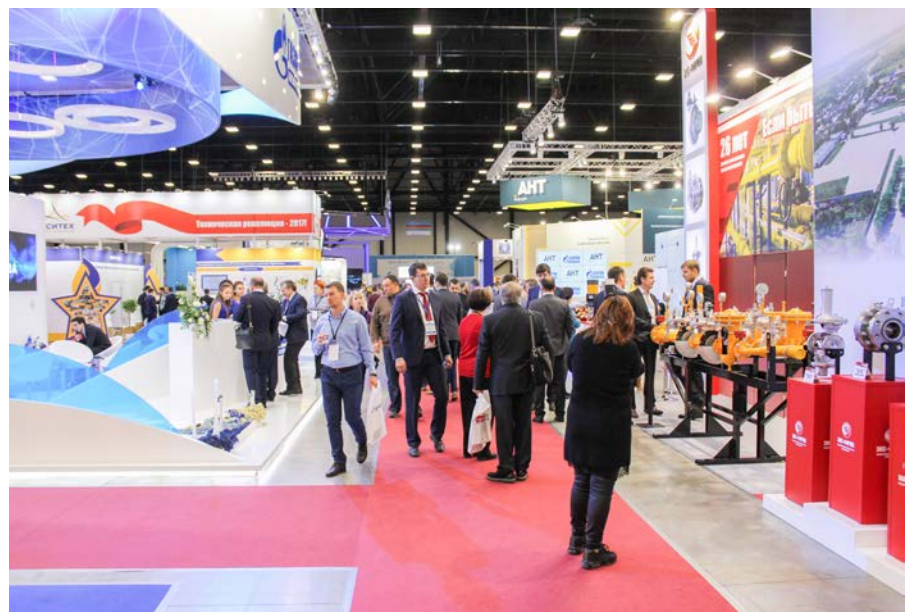
“ Hybrid events will retain the ease of online use, most likely incorporating more online technology into physical events, such as matchmaking features with the implementation of AI algorithms and machine learning. ”





adaptation to using these systems which will drive further online interaction. So, is it really possible that we may never return to the traditional 'in person' events, as we know them before the pandemic?

Many companies are pondering this question. It is impossible to ignore the volume of online traffic for virtual events. Likewise, overhead is substantially reduced, and the online communication platforms are certainly reliable enough to host many participants over multiple time zones. But then again, we humans are social creatures. If we have learned anything from the pandemic, it's that isolation is tough. We long for the days we can attend events, see other people, and share a common in person bond. For this overwhelming reason, 'in person' events will certainly remain. But do not expect things to return to "normal," and never discredit something as economically effective as online interaction. Hybrid events will retain the ease of online use, most likely incorporating more online technology into physical events, such as matchmaking features with the implementation of AI algorithms and machine learning. The platforms that we once considered awkward and difficult to adapt to, are quickly becoming more commonly used and comfortable.



Bearing Expo & B2B Meetings had almost 1,100 attendee inquiries within the first several days. This staggering immediate interest showcases the reach of such a global event as well as the longing for business interactions. The coronavirus pandemic has, and will continue to, transform more online global events, and offer opportunities for an enormously large variety of matchmaking business to business opportunities. Although all signs point to the second

half of 2021 as a better period, there is certainly a difficult road ahead until physical events are once again confirmed, especially those that largely depend on international guests. It may be quite some time before certain countries allow foreign travelers, and even longer before we all feel completely comfortable gathering. So, for now, embrace the online events, make yourself familiar with change, and adapt your business accordingly.



First Bearing ever EXPO online & B2B meetings

outperformed all expectations

2021's online Bearing Expo & B2B Meetings event, which took place on 15-18 March, hosted **1,057** guests from all around the world, covered multiple time-zones, and set a precedent for future shows. The new revolutionary format was widely embraced by the global bearing community and retained an impressive **73%** of registered guests. The large turnout was coupled by a remarkably high amount of user interaction across a variety of features.

Participant	One-to-one meetings
1057	653 <i>total meetings</i>
One-to-one chats	
1627 <i>conversation</i>	5014 <i>messages</i>
Polls	
22 <i>polls created</i>	425 <i>polls responses</i>
Average Time Spent in Event	
569,13 <i>minutes</i>	

Participants were free to come and go at their convenience, but on average spent a total of 569 minutes on the platform at any given time. With access to video and chat functionality, attendees participated

in over **653** video meetings and shared over **5,014** messages. A hefty majority of time was also spent participating in the B2B networking section of the event, along with the main expo area where attendees

explored exhibitor booths. Furthermore, significant interaction took place at the stage section of the event where expert speakers provided unique industry insights and answered questions during Q&A sessions.

Bearing Expo 2021's success in the new virtual space was groundbreaking and directly correlated to the significant amount of preparation from the exhibitors, conference speakers and organizers that went into the show's development.

Moving forward steps are being taken to make future shows even more efficient through added system functionalities. While there have been no official schedule announcements, the new additions, alterations, and improvements will be on full display in the latter half of 2021.

For a more detailed look at this year's Bearing Expo, please find the below the exhibitor booths, as well as speaker contact (LinkedIn) information. As last but not least we would like to thank all the participants and look forward to meet again in the near future!

Sponsors

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BRONZE SPONSORS



EXHIBITOR COMPANIES



Bearing Expo 2021 presentation videos

You can re-watch all the technical and market presentations which were presented during the online Bearing Expo 2021 event. All the videos include a link at the bottom to the linkedin profile of the experts and speakers, in case you would like to connect or ask a question.

Link to videos: www.bearing-expo.com/expo2021/presentations

Conference Speakers & Experts



Hagen Elgeti

Elgeti Engineering GmbH

Development of Bearing Suppliers and Quality Control during Purchasing



Dave Hull

Precision Components

The Evolution and Future of the Global Bearing Industry



Haris Trobradovic

SDT Ultrasound Solutions

Lubrication is not an island: Ultrasound Guided Condition Based Lubrication



Toon Van Grunderbeeck

Lubretec

Lubrication Reliability Fundamentals



Juergen Lauer

Rohmann GmbH

Eddy Current Inspection on Bearing Rings and Rollers



Markus Raabe

Mesys AG

"You need a Bearing Stiffness? Which one?" Remarks and Influence Factors for Stiffness of Shaft-Bearing Systems



Vikas Manral

SolutionBuggy

Recovery of the Bearing Industry



Rich Wurzbach

MRG Laboratories

New techniques for grease sampling and analysis to enhance reliability and extend bearing and grease life



Blair Fraser

UE Systems

Reimagine Bearing Lubrication with IIoT and Ultrasound



Mark Roberts

OTB Solutions

How to design and deliver conversations in the Bearing Industry, that lead to revenue (virtually)?



Todd Snelgrove

Experts in Value

Bearing Distributors and Manufacturers working together to change the discussion with customers to "Value First Then Price"



Ian Knight

Enluse BV

The Lube Room is the Foundation of Bearing Reliability



Pratap Kambley

Caravan Reliability Services

Case study on "How fretting corrosion can crack bearings in a wind application" and "The use of ultrasound for monitoring slow speed bearings"



Alejandro Perez Martinez

Grupo MTF

Correlation between laser shaft alignment & Bearing Life: A Holistic point of view



Sebastiano Rizzo

Tsubaki Nakashima Co. Ltd.

Modelling of Bearing Ball Lapping Machines for Vibration Monitoring and Quality Control



Christoph Martin

Georg Martin GmbH

Bearing Clearance Compensation and Shimming Strategies



Per Arnold Elgqvist Olsson

Tribologia

Bearing Reliability Assurance



David Beattie

DASH Engineering

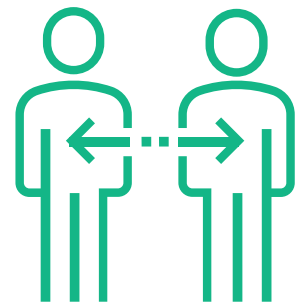
Mining Industry Application for Bearings: Myths & Reality

Bearing EXPO

14 – 18 FEBRUARY
2022

5 days “live” Online Exhibition,
B2B Matchmaking and Conference for
Bearing & Power Transmission
Industry Professionals

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Ball Bearing
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KEEP ON IMPROVING

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www.ruwhbearing.com pauline@ruwhbearing.com +8613958298821



Streamline your warehouse processes – PICARD contract logistics

From today, PICARD offers full logistics services for manufacturers and distributors of roller bearings and linear technology.

We take care of the entire logistics process on your behalf: from incoming goods to storage, order picking to dispatch - and of course, returns processing. Benefit from our know-how and 100 years of experience in the roller bearing trade, and take advantage of access to our global logistics network.

Your benefits:

- Same-day shipping for orders placed before 7pm
- Extensive express and courier delivery options
- Disruption-free communication via EDI
- Over 80 logistics specialists ensure reliable processing
- Transparent pricing structure

Focus on your core business and customer care, and let us take care of the rest. PICARD LOGISTICS – your logistics processes in our expert hands.

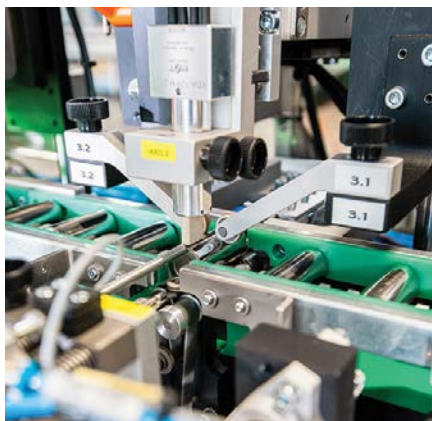


**Company details
and exhibit information**

www.bearing-expo.com/c/picard



Crack and grinding burn testing of rolling elements with the Rohmann ELOTEST PL600



Nowadays bearing rings and rolling elements are widely used in a great variety of dimensions. They transfer power, so that everything revolves, from the smallest drills to the wheels on a car up to the large rotor blades of a wind power plant. In order to ensure the consistent quality of the parts, they are 100 percent tested and the results are documented.

The digital eddy current testing instrument ELOTEST PL600 from Rohmann is used in an automated testing systems for the non destructive testing of rolling elements. The PL600 has been integrated for this contact free and quick testing. It has a two-channel structure and evaluates

the eddy current signals from two stations independently from one another. An 8 fold multiplexer as well as a 4-fold array and one single sensor, also from Rohmann, are used for the tests at every station for the detection of cracks and grinding burns on the surface and face areas of the rolling elements. The cycle time is approx. 1.2 seconds per part.

Please do not hesitate to ask for more detailed information by sending an e-mail to sales@rohmann.de or by calling +49 6233 3789-0.

**Company details
and exhibit information**

www.bearing-expo.com/c/rohmann

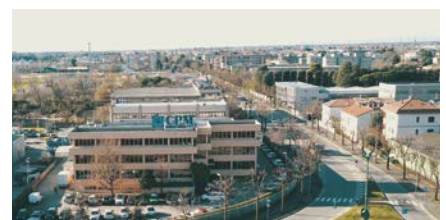


Added Value of being Certified

CPM SpA, located in Nova Milanese (MB), represents a highly specialized niche company in the design and manufacture of tailor-made bearings. Its brand is known throughout Europe and worldwide, thanks to its long-term experience in many different sectors. The numbers speak for themselves: over 160 employees, 4 million special bearings made every year and a turnover nearly 35 M€. Its products find application in numerous sectors - from automotive to robotics, from mechanical transmissions to textiles, worldwide. In

fact, in addition to the UNI EN ISO 9001: 2008 and UNI EN ISO 14001: 2015 certifications, CPM can count on the prestigious IATF16949 along with the ISO45001.

All that led to a change of mentality on our entire organization and represents an opportunity to review and optimize our entire production cycle, according to precise dictates aimed at the highest quality, efficiency and 'zero-defects' approach. With operating results that today translate into a further



improvement in terms of flexibility, competitiveness and dynamism along the entire supply chain.

**Company details
and exhibit information**

www.bearing-expo.com/c/cpm



Level up your leadership skills with EPTDA

The EPTDA Academy represents the new EPTDA commitment to its members to develop and improve their leadership skills and qualities, in accordance with the latest market business needs and trends.

The EPTDA Leadership Academy is part of the EPTDA Academy concept, representing the main platform for developing the leadership qualities for all aspirational leaders within the PT/MC industry, regardless of their age. The program is developed in

collaboration with a specialized training company with more than 25 years experience in the field.

The EPTDA Leadership Academy stands for active training by professionals, where participants are invited to take part in the sessions and discussing about the topic. The aim is to have dedicated sessions safeguarding the possibility to share experiences from participant to participant, to network and interact with other PT/MC professionals.



**Company details
and exhibit information**

www.bearing-expo.com/c/eptda



Discover Felstrom's POP series: excellent value for money



Felstrom, founded in 2015, is all about industrial essentials. And when you speak of essentials, you can't ignore the world's most widely used bearing types, the POP series. The Felstrom range includes various 6000 series and miniature bearings. Both open and sealed versions are available for use in a wide variety of applications. From high rotational speeds to dusty environments and from assembly lines to compressors: Felstrom bearings stand their ground.

Felstrom POP series are designed with a keen eye for detail. All bearings are packed individually. Clearly identifiable and well protected during transport. Carefully documented product features make the selection process a breeze. Equal attention was of course paid to the sturdy construction of these bearings which makes for an unbeatable price-performance ratio. Felstrom POP bearings simply deliver.

**Company details
and exhibit information**

www.bearing-expo.com/c/felstrom

FELSTROM®

Merger & Acquisition services for the Bearing Industry

ICT Advisory Division is specialized in M&A advisory in the Bearings industry and – more in general – in high precision mechanics sectors, for which more information can be found on www.ict-advisorydivision.com.

As part of the M&A activities, we are pleased to inform the sale of a bearings distributor, with a long tradition in the industry, from North Italy.

The company has more than 60 years of activity in the sector, with an yearly turnover of more than 4 million Euros and an active customers database of about 160 names. The company distributes two European brands and has been selling its own brand name bearings over the last 20 years.

If the above may be of your interest, please contact us at: e-mail: m&a@consulting-trading.com



**Company details
and exhibit information**

www.bearing-expo.com/c/ict



Push your business to the next level

We are facing a new age that demands new business roles and models. We rely on established partners. At the same time, we want to push your business further!

Our stand-alone pullers are made to dismount any available bearing. We are the only manufacturer who provides the one & only solution to dismantle bearings regardless of type.

It's time for an uplift! Your customers request complete solutions. Stand-alone pullers from KUKKO match these future needs. The new business model is a win for both of us. A holistic range will satisfy your customers and additional turnovers with extraordinary margins will be yours.

A new business expansion has never been easier! Please do not hesitate to contact



our CEO, Michael Kleinbongartz, right now: m.kleinbongartz@kukko.com.

Company details and exhibit information

www.bearing-expo.com/c/kukko



High Precision Bearing Ball for Aerospace



METALBALL is a French high precision bearing ball manufacturer. We supply balls to Aerospace, medical, nuclear and pharmaceutical market. We are full compliance with aerospace requirement : EN 9100 and NADCAP certification.

We are specialized in low to medium volumes and for special increment required by the ball bearing and ball screw manufacturer.

We produce :

- Steel balls : 440C AMS 5618; M50 AMS 6491; 52100 AMS 6444; Cronidur 30 AMS 5898; XD15Nw AMS 5925
- Silicon nitride balls Class 1
- Plastic balls for pharma application

METALBALL is also able to reduce balls from your stock : if you have "old stock", we can reduce these balls to an "active" diameter.

Company details and exhibit information

www.bearing-expo.com/c/metalball



Hybrid Bearings from NKE are suitable for tough industrial applications

Industrial applications in challenging environmental conditions call for special bearing solutions. Bearing manufacturer NKE Austria GmbH has developed hybrid bearings for precisely these applications. NKE hybrid bearings consist of ultrapure steel bearing rings and ceramic rolling elements made of bearing grade silicon nitride Si_3N_4 . At first glance, this material pairing is highly unusual, but it offers many advantages in an enormous

range of applications, which significantly increases the reliability of the overall system. The ceramic rolling elements have high wear resistance and can achieve better results under extremely demanding conditions, such as poor lubrication, thereby extending service life significantly. The very good 'dry-running properties' of a hybrid bearing play an extremely critical part in substantially enhancing the reliability of an application.



Company details and exhibit information

www.bearing-expo.com/c/nke



METER BEARINGS GROUP- Your own bearings supplier, from customized concept to first class service

We are a company with an international spirit and Italian roots. We have four company headquarters (Italy, Germany, USA, China) in three different continents, enabling us to satisfy local demands. Our 'Made in Italy' is the guarantee of a product which from the design table to the production process is continuously under the microscope.

It is the Italian way to produce 'made to fit' and we, just like the tailors of years gone by, develop a

product with specific and unique characteristics, using both specified materials and heat treatments for each individual project. We study innovative solutions, personalized and sustainable.

Our research is ongoing and we take extreme care in all phases of production, beginning with the raw materials. Quality is at the base of all our process, we monitor the incoming raw material, the external processes and the purchased



components coming from suppliers with continuous audits in order to control every single step leading to the realization of the final product.

**Company details
and exhibit information**

www.bearing-expo.com/c/meter



Efficient maintenance thanks to simatherm and simatool



A professional installation and removal of rolling bearings are very demanding and important maintenance tasks. Without the right special tools, professional assembly and disassembly of rolling bearings is impossible. With its wide range of high-quality tools, simattec offers the best conditions for fast and safe working. With the proven simatool Fitting Tool FT 33, bearings can be quickly and precisely, cold-mounted onto the shaft or into a housing.

Another method for the professional installation of bearings is the heating of the components before assembly. The leading bearing manufacturers recommend heating bearings to a temperature of 110 °C for installation. With simatherm induction heaters, rolling bearings and other annular metal parts can be heated efficiently.

The devices allow quick and clean installation and replace conventional heating methods such as hot oil baths, open flames or ovens.

**Company details
and exhibit information**

www.bearing-expo.com/c/simatec

simatec
smart technologies

ZEN, German know-how, global reach

The Zen group's logistics network extends to every corner of the world. This, in addition to perfect coordination and communication with its customers, optimal delivery times and a constant spirit of innovation, makes it possible to find ZEN Bearings wherever you are.

From America to Australia, passing through Europe, Asia and Africa, its network of official distributors, sell points, warehouses, quality control centres and factories will adapt 100% to your needs.

True to its commitment to offer the best to its customers, the ZEN Group has made a big step towards international distribution and from now its non-European customers will benefit from shorter delivery times and more competitive prices, as direct shipment from China is now possible. You can find the contact details of our German Headquarter, UK Branch, Spanish Branch, China Branch, French and Brazilian Branches on the link below.



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ZEN BEARINGS FOR YOUR FUTURE

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ZEN SHANGHAI TRADING CO. LTD.

PBI INTERNATIONAL
ZEN BEARINGS FOR YOUR FUTURE

RODAPLUS SARL
ZEN BEARINGS FOR YOUR FUTURE

RODAPLUS SL
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CYH
ROLAMENTOS E ESFERAS

**Company details
and exhibit information**

www.bearing-expo.com/c/zen



The Future of Split Bearings is here...

WE ARE HELPING REVOLUTIONISE THE SPLIT BEARING – BRINGING A 125-YEAR-OLD DESIGN INTO THE 21ST CENTURY.

British made and assembled, you can guarantee a high quality, highly efficient and long-lasting piece of equipment that will save you time and money through more efficient installations and simplified designs resulting in increased production.

Why fix something that isn't broken right? Wrong. The evolved design and working of the new split bearings will increase load capacities, by incorporating radial and axial elements that work separately. By extending the operating envelope for high thrust load applications, this is the one and only bearing for the job. The split bearing is incomparable to its competitors bringing a 70% increase to radial load and up to 1000% axial capacity increase.



**Company details
and exhibit information**

www.bearing-expo.com/c/godiva



COMMONSense – The SDT Ultrasound Solutions brand-new range of permanent ultrasonic sensors



Ultrasound signals are produced by assets in distress or suffering from deficient product quality. The symptoms manifest themselves through FRICTION, IMPACTING, and TURBULENCE making COMMONSense a FIT for all failure modes.

These globally accepted outputs are adaptable to any standard industrial measurement system commonly in use at your plant including data acquisition boards, PLC measurement modules, and SCADA systems. Moreover, configuring COMMONSense to these systems is simple and straightforward.

COMMONSense sensors are designed for permanent installation on your most critical assets. Permanent mount sensors are proven enhancements to any condition monitoring initiative. Reduce maintenance costs, lower spare parts inventories, and improve the overall efficiency of your operations.

Whether your applications are related to reliability, safety, or product quality, COMMONSense helps detect problems earliest in the P-F curve. Stay VIGILANT... Stay RELIABLE... Use your COMMONSense.

**Company details
and exhibit information**

www.bearing-expo.com/c/sdt



COC mounted bearing units are designed for the future of safety

COC presents spherical roller bearing units and stainless ball bearing units with innovative new designs and features to handle the world's toughest power transmission needs.

COC's patented CROSSLOC™ locking system with SN & SAF SRB dimension units are unitized replacements for standard SN & SAF split housing units. One hundred percent interchangeable with competitive SN & SAF products, COC SRB

units are shaft ready and are factory sealed, pre-lubricated, and assembled. It's a great off-the-shelf solution that can save time and money.

COC 100% stainless steel washdown ball bearing units have achieved IP69K certification and it's a relubrication-free solution for food safety programs. COC's new concentric OCCLOC™, 8 slot locking system doesn't damage shafting and is easy to mount and dismount.



OCCLOC has great holding power even with the undersized commercial shafting.

**Company details
and exhibit information**

www.bearing-expo.com/c/coc



We offer INA's complete range of needle roller bearings

ABF has a very wide selection of needle roller bearings in stock, ready for immediate shipment. Needle roller bearings are a particularly diverse product group. Thanks to their specific design, they can be used in a wide variety of applications involving limited radial space and high radial loads. Our product selection naturally includes bearings from INA, the inventors of cage-guided needle roller bearings.

INA's portfolio covers more than 15,000 types. From A to Z, or rather from BK to RNA, we can supply all models and series quickly and easily. As an official Schaeffler distribution partner, we can draw on the entire INA product range. Are you looking for a needle roller bearing in a haystack? We'll help you find it! Feel free to contact us or visit www.abf.store for our real-time availability.



**Company details
and exhibit information**

www.bearing-expo.com/c/abf



Spend more time growing your business by managing your supply chain



Today's global business environment is getting more and more complex and small and middle-

sized bearing distributors struggle managing their supply chain every day. Inquiring & ordering from plenty of suppliers, managing transport and increasingly inconsistent delivery conditions together with compliance can be extremely consuming in terms of time and money.

Bearing that in our mind, we try to address those issues by offering broad product assortment ob bearings, bearing housings, chains, sprockets, platewheels, belts, oil seals, o-rings, retaining

rings, glues, sprays and other products that can be browsed and ordered through Potissimus – our B2B webstore accessed and designed especially for them.

Not only does our customers benefit from customer consolidation with saving time and money but also with increased customer satisfaction because of compliance improvement, increased purchasing power and stronger supplier relationship due to the consistency in product quality.

**Company details
and exhibit information**

www.bearing-expo.com/c/codex



VCI Bearing Wrap Stays Tight, Prevents Corrosion on Precision Machined Metals

Corrosion inhibitor (VCI) film with an embossed texture that grips, stays in place around large bearings and round shapes. Used as a final wrap, the VCI bearing tape holds layers of rust inhibiting materials together. Premium Metal-Guard® in the film effectively prevents corrosion on packaged steel, stainless steel, cast iron, galvanized, nickel and nickel-plated, copper and a wide range of ferrous/non-ferrous metals.

Benefits

- Long-term protection against corrosive effects of moisture, salt, and other contaminants
- Eliminate extra costs of additional packaging such as bags, bands, or preservative oils
- Tear-resistant, strong, durable, and flexible
- Odorless, non-toxic, easy to handle and safe to use
- RoHS and TRGS615 compliant
- Recyclable



Use in automatic packaging of bearings and precision machined parts to dramatically.

**Company details
and exhibit information**

www.bearing-expo.com/c/daubertcromwell



perma ULTRA – Innovation based on experience

perma ULTRA – Capable single-point lubrication system with Bluetooth functionality

Very precise discharge, three different cartridge (LC) sizes for lubricant volumes of 500, 750, or 1000 cm³, and automatic LC detection via an integrated chip make perma ULTRA ideal for applications which demand high lubrication rates.

Due to its continuous pressure build-up to 50 bar, the

lubrication system is particularly suited for use wherever long remote grease lines (up to 20 m) are required for safe access to lubrication points indoors and outdoors.

perma ULTRA is equipped with Bluetooth functionality as standard for remote configuration, control and maintenance. The perma CONNECT APP was specially developed for easy and reliable monitoring of perma ULTRA in hard-to-reach or dangerous areas, e.g. via smartphone, which actively contributes to increased



workplace safety. The app is available free of charge on Google Play and App Store.

Company details and exhibit information

www.bearing-expo.com/c/perma



Helping India Breath!



During the second wave of the Covid crisis, the oxygen cylinders are huge in demand in India. The crisis is touching the sky where Indian people are dying without breathing. The second wave is slipping into an increasingly devastating crisis, with hospitals unbearably full, oxygen supply running low, desperate people waiting in line to see doctors, and there is growing evidence that the death toll officially is far more than the reported deaths. Few kind people and the business owners are moving

their steps forward in helping people to catch their breath. KG BEARING INDIA donates to Phoenix Group providing FREE Oxygen cylinders to Hospitals in India. It comprises business owners who have come forward to align their time, resources and energy to contribute to solving the problem of oxygen supply to some hospitals. To donate kindly visit www.ketto.org. We are hoping and praying that the world will be infection free soon.

Company details and exhibit information

www.bearing-expo.com/c/kg-india



To become the leading company for Tapered Roller Bearings in China

Hanking Rolling Bearing including: Tapered roller bearing, Cylindrical roller bearing, Spherical roller bearing. Bearing dimensions are from 200mm to 1.4 meters, accuracy can reach to P2/P4. Wholly-owned Hanking roller production base- Cylindrical roller, Tapered roller. The product dimensions are from 20mm to 200mm.

For Hanking Taper Roller Bearing, according to the actual size requirements, we can provide imperial or

metric dimension. In addition, we can optimize the design on the structure according to actual needs. For example: the structure of cage is changed to pin type; the end face of ring is evenly distributed with annular oil groove; the bore is with spiral groove, etc.

Hanking Bearing aims to produce high life, high reliability roller bearing, suitable for different applications.



Company details and exhibit information

www.bearing-expo.com/c/hanking



RKB Bearing Industries presents a new AF2D Multiroll Cage Design for rolling mill stands



RKB Multi-row cylindrical roller bearings, also known as Multiroll, are mainly used in rolling mill stands, where they are subjected to very high radial loads and impacts, combined with medium-low speeds.

With its revision of the AF2D design, RKB

adopted a new generation of two double pronged machined steel cage featuring:

- Higher cage tenon stiffness compared with the classical design
- Cage pocket optimization, which reduces roller drop and highly improves piloting
- Enhanced cage manufacturing precision with narrow dimensional tolerances

Furthermore, to better suit in a wide range of

applications and environments in the harsh conditions of the steel and aluminum industry, the new RKB AF2D Multi-row presents superfinished rolling elements with a special roller profile and an advanced crowning technology for outer ring raceways. Combining these two technical solutions, the new RKB AF2D Multi-row gets a smooth pressure distribution among rolling elements and ring raceways, reducing stress edge effect and leading to longer bearing service life.

**Company details
and exhibit information**

www.bearing-expo.com/c/rkb



Elgeti Engineering unveils its 4th generation bearing test rigs



Elgeti Engineering has been designing and building test rigs for over ten years and is proud to announce the newest generation. The new test rigs are built on a standardized platform with an improved housing design and our newest software package. Like all Elgeti Engineering test rigs, they feature two test stations on a single frame, allowing two independent tests to be carried out simultaneously. The first new EELPRAAX-130 model, suitable for bearings up to 130mm outer

diameter, has already been sold and several other new models are joining Elgeti's testing facility.

Elgeti Engineering is happy to build you a test rig either according to our standard or customized to your specifications. Rigs are available in radial, axial, and combined load models with flexible lubrication conditions and time-dependent test parameters.

**Company details
and exhibit information**

<https://www.bearing-expo.com/c/elgeti>



Roller Bearing Analysis "Done-in-One"

All Klingelberg Precision Measuring Centers have the capability to accurately analyze and measure roller bearings and roller bearing elements to an extremely high degree of precision. Based on the manufacturer data and specifications, measuring runs and clear, conclusive protocols are created automatically in compliance with current standards and regulations. The series variations and quality grades of the bearings are supported by the innovative Klingelberg software.

Additional measurement tasks based on specific requirements of the bearing manufacturer are also easily implemented. The specifications of these highly accurate precision measuring centers make them ideal for in-process inspection of rolling bearings and rolling bearing elements in the immediate production environment. Thanks to standard interfaces, the results feed directly into the process and ensure appropriate responses and actions in the upstream and downstream processes.



**Company details
and exhibit information**

www.bearing-expo.com/c/klingelberg



Steel Cages for Bearings

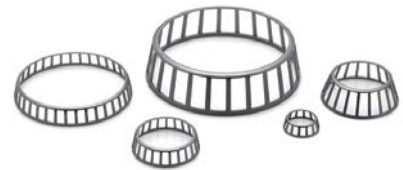
Our fully automated, deep-drawn transfer and die pressing technology allows us to manufacture a wide variety of precision sheet metal parts, including tapered and spherical roller cages as well as other products. This process delivers high precision and improves overall product performance. Most part of Tsubaki Nakashima's cages are used for roller bearings in the automotive industry, such as belt tensioners and suspension bearings, and in a wide variety of other industrial applications. All products can be surface treated for applications that require low friction or better wear protection.

Capabilities

- Precision up to 50 μ tolerances
- Width up to 400mm and 4mm thickness
- Low to high volumes
- Various treatments possible
- Various materials available
- Flexible laser welding production cell
- Samples available within 3 weeks

Benefits

- Increased bearing loads
- Enhanced roller running accuracy



- Higher RPM's
- Lower friction and heat generation
- Reduced energy consumption
- Improved automated bearing assembly
- High temperatures tolerated

Company details and exhibit information

www.bearing-expo.com/c/tsubakinakashima



2nd and 3th generation Hub Units from PFI



PFI supply 2nd and 3rd generation hub assemblies, both of them identified with prefix PHU. Our hub assemblies (more than 700 different SKUs) are supplied with or without ABS sensors according to original

equipment specifications. We are constantly adding new applications for a variety of new vehicles, including American, European, Japanese and Korean applications.

PFI 2nd generation bearings are compact double row units (double row angular contact ball bearings – 80% of the range or double row taper roller bearings – 20% of the range). They have the same technical advantages of the 1st generation bearings (PW bearing family) and add a locking element (flange) that enables easier installation, reduces the number of assembly tools and the possibility of human errors. Flange ring material is different,

PFI uses AISI – SAE 1055, which allows the forging of complex final forms, as required by the application.

PFI 3rd generation bearings are compact double row units (double row angular contact ball bearings – 80% of the range or double row taper roller bearings – 20% of the range) that share the same technical advantages of the 1st and 2nd generation and have an additional flange (2 flanges). This addition makes it even easier to mount and assemble the bearing to the car. Flange material is AISI – SAE 1055, as in the case of 2nd gen bearings.

Company details and exhibit information

www.bearing-expo.com/c/pfi



The Supplier with a Broad Scope on Angular Contact Ball Bearings

Ritbearing supplies a broad scope of angular contact ball bearings specially designed to withstand the demands of high-speed applications. These bearings are non-separable and have a contact angle which can accept radial and thrust loads. Although the angular contact bearings can accept thrust loads in only one direction, there are different contact angles available to transfer the load acting upon the bearing.

Common models of angular contact ball bearings available through Ritbearing include the 5200 Series, 5300 Series, 7000 Series, 7200 Series, 7300 Series, 7800 Series, 7900 Series, QJ200 Series, and the QJ300 Series.

If standard solutions aren't right for your application, we can help. Our experts can work with you to provide custom engineered angular contact ball bearings designed specifically for your design needs.



Company details and exhibit information

www.bearing-expo.com/c/ritbearing



Customized Bearing Production & Components Modifications



Custom Bearing Manufacturing of complete bearings is our specialty at Napoleon Engineering Services. We take great pride in satisfying our customers' needs and providing them with high quality

bearings that will exceed both their expectations and those of their customers. Our savvy engineers extensively analyze application conditions to create a cost effective reliable product. With our comprehensive machining facility consisting of CNC turning, CNC milling, and CNC grinding machines capable of producing parts up to 18" in diameter, NES can manufacture a large range of products with specialty materials and processes to fit your needs.

Bearing Modification

Napoleon Engineering Services modification

program provides customers with flexible solutions to their bearing problems. Through the use of existing inventory NES can modify standard products to fit the most specific application requirements. Modifying existing products reduces lead time and increases savings while significantly enhancing the products performance in the application. NES is equipped to conduct precision and simple modifications, ensuring the bearing will operate efficiently. Bearing modification is part of the industrial bearing Condition Analysis Reclamation (CAR) program.

**Company details
and exhibit information**

www.bearing-expo.com/c/nas



Cost-effective, reliable, safe and ecological lubrication system



G-LUBE is an electronically controlled single-point lubrication system, driven by a chemical reaction. The dispenser excels through user-friendliness

and a good cost-performance ratio. This product is the right choice for most lubrication applications: cost-effective, reliable, safe and ecological!

G-LUBE combines all the advantages of gas-powered lubrication systems and is a cost-effective solution for users wishing to switch from manual to automatic lubrication and for those familiar with automatic lubrication systems.

The function is based on the proven technology of an

electrochemical reaction that produces non-reactive nitrogen (N₂) through the systematic use of an electrolyte. This type of pressure generation makes G-LUBE more temperature-independent than many conventional gas-powered lubrication systems.

With pressure generation not exceeding 5 bar and at ambient temperatures from -20 °C to +55 °C G-LUBE guarantees up to 12 months of reliable operation. The lubrication system is available in the sizes 60, 120 and 240 ml.

**Company details
and exhibit information**

www.bearing-expo.com/c/gruetzner



Super Precision Rings for Super Precision Bearings

PROSINO offers a wide range of ring products from 8 mm to 300 mm of OD for the bearing industry. The competence of the company goes from the sourcing of the best raw material (only from European Suppliers) to turning (with different technologies), to heat treating, vibropolishing, grinding and hard turning. Every step is carefully checked and recorded in ERP IT system. Fully reliability and manufacturing consistency is granted in all steps.

Prosino's activity is not confined to the pure

implementation of customer's drawings, but thanks to its 60 years experience is also able to offer a co-engineering support to its customers. The collaboration involves the creation of new geometry aimed at the production optimization and cost reduction (for the client's benefit), and the selection of thermal and/or surface treatments.

The company presence in different industrial sectors created synergies that allowed to apply technical solutions from one field to every field. Two of the major tools used by Prosino in order to offer customized



products is a pre-manufacturing study of the item on the 3D CAD working stations and an absolute freedom in turning thanks to shaped tools profiled with EDMs.

**Company details
and exhibit information**

www.bearing-expo.com/c/prosino



Listen to the bearing, start lubricating and determine when to stop!

The Ultraprobe 201 Grease Caddy is uniquely designed to allow an operator to simultaneously lubricate and monitor ultrasound levels to prevent over-lubrication.

As lubrication levels fall, friction levels rise, producing ultrasonic waves, which are very directional and localized. Easily attached to most standard grease guns, or worn in an optional belt holster, the Ultraprobe 201 Grease Caddy translates high frequency sounds into the audible range, where

users will hear and recognize bearing sounds. The Ultraprobe 201 Grease Caddy focuses in on these sounds – even in the noisiest environment – and helps users identify when to stop lubricating.

The Ultraprobe 201 Grease Caddy will support your lubrication program resulting in:

- Prolong the life of your equipment
- Identify bearing issues by listening
- Prevent over lubrication



- Save on working hours & operational costs
- Improve maintenance efficiency

**Company details
and exhibit information**

www.bearing-expo.com/c/uesystems



ZWZ is looking for NEW distributors



China's well-known and largest bearing manufacturing company ZWZ Group (Wafangdian Bearing Group Corp. Ltd.) is expanding its

global distributors network by announcing new distributors cooperation plan. The company is currently present in more than 100 countries and aims to increase this number in the coming period by appointing new distributors.

ZWZ Group has been the backbone of China's bearing industry since 1938 and has always been leading the bearing industry trends in China. The Group has today 8 large production bases, and 22 branch plants in China, and 1 bases in Germany, branded KRW. With

a production capacity of more than 20,000 different types of bearings for key technical equipment and applications, the company covers a full range of bearings for its distributor partners. The ZWZ bearings are mainly designed and produced for the steel, cement, mining, engineering machinery, transmission equipment, oil, wind, automotives, railway, shipping and related general industrial machinery applications.

You can contact ZWZ from the link below for becoming a distributor.

**Company details
and exhibit information**

www.bearing-expo.com/c/zwz



Marine bearings that replace composite, plastic, bronze and oil filmed bearings

Lignum Vitae North America, LLC. offers a time-proven EPA / ABS compliant water-lubricated bearing technology. With over a 160 year service record in vessels from workboats to icebreakers and submarines, our bearings will not smear or seize onto the shaft as plastic or composite materials often do. Lignum vitae bearings effectively replace composite, plastic, bronze and oil filmed bearings. Contact us to determine the best bearing for your vessel.

Technical Advantages

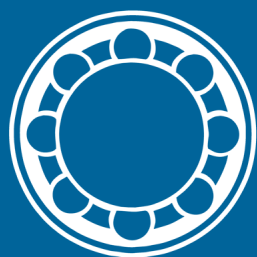
- Zero clearance
- No filtering or external cooling systems required
- Zero wiping or smearing of material
- High resistance to shock, edge loading/vibration issues
- Oil/grease-free operation
- No hydrolysis degradation/perfect memory
- Sustainable supply chain
- Steel friendly



**Company details
and exhibit information**

www.bearing-expo.com/c/lignumvitae



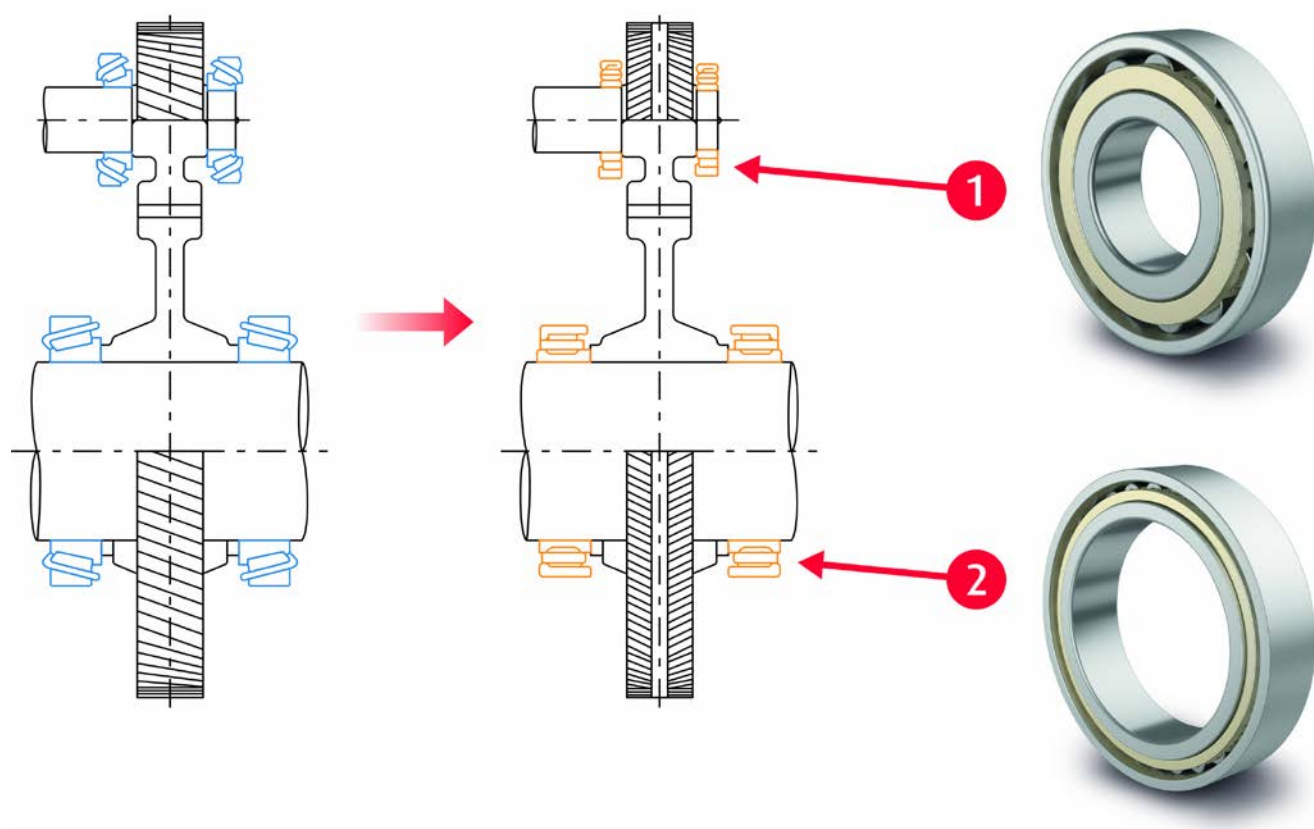


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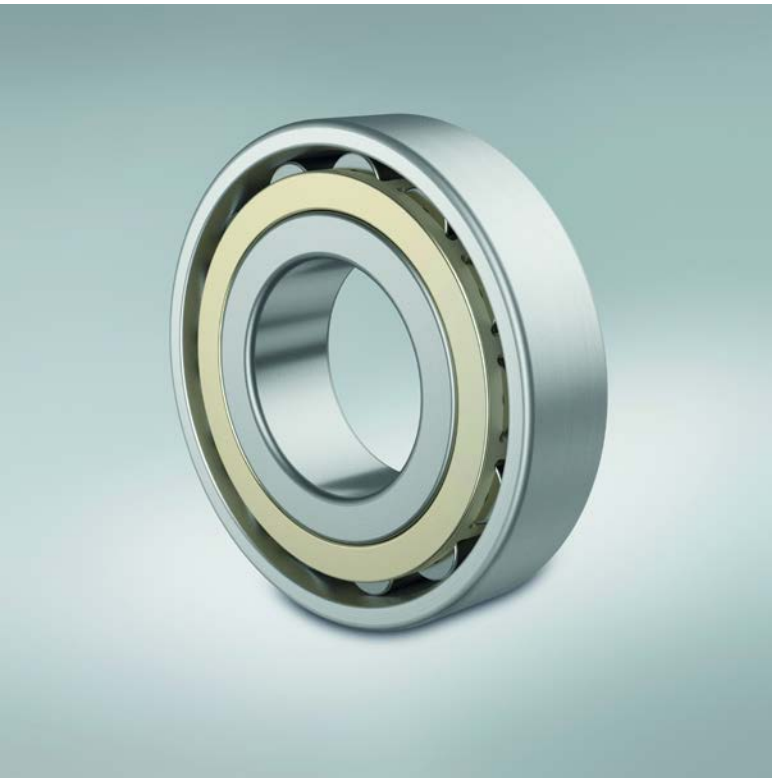
www.cpmbearings.com

New-generation bullet train relies on **NSK** bearings

High-performance bearings from NSK are now operational in the newly developed N700S Shinkansen (bullet train), which from 1 July 2020 began service on the Tokaido Shinkansen line between Tokyo and Osaka. The N700S marks the start of a new era, being the first completely new Shinkansen design from the Central Japan Railway Company in 13 years. NSK bearings underpin the train's no-compromise focus on safety, stability, comfort and environmental performance.



— Positions of NSK cylindrical roller bearings for small gear (1) and large gear (2) on the new herringbone gear type (right) - as compared with a conventional helical gear (left)



— The NSK cylindrical roller bearings used on the small gears (left) and large gears (right) in the N700S gearbox provide longer life and reduced maintenance requirements

Bearings for railway applications contribute directly to safe operation and travel. High reliability is key, as is the ability to support elevated speeds, improved energy efficiency and reduced maintenance requirements. The demands placed on railway bearings are especially apparent in bullet trains, which transport large numbers of passengers at high speeds over long distances. Applications of this type call for highly efficient and durable bearings, along with meticulous quality control in all production processes.

The 'S' suffix of the new-generation N700S bullet train stands for 'Supreme', signifying the progression in design, technology and comfort. High-performance bearings from NSK can be found in the gearbox, axle and traction motor assemblies.

Regarding the gearbox, the N700S is the first Shinkansen to replace helical gears with herringbone gears, which offer increased reliability and lower noise output. Gearbox bearings are subject to intense shocks and vibration,

so exhibiting a long operational life under these conditions is a priority. NSK has been supplying tapered roller bearings for helical gears in bullet trains for decades. Drawing on this experience, the company has designed a special flanged cylindrical roller bearing for the N700S's herringbone gears that delivers longer life, lower heat generation and reduced maintenance compared with the previous generation product.

Further benefits of the gearbox bearings used on the N700S include improved seizure resistance, which has been achieved by optimising the design of areas that do not contact the flange face. In addition, a high-strength machined brass cage optimised with NSK's proprietary R-pocket technology reduces internal stress in the cage structure.

For the axles, the NSK double-row tapered roller bearings used in the previous Shinkansen have been further improved to deliver even higher reliability and reduce maintenance costs.

Lower heat generation leading to longer life is a particular attribute. Concerning the N700S's traction motors, NSK cylindrical roller bearings and deep groove ball bearings feature outer rings that are plasma-sprayed with a ceramic coating. This coating increases reliability by preventing any opportunity for electrolytic corrosion, an unwanted effect that occurs due to the transfer of electrical current through the inside of uninsulated bearings.

NSK has been supporting the advancement of the global railway industry since the company first became involved with the sector in 1932. Bearings from NSK are trusted for their world-class safety, high-speed performance, high reliability and efficiency. Today, the company's products are used by high-speed rail operators throughout Europe. Close ties with partners in the European OEM and aftermarket sectors help create products that bring about notable advances in this important industry.



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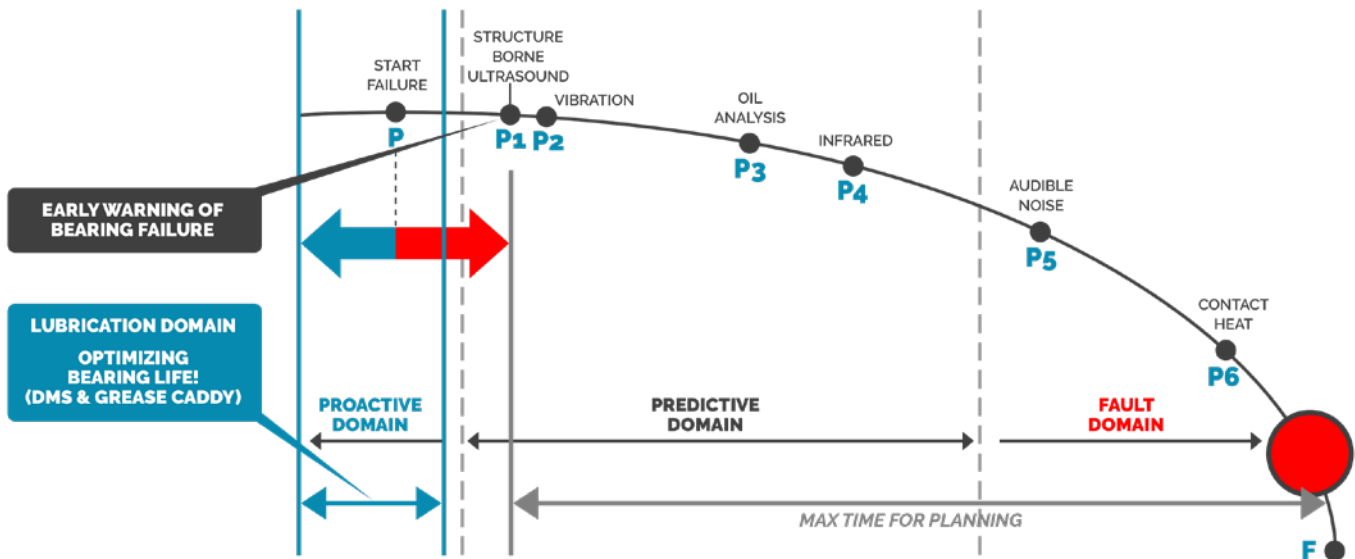
Business
Due Diligence





Ultrasound & Vibration Analysis: **Two Key Elements of Predictive Maintenance**

Vibration analysis has been for many years the technology of choice for maintenance professionals to monitor the condition of rotating assets. However, in the last years ultrasound has also emerged as a very popular technology for condition monitoring. The question that many are now asking themselves is: which one is best? Ultrasound or vibration? In this article we will focus on the role of ultrasound as a condition monitoring tool and why using vibration and ultrasound together is the best way to reach excellence in your maintenance practices.



Why vibration analysis?

Vibration analysis is an incredible tool: it detects and measures small vibrations and what is causing them, thus allowing maintenance professionals to detect early failures on rotating equipment. Furthermore, vibration analysis gives us a very deep diagnostic and allows us to identify the failure's root cause, and thus correct it to avoid further issues in the future. Plus, there is a great number of vibration sensors and solutions in the market to choose for, so maintenance teams can find a solution that is suitable for their needs.

Why Ultrasound?

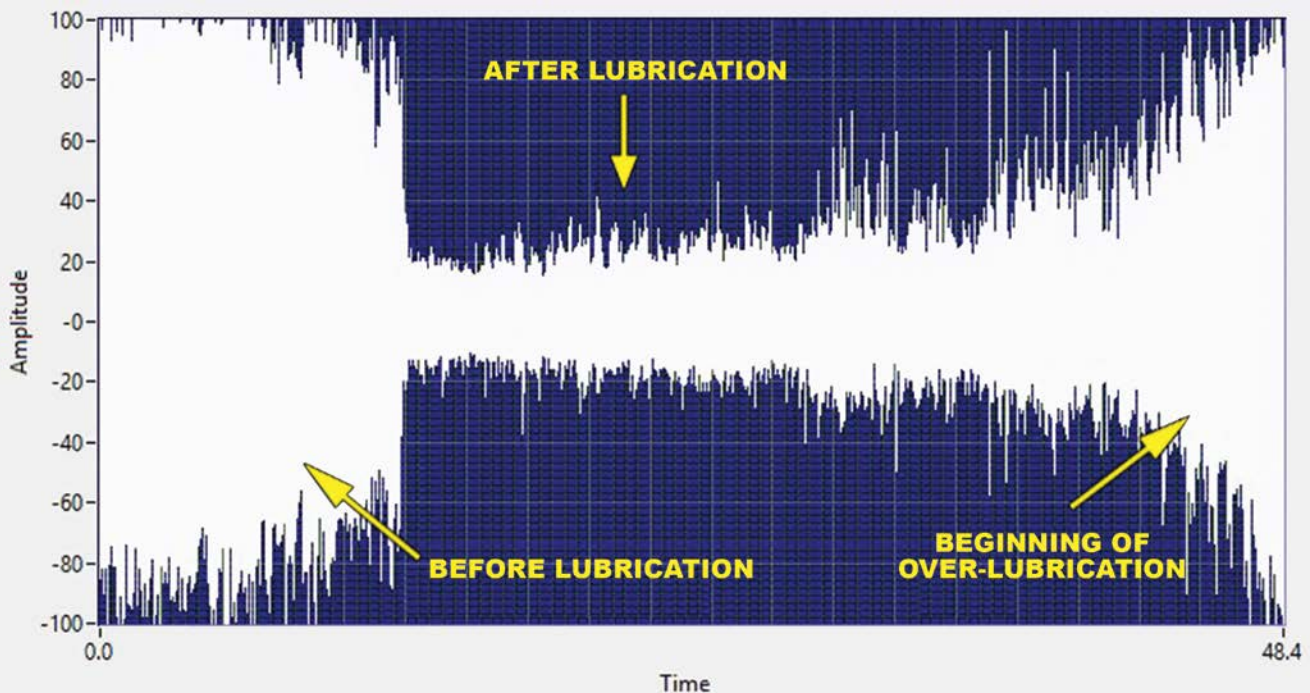
Ultrasound is considered by many the first line of defence when it comes to bearing failures, since it can give a very early warning of a potential problem, even with lubrication issues. The way ultrasound does that is by monitoring the friction levels on rotating equipment. The concept is simple: as a bearing starts to fail or is not lubricated properly (under or over lubricated), the friction levels rise. Friction creates ultrasound emissions that can be picked up by an ultrasonic handheld device or sensor and translated to low frequency sounds that the inspector can hear. Ultrasound equipment will also provide a decibel level – and the higher the decibel, the higher the friction.

Ultrasound or vibration?

There is no easy answer to this question, but one thing is for sure: if a maintenance team wants to reach excellence, both technologies should be used. Ultrasound will provide the earliest warning of failure and is also very easy to use, since it relies on simply trending decibel levels. Vibration

analysis is extremely complete and will give maintenance professionals a deep overview of the issue and the root cause of such issue. Almost as if ultrasound is the doctor who detects the problem, and vibration is the health specialist that will diagnose it properly. We will now talk about a few situations where, in general, ultrasound can be used instead of vibration analysis.





Slow Speed Bearings

Slow speed bearings are difficult to monitor. Since they rotate very slowly, it's difficult for vibration sensors to pick up significant changes in vibration. Even with an ultrasound instrument it may be difficult to pick up failures if we rely only on decibel levels, since in extreme slow speed bearing applications (usually less than 25rpm), the bearing will produce little to no ultrasonic noise. However, high-end ultrasonic devices will allow for sound recording; by recording the sound of the bearing and checking it in a spectrum analysis software, we can easily find peaks in the sound spectrum amplitude which indicate a fault in the bearing.

First line of defence, easy to use

For a maintenance professional to properly work with vibration analysis, significant training and experience are needed. On the other side, ultrasound has a much quicker learning curve. And this is because of how the technology works: since it is monitoring friction levels and translating them to dB values, we can easily check for potential problems with our rotating

equipment. Once we setup a dB baseline for a bearing, we just need to trend the dB value overtime. So, if the baseline for a bearing is 20dB, but the ultrasonic instrument reads 32db, we already know there is a problem simply by comparing values.

Lubrication

Again, because ultrasound is based on the friction levels, it is perfectly adequate for bearing lubrication. Is the bearing lacking lubrication? Then the friction levels will increase, and we can hear that through the ultrasonic instrument and see it in the dB levels. If we start lubricating the bearing, most likely we will see a decrease in the sound intensity and the dB levels. Did the bearing receive too much lubricant? Then again, friction levels will increase, and we will know that using the ultrasonic instrument. Thus, ultrasound is perfect to avoid under- and over-lubrication issues.

Versatility

While vibration analysis is an extremely powerful tool, its uses are limited to mechanical equipment. On the other hand,

ultrasound has a wide range of applications which makes it a very versatile technology. One of the most popular applications of ultrasound, besides condition monitoring, is energy savings. Since turbulence also creates ultrasound emissions, the ultrasonic instruments can be easily used for leak detection (compressed air and other gases), steam traps inspection and even for electrical inspections, to detect issues such as corona, tracking and arcing.

Conclusion

We believe, as many other maintenance professionals nowadays, that using multiple technologies that complement each other is the way to go. Therefore, the question is not ultrasound vs vibration, but instead ultrasound AND vibration and when we should be using one or the other. Both are very powerful condition monitoring technologies and, when used properly together, can really take any maintenance and reliability program to the excellence level.



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- Tachometer
- Process



A turn-key condition monitoring solution combining the versatility of ultrasound, the analytics of vibration, standard communication protocols and an embedded trending and analysis software.



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Bearing Designs for Reliability in Extreme Environments

Increased demand to improve reliability across industry means engineers need to consider all components of their equipment. Bearing systems are critical parts in a machine and their failure could have catastrophic and costly consequences. The bearing design has a major impact on reliability, especially in extreme operating conditions including high or low temperatures, vacuum and corrosive atmospheres. This article outlines considerations to take when specifying bearings for challenging environments, so engineers can ensure high reliability and excellent long-life performance of their equipment.

A bearing system comprises many elements including balls, rings, cages and lubrication for example. Standard bearings do not typically stand up to the rigours of harsh environments and so special consideration to the individual parts needs to be taken. The most important elements are lubrication, materials, and special heat treatment or coatings and by looking at each factor means bearings can be best configured for the application.

Operating at high temperature

High temperature applications, such as those used in actuation systems within the aerospace industry can present challenges for standard bearings. Furthermore, temperatures are rising in equipment as units become increasingly smaller and have increased power-density, and this poses an issue for the average bearing.

Lubrication

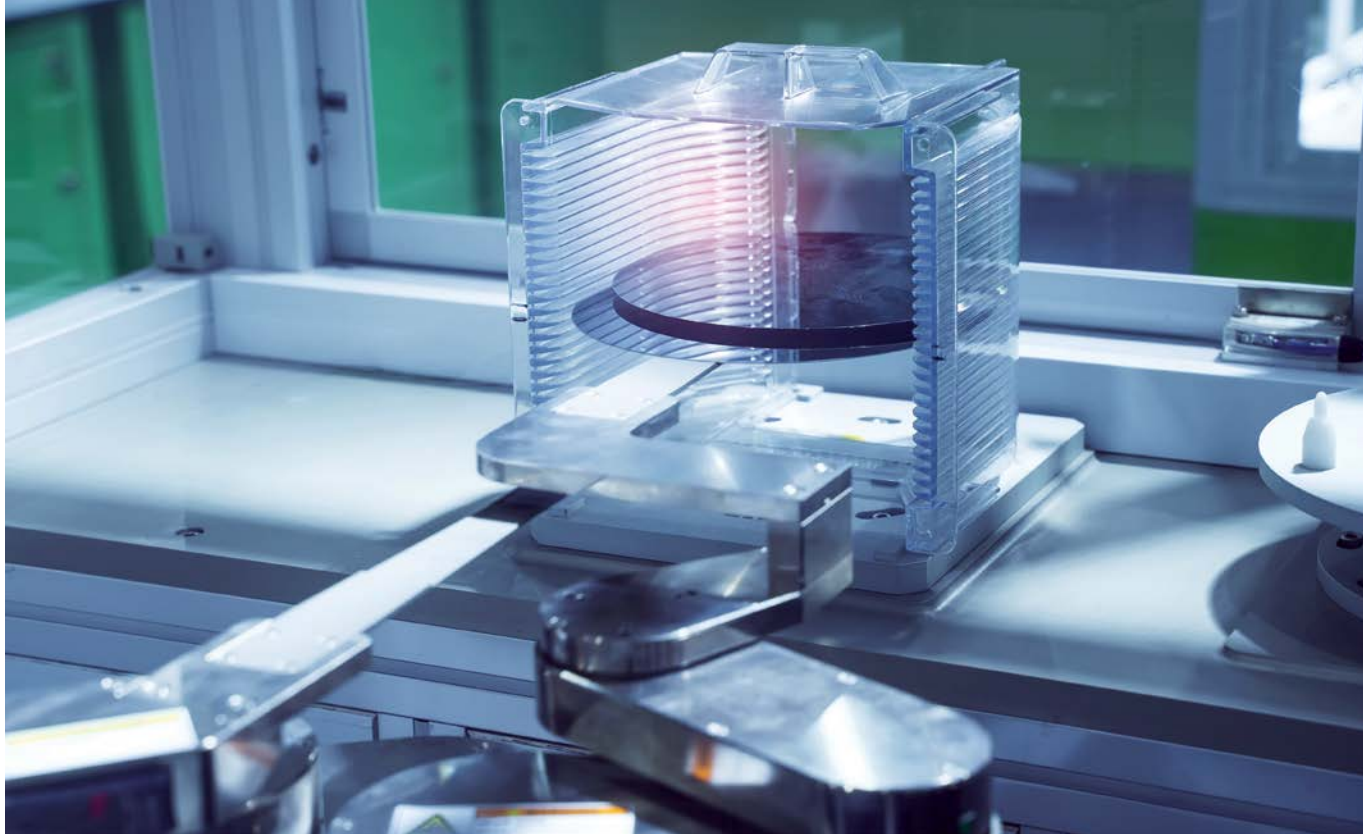
Lubrication is an important consideration here. Oils and greases have maximum operating temperatures at which point they will start to degrade and evaporate quickly leading to bearing failure. Standard greases

are often limited to a maximum temperature of around 120°C and some conventional high temperature greases are capable of resisting temperatures of up to 180°C.

However, for applications that require even higher temperatures special fluorinated lubricating greases are available and temperatures in excess of 250°C are



— Bearings for aerospace actuation systems can be best configured by considering lubrication, materials, and special heat treatment or coatings.



— Specially designed bearings can operate reliably in ultra-high vacuum environments such as semiconductor manufacturing.

attainable. Where liquid lubrication is not possible, solid lubrication is an option which allows for low speed reliable operation at even higher temperatures. In this case molybdenum disulphide (MOS₂), tungsten disulphide (WS₂), graphite or Polytetrafluoroethylene (PTFE) are recommended as solid lubricants as they can tolerate very high temperatures for longer periods of time.

Materials

When it comes to temperatures in excess of 300°C special ring and ball materials are necessary. AISI M50 is a high temperature steel that is typically recommended as it exhibits high wear and fatigue resistance at high temperatures. BG42 is another high temperature steel that has a good hot hardness at 300°C and is commonly specified since it has high levels of corrosion resistance and is also less susceptible to fatigue and wear at extreme temperatures.

High temperature cages are also required and they can be supplied in special polymer materials including PTFE, Polyimide, Polyamide-imide (PAI) and Polyether-etherketone (PEEK). For high temperature oil lubricated systems bearing cages can also be manufactured from bronze, brass or silver-plated steel.

Coatings and heat treatment

Advanced coatings and surface treatments can be applied to bearings to combat friction, prevent corrosion and reduce wear, thus improving the bearing performance at high temperatures. For example, steel cages can be coated with silver to improve performance and reliability. In the case of lubricant failure/starvation, the silver-plating acts like a solid lubricant, allowing the bearing to continue running for a short period of time or in an emergency situation.

Reliability at low temperature

At the other end of the scale, low temperatures can be problematic for standard bearings.

Lubrication

In low temperature applications, for example cryogenic pumping applications with temperatures in the region of -190°C, oil lubrications become waxy resulting in bearing failure. Solid lubrication such as MOS₂ or WS₂ are ideal for improving reliability. Furthermore, in these applications, the media being pumped can act as the lubricant, so the bearings need to be specially configured to operate at these low temperatures using materials that work well with the media.

Materials

One material that can be used to improve a bearing's fatigue life and wear resistance is SV30® - a martensitic through-hardened, high nitrogen, corrosion-resistant steel. Ceramic balls are also recommended as they deliver superior performance. The inherent mechanical properties of the material mean they provide excellent operation in poor lubrication conditions, and it is far better suited to operate reliably at low temperatures.

Cage material should also be chosen to be as wear resistant as possible and good options here include PEEK, Polychlorotrifluoroethylene (PCTFE) and PAI plastics.

Heat treatment

Rings should be specially heat treated to improve dimensional stability at low temperatures.

Internal design

A further consideration for working in low temperatures is the bearing's internal design. Bearings are designed with a level of radial play, but as temperature reduces, the bearing components undergo thermal contraction and the amount of radial play

is therefore reduced. If the level of radial play reduces to zero during operation this will result in bearing failure. Bearings that are intended for low temperature applications should be designed with more radial play at room temperatures to allow for an acceptable level of operating radial play at low temperatures.

Handling the pressure of vacuum

In ultra-high vacuum environments such as those that are present in manufacturing electronics, semiconductors and LCDs, the pressure can be lower than 10⁻⁷mbar. Ultra-high vacuum bearings are typically used in actuation equipment within in the manufacturing environment. Another typical vacuum application is turbomolecular pumps (TMP) which generate the vacuum for manufacturing environments. In this latter application the bearings are often required to work at high speed.

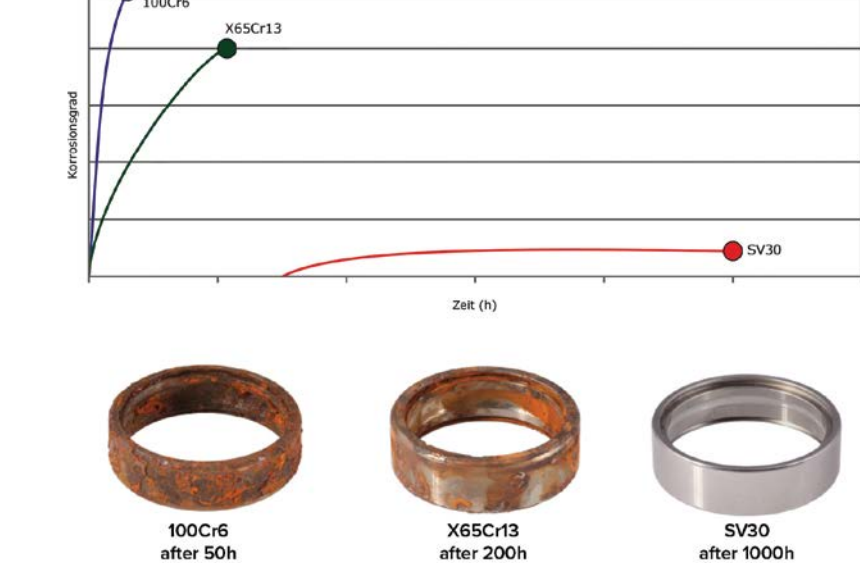


— Barden's bearing systems deliver long life times and operate at high speed - ideal for turbomolecular pumps used to generate vacuum environments.

Lubrication

Lubrication in these conditions is key. At such high vacuums, standard lubrication greases evaporate and also outgas, and the lack of effective lubrication can result in bearing failure. Special lubrication therefore needs to be used. For high vacuum environments (down to approximately 10⁻⁷ mbar) PFPE greases can be used as they have a much higher resistance to evaporation. For ultra-high vacuum environments (10⁻⁹mbar and below) solid lubricants and coatings need to be used.

For medium vacuum environments (around 10⁻²mbar), with careful design and selection of special vacuum grease, bearing systems that deliver long life times of more than 40,000 hours (approximately



— The graph shows the degree of corrosion over time for three materials SV30, X65Cr13 and 100Cr6 following controlled salt-spray tests.

5 years) of continual use, and operate at high speeds, can be achieved.

Corrosion resistance

Bearings which are intended for use in a corrosive environment need to be specially configured as they can potentially be exposed to acids, alkalis and salt water among other corrosive chemicals.

Materials

Materials are a vital consideration for corrosive environments. Standard bearing steels readily corrode, leading to early bearing failure. In this case, SV30 ring material with ceramic balls should be considered as they are highly resistant to corrosion. In fact, studies have shown that SV30 material can last many times longer than other corrosion resistant steel in a salt spray environment. In controlled salt-spray tests SV30 steel only shows slight signs of corrosion after 1,000 hours of salt spray testing (see graph 1) and SV30's high corrosion resistance is clearly seen on the test rings. Special ceramic ball materials such as Zirconia and Silicon Carbide can also be used to further increase a bearing's resistance to corrosive substances.

Getting more from media lubrication

The final challenging environment is applications where the media acts as the

lubricant, for example refrigerants, water, or hydraulic fluids. In all of these applications the material is the most important consideration, and SV30 - ceramic hybrid bearings have often been found to provide the most practical and reliable solution.

Conclusion

Extreme environments present many operational challenges to standard bearings, thus causing them to fail prematurely. In these applications bearings should be carefully configured so they are fit for purpose and deliver excellent long-lasting performance. To ensure high reliability of bearings special attention should be paid to lubrication, materials, surface coatings and heat treatment. As experts in super-precision bearings for challenging environments, HQW Precision and The Barden Corporation fully understand the demands of harsh applications. Working together as 'Partners in Precision', the companies are sharing knowledge with customers worldwide, helping them to improve reliability of their equipment. For more information visit www.hqw.gmbh or www.bardenbearings.co.uk.

Author

By Barney Eley, Senior Application Engineer at The Barden Corporation and Stefan Vogel, Sales & Applications Manager, HQW Precision GmbH.

Our universe is made of

**balls, cylindrical rollers, taper rollers, spherical rollers
and needles in steel and ceramic, cages in brass and steel**



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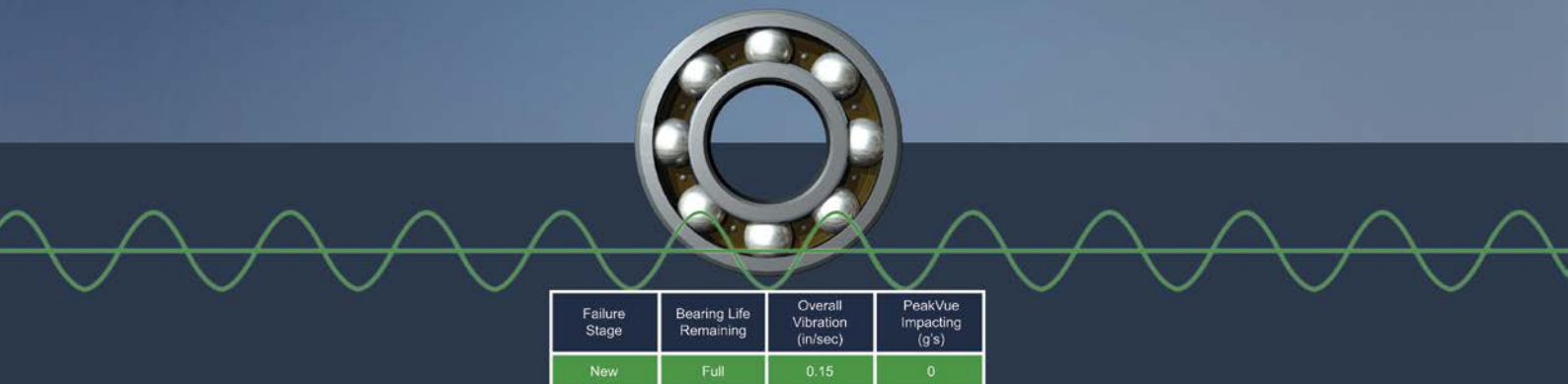
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Emerson Vibration Sensor Simplifies Asset Monitoring

The AMS Wireless Vibration Monitor from Emerson is a low-cost, easy-to-deploy vibration sensor that performs prescriptive analytics on vibration data using native software to automatically identify failure modes and prevent potential problems involving rotating assets. The compact device makes it economically feasible to fully monitor motors, pumps, fans and other critical plant equipment to reduce downtime and achieve more reliable operations.



Vibration in rotating machinery can signal issues such as misalignment, gear defects, insufficient lubrication, pump cavitation and rolling element bearing defects – all of which can be precursors to hazardous conditions. Vibration analysis is therefore one of the most important techniques for monitoring the condition of such machines as part of a predictive maintenance programme.

The continuous collection of vibration data enables potential problems to be identified earlier, thereby preventing unexpected failures that can cause safety incidents and production loss. However, cabling and equipment costs can prohibit continuous, hard-wired online vibration monitoring. In these cases, organisations have typically substituted manual measurements taken via handheld units, but the analysis of manual readings can require time and expertise. Wireless monitoring technology removes the need for expensive cabling but many organisations do not have personnel with the necessary ability to correctly interpret the often-complex vibration data that is made available.

Generating actionable data

The AMS Wireless Vibration Monitor provides a solution by collecting and contextualising vibration data to generate actionable information. By applying Emerson's patented PeakVue™ Plus technology, the device not only identifies when and how assets will fail, but also why. PeakVue Plus builds on proven PeakVue technology that filters vibration signals to focus on impacting, a leading indicator of overall asset health on any type of rolling element bearing machine. Thanks to this embedded intelligence, plant managers can add wireless vibration monitoring to their maintenance toolbox without having to train current staff to perform complex analysis. Instead, technicians, regardless of expertise, can quickly and clearly identify and prioritise mechanical issues, enabling them to focus more on operations-critical tasks.

The AMS Wireless Vibration Monitor can be preconfigured or configured onsite using a wireless gateway or handheld device, enabling organisations to place the device at any location in a facility immediately without needing to install and connect separate sensors to the

transmitter. This gives almost instant access to readings and complete visibility of the health of that equipment. In addition, a longer battery life and field-replaceable batteries means users can plan for less maintenance and fewer trips to the asset being monitored. All these capabilities mean faster deployment, less engineering, and quicker return on investment.

The AMS Wireless Vibration Monitor operates on a plant's existing WirelessHART® network and fully supports the vibration analysis tools included in Emerson's AMS Machine Works software. It uses a triaxial sensor to capture data in three dimensions to generate a complete picture of the machine condition. The AMS Wireless Vibration Monitor is the latest addition to Emerson's comprehensive health monitoring portfolio, which includes the AMS Asset Monitor and AMS 6500 ATG. Together, these devices help organisations fully monitor the health of machinery equipment, from essential assets to operations-critical assets that can have immediate impact on safety and production.

For more information on AMS Wireless Vibration Monitor, visit <http://bit.ly/3iZUz2f>

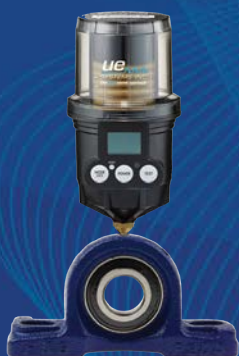


MODULAR SYSTEM

Each OnTrak is capable of 16 sensors. Easily scale OnTrak systems to thousands of sensors to one central dashboard

COMMUNICATION

(Ethernet, wifi or cellular)



SINGLE POINT LUBRICATOR

Dispense lubricant with precision only when needed from up to 16 single point lubrication devices



MOBILE VIEW

Viewable on any network connected device; pc, laptop, tablet, phone using a standard browser

ALARM NOTIFICATION

Built-in events system, which is configurable, and has the ability to display, email and text any alerts the system has

BEARING LUBRICATION REIMAGINED

Remote and Real Time Bearing Monitoring and Lubrication



The OnTrak SmartLube is a unique remote bearing monitoring and lubrication system. Designed to **monitor and lubricate bearings remotely**. With remote condition-based lubrication you can greatly reduce bearing failures.

System uses ultrasonic sensors: identify bearing issues beyond lubrication at the earliest possible point

Lubricate bearings remotely with a push of a button, using always the right grease and the right amount

All data accessible anytime, anywhere, via user-friendly dashboards

System includes single point lubricators: no more lubrication issues!

Easy to install, affordable and scalable

Integrates with existing databases and CMMS

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On a Roll:

Raising standards
for collecting bearing data







SKF is developing a fully commercial version of its Sensor Roller – which will gather detailed information from large bearings such as those used in wind turbines

Information is everything in modern engineering. The ability to collect and analyse ‘big data’ is practised across the sector, from factory floor production to operating remote windfarms.

This is increasingly done by smart components that gather, analyse and transmit process data. For bearings, critical details such as load, rotation speed and temperature can be used to calculate bearing life. This, in turn, helps to improve the performance – and lengthen the life – of key assets.

One system that can perform this is SKF’s Sensor Roller system. It uses rollers embedded with sensors to gather several types of data. This data can be transmitted wirelessly to maintenance staff, allowing them to gain an instant picture on the state of a piece of machinery. It is typically used in large bearings, as the roller must be of a minimum size (in order to

accommodate the electronic components).

Magic performance

The Sensor Roller system grew out of the older Magic Roller system, which was developed more than 30 years ago. The Magic Roller was relatively crude by modern standards: for example, it used a large external coil to power the roller electronics. Incorporating the coil, which was relatively expensive, also required equipment to be modified.

Also, it was only capable of measuring loads and could not gather other data such as temperature and rotation speed directly. Overall, the system was relatively limited in its use, and was generally aimed at troubleshooting.

The modern Sensor Roller system is far more sophisticated and is becoming more so as product development continues. To

date, SKF has spent around three years improving and modifying the product into an advanced prototype. Different versions and sizes continue to undergo rigorous testing. Now, it is installed in a large wind turbine bearing for a one-year field trial. The aim is to make Sensor Roller a fully commercial product – that can last as long as the bearing itself – within two years. Such a system will enable continuous process control, with the opportunity for SKF to offer long-term Rotating Equipment Performance (REP) contracts.

Sensorised roller

Sensor Roller consists of a hollow roller containing various measurement sensors, associated electronics and a battery. The sensors measure three types of data: load, temperature and rotation speed. All three are critical in determining bearing life, which has a direct effect on asset life. While temperature and rotational



speed both influence bearing life, the effect of load is far more significant.

The roller has three accelerometers that measure acceleration in three directions plus a tri-channel gyroscope that measures rotational speed in three axes. Together, this shows the complete motion of the roller. Accurate measurement of rotational speed can reveal if the roller is moving or sliding – rather than truly rolling – which can cause overheating and subsequent deterioration.

Measuring temperature is relatively simple but is critical in one particular area: lubrication. If bearings run too hot, lubricant thins out; this reduces levels of protection, potentially causing metal-metal contact between raceways and rollers.

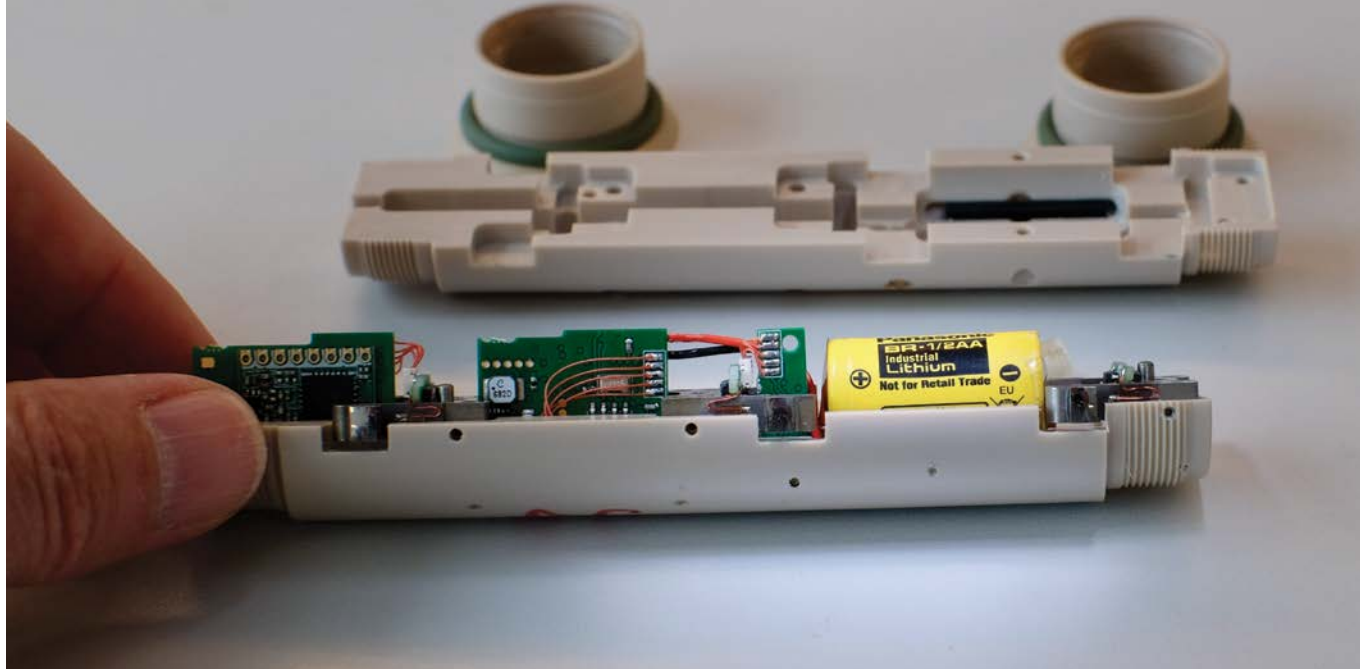
The roller itself is long enough to accommodate three separate load measurement points. This allows it to detect a variety of different effects. For instance, a mismatch between loads along the roller can highlight misalignment of the raceway. This can result in serious problems if not corrected. A polar plot of the load can show whether the bearing is loaded correctly and can even pinpoint imperfections in the design of the bearing and/or the surrounding structure.

The way that load is transferred in these



types of large bearings depends heavily on the system into which they are installed.

For instance, large SKF bearings for wind turbine main shafts are 4m in diameter.



Compared with a typical small bearing, the rings for these large bearings are relatively thin. This means that ring stiffness is much lower, so that the structure has a huge influence on bearing performance.

Measuring all relevant parameters therefore helps both SKF and each customer to understand the application in greater detail, by demonstrating exactly how a bearing is performing in each application and under varying operating conditions. This knowledge can then be used to improve reliability and efficiency, while reducing whole-life cost.

Forward motion

SKF has been testing the Sensor Roller rigorously in a variety of bearing types and sizes for some years. For example, it has been put through its paces on specialised test rigs at the company's Sven Wingquist Centre in Germany since 2017, where the product is being assessed in spherical, cylindrical and tapered roller bearings.

The data generated has helped product development teams to understand how these bearings behave in reality, with the data being used for designing new bearings, rather than data from within simulation programs.

SKF has also installed a Sensor Roller System in a wind turbine main shaft bearing in Northern Germany, for an extended field trial. The radio gateway - which transmits the data - has been installed in June and the application will run for twelve months. It will capture

the behaviour of the main shaft bearing, in minute detail, for the whole time. This will help SKF, and the customer, to understand exactly how seasonal variations in weather affect performance.

SKF has also helped the customer to verify pre-load conditions, which is vital in making sure that bearings keep rolling (and do not slip). Part of the verification process includes checking that the customer has assembled the bearing correctly before it goes into service. As the Sensor Roller moves through the bearing, it provides insight into the load variation caused by manufacturing tolerances and support structure.

At the end of the trial, both SKF and the customer will have learnt a lot more about how the bearings operate under real conditions. Normally, bearing designers are restricted to using statistical data on wind conditions, with a variety of scenarios that are based on assumed operating parameters. Because of this, bearings and other components are often over-engineered (or over-dimensioned) in order to accommodate all potential forces acting on them. Using real data will give the designers better inputs for their simulation models, which will optimise future designs.

At a basic level, understanding the exact forces acting on a bearing means that parts could be made thinner. This, in turn, will save on material, weight, energy and ultimately, cost.

Future plans

While the Sensor Roller has come a long way from the Magic Roller, SKF has plans to take it much further. Within two years, it intends to have a fully autonomous roller that can last the life of the bearing. This means replacing the battery, which has a limited lifespan, with an energy harvesting system; SKF already has access to this technology and is working to integrate it into the next generation of prototypes.

The Sensor Roller of the future will also do more than simply gather data. For instance, it should be able to determine the remaining lifespan of a bearing, by feeding precise data into a bearing life model. This early warning will help operators to schedule maintenance or order a replacement bearing. Ultimately, this helps to avoid unplanned shutdowns, which lowers cost of ownership.

Sensor Roller could also help to control the operation of the wind turbine itself. Here, an operator may want to harvest as much energy as possible during high winds, without the risk of overloading the bearing. Fast, accurate feedback on bearing forces will help to determine the precise conditions, such as pitch angle, that maximise energy conversion within safe limits.

With electronic components continuing to shrink in size, SKF believes these rollers will one day become available for smaller bearing sizes. However, for now, the immediate aim is to get Sensor Roller ready for large bearings.



McGILL®



IS THERE A BETTER CAM FOLLOWER FOR YOUR APPLICATION?

McGill® cam followers have been helping conveyors run better for decades. The cylindrical roller design and seal features of the CAMROL® series cam followers provide reliable performance in extendable conveyor and packaging applications by being able to support the heavy loads and reducing maintenance. CAMROL bearings are also lubricated to last, and in lube-for-life testing lasted up to 5 times longer than standard needle bearing cam followers.

For applications involving heavy dry/wet contamination or thrust loads, McGill® TRAKROL® bearings can help prevent downtime and are available in ball and tapered roller types and with multiple roller configurations. Additionally, Heavy Duty cam followers feature large diameter cylindrical rollers, higher radial load ratings than conventional cam followers, and can solve issues such as incidental thrust.

For more information on McGill cam followers or other McGill products, visit:

regalbeloit.com/McGill
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Since our foundation, back in 1936, we are continually improving, learning, and adapting to the industrial needs. With over 80 years of experience, we were part of the industrial challenges of 20 and 21 centuries, which offered us valuable knowledge about the ever-evolving technologies. We grew side by side with the innovation from the manufacturing sector.

It's not easy to always adapt at a fast pace, but you must do it to stay competitive. No matter what happened, we adapted. It was also the case of the novel coronavirus crisis. The pandemic has left millions of workers to wonder when and how will the economy going to recover. A gradual process is in place all over the world to fully reopen the industrial activity. The recovery speed varies on many factors (location, industrial sectors, the health status of the population, etc.). This time, the economic policies are also different from other crises, because of the threat of a new wave of coronavirus cases.

At RKB we had an internal protocol that helped us from the start of the crisis. Even with the novel coronavirus pandemic, all our activities continued regularly. We never stopped. We had no supply problems or significant delivery shifts. Our large and locally-based warehouses



Since our foundation, back in 1936, we are continually improving, learning, and adapting to the industrial needs. ”

solved many critical situations that our clients across the world were facing. RKB has an ever-growing network of local warehouses directly run in cooperation with its regional partners to ensure proximity and fast delivery. Our worldwide distribution network ensures exports to more than 50 countries.

Now, even with some industries being more demanding than others, we are prepared for every scenario. RKB presently engineers and produces over 8.000 different part numbers.

Our production capacity and fast delivery times were not affected by the pandemic.

RKB can point to a history of real gains in all major sectors, from shipbuilding to offshore oil platforms, from steelmaking to metalworking, from excavators to tunnel boring machines, from lifting bridges to power transmission applications, from home appliances to giant gearboxes for wind turbines, from heavy automotive to off-highway applications and more.

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Electrical Bearing Protection

Q & A Sessions with Aegis

Q1. How do I implement a plantwide program to adopt AEGIS shaft grounding on all of our VFD-fed motors?

A1. We run into that every week. It's one thing for us to tell you, "This is the solution." But then how do you implement that solution? You've got dozens or hundreds of existing motors. Some of them already have bearing problems, and some don't. Obviously the ones with problems need to be repaired and have AEGIS added or to be replaced with motors with AEGIS factory-installed.



But you don't want to stop there. Every motor on a drive is at risk cost-effective, even for 1-2 hp motors, to use shaft grounding and avoid the cost and hassle of replacement. Suppose you've got a \$400 2 hp motor that fails once a year. OK, that's \$400/year for a new one. If you swap in a 2 hp motor with AEGIS, that's a bigger expense in Year One... But then that motor doesn't need to be replaced, not for electrical bearing damage. AEGIS rings are usually good for 100,000 hours. That's quite a few years where you're spending \$400 less each year. Now multiply those savings by every motor you have on a drive, and that adds up.

There are two philosophies on how to implement the program. Some companies just replaced or put rings on all of their motors at once. But usually it's phased in. One way to do it is to get a small inventory

of motors with AEGIS, and as in-service motors fail or need work, repair or replace them with AEGIS-installed motors. Then you continue the acquire & swap out process until every motor on a drive has a ring.

problem is that you have a voltage across the bearings. And if the shaft voltage is bigger than a few volts, it's going to arc through the bearings and damage them.

“

AEGIS Rings also come with a 2-year extended warranty against bearing fluting damage. No other form of protection against VFD-caused bearing damage offers a warranty like this.

And if you every try to implement this and get hung up on something, give us a call. Our Regional Sales Managers would be happy to talk to you or visit your plant and help you phase this in.

Q2. I know that larger motors on drives are subject to high frequency circulating currents. Do they still have problems with shaft voltage discharge (EDM) current?



A2. The short answer is Yes. When a three phase motor is on a, the voltage in the three phases will never cancel out. There will always be some extra voltage in the motor windings. And that extra ("common mode") voltage is always going to charge up the rotor and create a shaft voltage. Now, we say "shaft voltage," but the real

It's true that circulating currents are actually a bigger problem than shaft voltage in these large motors. You can interrupt (stop) circulating currents with one insulated bearing. Protecting one bearing from circulating current protects the other too. But insulating one bearing won't protect the other bearing from EDM bearing current from shaft voltage discharge. So to minimize the risk of electrical bearing damage in these motors, you need one insulated bearing and good reliable shaft grounding like an AEGIS ring. (And grounding of the motor frame to prevent rotor ground current, but that's another issue.)

AEGIS Rings also come with a **2-year extended warranty** against bearing fluting damage. No other form of protection against VFD-caused bearing damage offers a warranty like this. To learn more about AEGIS shaft grounding and best practices for electrical bearing protection. We offer monthly live training webinars at <https://est-aegis.com/training>, and – if pandemic restrictions permitting – we can also visit your facility to review your exact application.

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we'll fail your bearings
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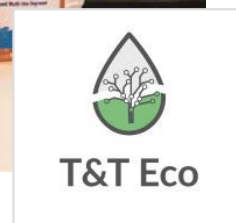
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The company has brought together several technically leading brands into the EMEA market to form a unique and professional range of degreasers, absorbents & cleaning solutions that are non-toxic and safe to use, as well as ecologically clean and biodegradable. Making them a practical and competitive solution without compromising performance.

T&T Eco products are used throughout most sectors around the globe & are widely acknowledged by engineers, technicians, maintenance staff & H&S managers as high performing quality maintenance chemicals. Their supplies are cost-effective, safe & sustainable maintenance solutions for specialty industry & service applications.

T&T Eco are looking for established distributor partners with a strong geographic & / or application focus, they are also welcoming 3rd Party purchasing consultants that are recommending, sourcing or supplying into target applications & customers.

When it comes to the application & use of chemicals for maintenance, cleaning & lubrication, each industry faces its own individual requirements & challenges.

T&T Eco has developed a comprehensive professional range of eco-friendly cleaning products that will effectively remove industrial greases, welding spatter & paints.

The range of specialist chemical products

designed to perform in the most testing environments:

- Degreasers & Cleaners: A range of degreasers & cleaners for use in all types of industries
- Specialised Products: Specialist & niche functions & applications (Cleaning – Protecting – Removing)
- Absorbents: FloodSax & Pro Earth range of natural absorbent material & products
- Descaling: Limescale & Calcium Removal
- Deodorise: Wastewater treatment & odour control

If you think T&T Eco can benefit your company, visit their website www.tandteco.com or get in contact with mike@tandteco.com

Making the world run more smoothly

"Clean Metal" for a sustainable future

"Clean Metal" takes lubrication-free plain bearings to the next level. Copper alloy is sintered onto a steel back and impregnated with fluorine-based polymer to achieve a low coefficient of friction. Despite its simple structure, various materials with focus on low friction, high load or fast rotation are available and can be selected according to desired application. Clean Metal is compliant with recent environmental regulations and contributes to a sustainable future.



Rotating assets with fewer spare parts - *it is possible!*

During my 16-year career with the Royal Netherlands Air Force, I learned and experienced that having the right spare parts available or not affects the availability of technical systems. Aircraft stood still at Volkel Air Base due to a shortage of spare parts, while those in Kleine-Brogel in Belgium (68 km south) were in stock. For so-called consumables, I exchanged parts monthly with my Belgian colleagues. As a result, we solved each other's shortages and improved the availability of spare parts and thus the deployability of the aircraft.

After my career at the Air Force, I am now sharing my knowledge and experience as a consultant at Gordian with service and maintenance managers in various industries. I experience that few realize that stock management for spare parts differs so enormously from the generally known and available stock management methods and techniques. As a result, many service and maintenance organizations still encounter numerous problems with the timely availability of the correct spare parts, despite high stocks of them.

Spare parts and system availability go hand in hand

The direct relationship between the timely availability of spare parts and

system availability (in this example the deployability of aircraft) becomes clear from the simple numerical examples below. A technical system is "Up" (it works, green in the picture below) or "Down" (it does not work, red in the picture below). During the time that a system is down, maintenance is carried out or the system waits for it. That waiting time is caused by not having one of the following immediately available: People, Resources, Methods or Materials¹. In the normal situation in the picture below, half of the 'Down' time (28% per year) consists of waiting for materials (14%) and the other half of actual maintenance (14%).

Now imagine that we can reduce the waiting time by 50% through better

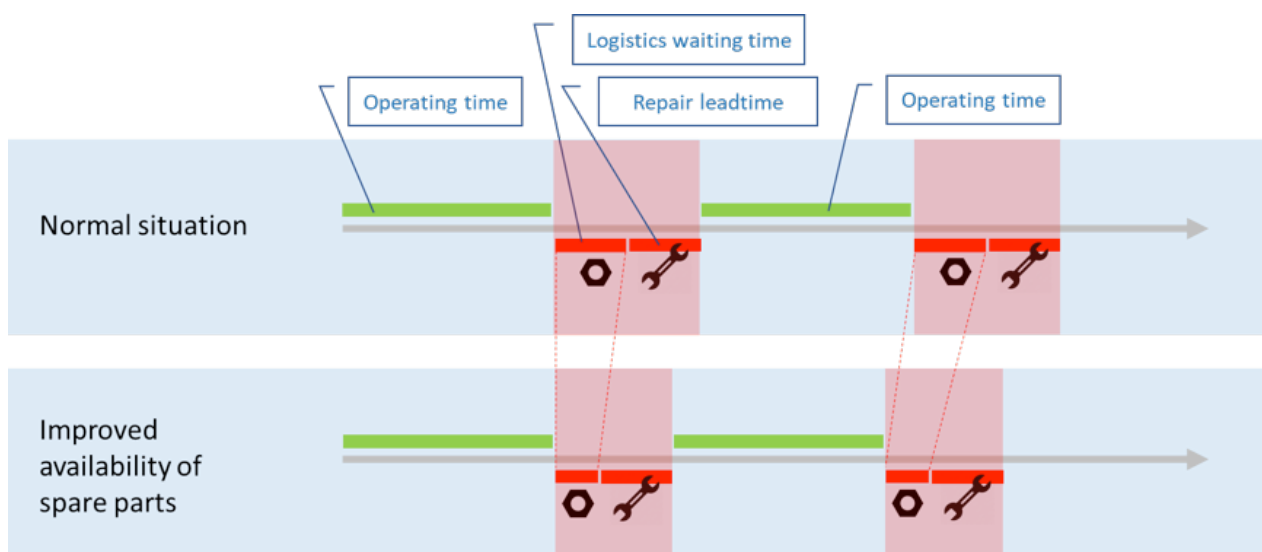
availability of spare parts. Then the uptime of the technical system increases by 5% from 72% to 77%.

One stock management is not the other

The management of stocks for service and maintenance differs substantially from the well-known and used methods because:

- the demand for spare parts is low and therefore (a.o.) unpredictable,
- spare parts are sometimes critical and / or repairable,
- delivery and repair leadtimes are long and unreliable,
- prices can be very high.

Just compare the demand for packs of coffee in the supermarket with the



demand for any part (petrol pump, starter motor, alternator, etc.) in a car garage. The (standard) stock management techniques and systems that are taught during training and are available in

planned: relatively inexpensive, fast-moving consumables require different settings and techniques than relatively expensive, slow-moving and repairable items.

Such a system is based on and includes a fully closed Plan-Do-Check-Act cycle, which continuously improves stock management for spare parts.

Subject	Coffee	Car-Part
Demand	Large and stable – well predictable	Small and unexpected – hard to predict
Usage	Once, consumed	Multiple use – reconditioned parts available, repair possible
Supply chain	One direction – from coffee plant to the customer	Largely closed loop between use and revision / repair and sometimes scrapping
Criticality	Small – there are multiple brands available	Large – Depending on make and type, only 1 specific part fits
Stock	In the shop	Specific parts not directly available in the garage
Lead times	Short and stable	Can be long and unreliable depending on the specific part
Price	Low	High

ERP and stock management systems are aimed at items such as coffee. Demand is predictable based on past demand, returns are virtually non-existent and delivery leadtimes are stable. Stock for coffee is a trade-off between stock keeping costs and order costs given a specific demand. This does not apply to spare parts. That stock decision is based on completely different things; there are many more uncertainties.

Maintenance management systems also do not take these characteristics into account. This is resolved by entering manual min and max levels.

Gordian has already published a lot about a better balance between the availability of spare parts and the required stock² and we will repeat that only briefly here. We create the right service or maintenance stock by taking the following measures:

- Distinguish between spare parts for planned (preventive) and non-planned (corrective) maintenance. In generic stock management comparable to the distinction between dependent and independent demand.
- Segmenting spare parts for maintenance that cannot be

- Applying more appropriate statistical models and demand forecasting techniques.
- Taking into account unreliable delivery and repair leadtimes (common in service and maintenance).

We have helped organizations more than 100 times, based on transactional data from ERP or maintenance management systems, to improve the availability of spare parts, at (much) lower stocks and at lower logistics costs. These savings are not the "theoretical" costs, but actual "cash-out" savings.

Keep improving with a continuous improvement process

Before even thinking about interventions, it is necessary to create awareness about the improvement potential. Therefore, always start with a scan and quantify the improvement potential. As soon as there is realization of a great business case, you continue: depending on the maturity level of stock management, you implement project-based improvement processes. One of these is the implementation of a suitable stock management system for spare parts (for service and maintenance).

Have you been triggered and do you realize that you use a coffee stock management system for spare parts?

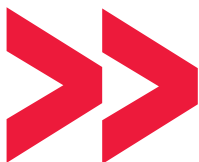
Then contact us. I would like to make you aware of the opportunities that still exist. There is a good chance we can significantly increase system availability at lower stocks and logistics costs.

Author

Jürgen Donders,
experience expert at Gordian
Logistic Experts BV

¹ We are aware that daily reality is more unruly than this simplified example due to redundancy, temporary loss of function and recovery, practical emergency solutions, supplier crash actions, etc. As a result, the pain is often not or less felt. However, it does cost money and energy. Better stock management leads to less waste of money and energy.

² <https://gordian.nl/en/news-publications/publications>



PRECISELY FORWARD NSK MOTION SOLUTIONS

From Machine Tool, Injection Molding, Medical & Measuring to General Machinery applications, NSK offers the best technical solutions and a full range of engineering services. Every NSK Linear Guide, Ball Screw, Support Bearing and Super Precision Bearing is tailored to your specific needs. NSK, the only comprehensive engineering service supplier on the market, will take your business a step ahead. Find out more at www.nskeurope-motionsolutions.com.

LINEAR GUIDES | BALL SCREWS | SUPPORT BEARINGS
SUPER PRECISION BEARINGS | ENGINEERING | SERVICES

THE NEW CHINA BEARING INDUSTRY DIRECTORY

BearingNEWS, the world's most important bearing magazine, is bringing the global bearing industry closer than ever before. It is our pleasure to announce the launch of the **China Bearing Industry Directory**. This limited time publication will be made available for 2 years and will showcase a selection of world-class Chinese manufacturers competing in a variety of product ranges to the global bearing industry.

China is a major manufacturing center for the global bearing industry with thousands of companies constantly changing, growing and adapting. In an effort to help you navigate the vast expanse of manufacturers, each product category will highlight only 3 to 4 manufacturers across a spectrum of product offerings. This includes but is not limited to, **bearings, components, seals, materials, equipment, machine tools and services**. Through a concise company snapshot, customers can easily determine the product offerings, capabilities, and other valuable information necessary to qualify a new potential partner.



The China Bearing Industry Directory is created using a mature network strategically developed by BearingNEWS magazine, and has been designed to provide key company insights for those looking to optimize supplier development. Demand for this resource has increased due to recent cancellation of in-person events, and we are proud to offer this in digital and print to our partners throughout the world.



The Superior Quality Bearing Manufacturer of China is Looking for New Distributors Worldwide

China's well-known and largest bearing manufacturing company ZWZ Group is expanding its global distributors network by announcing new distributors cooperation plan. The company is currently present in more than 100 countries and aims to increase this number in the coming period by appointing new distributors.



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www.zwx-bearing.com



Wafangdian Jinfeng Bearing Manufacturing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Wafangdian Jinfeng Bearing Manufacturing Co.,Ltd.
<i>Business Type</i>	Manufacturer and R&D
<i>Main Product</i>	Spherical Roller Bearings
<i>Inner Diameter (D)</i>	100 mm - 1600 mm
<i>Outer Diameter (D)</i>	120 mm - 2000 mm
<i>Precision Rating</i>	P6 P5 P4
<i>Other Products</i>	Taper Roller Bearings, Cylindrical Roller Bearings, Thrust Spherical Roller Bearings
<i>Total Employees</i>	400
<i>Year Established</i>	2000
<i>Certifications</i>	ISO9001:2015, ISO14001:2015 ISO45001:2018
<i>Brand Name(s)</i>	WBJF or customer brand
<i>Ownership</i>	Private Enterprise
<i>Annual Turnover</i>	36 million USD
<i>Main Markets</i>	China Domestic, Europe, India
<i>Main Industries</i>	Mining, Cement, Rolling Mill, Paper industry, Petrochemical Industry, kinds of transmission machinery

WBJF is one of the best quality middle size and large size bearing manufacturers in China. WBJF has focused on quality and efficiency improvements for many years, who has worked with many world famous brands in Japan and Europe, as well as many top brands distributors and end users.

WBJF is serving mining industries, cement industries, steel rolling mills, petrochemical industries, kinds of transmission industries all over the world.

Our vision is "Let the world praise Chinese bearing".

Our mission is "To provide customers with high value-added products and services".

CONTACT INFORMATION

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Dalian Chengfeng Bearing Group Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Dalian Chengfeng Bearing Group Co., Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Spherical Roller Bearings
<i>Inner Diameter (D)</i>	100 mm - 1600 mm
<i>Outer Diameter (D)</i>	120 mm - 2000 mm
<i>Precision Rating</i>	P0 P6 P5 P4 P2
<i>Other Products</i>	Taper roller bearings, Cylindrical roller, Deep groove ball bearings, thrust roller bearings, Thrust ball bearings
<i>Total Employees</i>	230
<i>Year Established</i>	2007
<i>Certifications</i>	ISO9001:2008, ISO14001:2004
<i>Brand Name(s)</i>	DWCFO or customer brand
<i>Ownership</i>	Private owned
<i>Annual Turnover</i>	20 million USD
<i>Main Markets</i>	China Domestic, India and Korea
<i>Main Industries</i>	Mining, Cement, Steel

Dalian Chengfeng Bearing Group is a group company, which has a full production process covering forging, lathing, heat treatment, roller, cage, grinding, honing and assembly.

The company's main product is large sized high precision spherical roller bearings.

It also produces taper roller bearings, cylindrical roller, deep groove ball bearings, thrust roller bearings, and thrust ball bearings.

CONTACT INFORMATION

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Changzhou NRB Corporation



GENERAL INFO

<i>Company Name</i>	CHANGZHOU NRB CORPORATION
<i>Business Type</i>	Manufacturer, R&D
<i>Main Product</i>	Needle- & Cylindrical roller bearings
<i>Inner Diameter (D)</i>	5 mm - 430 mm
<i>Outer Diameter (D)</i>	8.7 mm - 450 mm
<i>Precision Rating</i>	P0, P6, P5, P4, P2
<i>Other Products</i>	Ball bearings, Clutch release bearings, Tapered roller bearings, Wheel hub bearings, Intermediate cones in synchronizer, Robot reducer bearings
<i>Total Employees</i>	2799 People
<i>Year Established</i>	1994
<i>Certifications</i>	IATF16949:2016, ISO9001:2015, ISO14001:2015, ISO45001:2018, CNAS2018
<i>Brand Name(s)</i>	NRB
<i>Ownership</i>	Joint Venture
<i>Annual Turnover</i>	over 200 million USD
<i>Main Markets</i>	China Domestic, America, Europe
<i>Main Industries</i>	Commercial Vehicles, Passenger Vehicles, Industrial machinery

Specialized in developing and manufacturing full range of transmission system bearings for new energy vehicles and traditional vehicles, NRB also develop and manufacture various wheel hub bearing and various types of precision bearings applied in other automotive applications and engineering machinery.

NRB Vision:

NRB, Give you a better quality life.

CONTACT INFORMATION

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STZ

Sichuan Dongzhou Bearing Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Sichuan Dongzhou Bearing Technology Co., LTD
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Outer spherical ball bearing mounted units with seats
<i>Inner Diameter (D)</i>	12 mm - 140 mm
<i>Outer Diameter (D)</i>	200 mm - 1600 mm
<i>Precision Rating</i>	-
<i>Other Products</i>	Large size and specialized bearing products
<i>Total Employees</i>	-
<i>Year Established</i>	-
<i>Certifications</i>	ISO 9001, China National High-Tech Company, Sichuan Province Innovation Company
<i>Brand Name(s)</i>	STZ
<i>Ownership</i>	Private
<i>Annual Turnover</i>	-
<i>Main Markets</i>	China, Korea, US
<i>Main Industries</i>	Machinery, Metallurgy, Oil&Gas

STZ is in historical Guanghan city, 45 minutes' drive to Chengdu, capital of Sichuan province. It specializes in designing, development, manufacturing, and services for various types of large size and specialized bearing products, with an annual output of 6 million sets. Insisting on the approach of "Focus, Precision, Specialization".

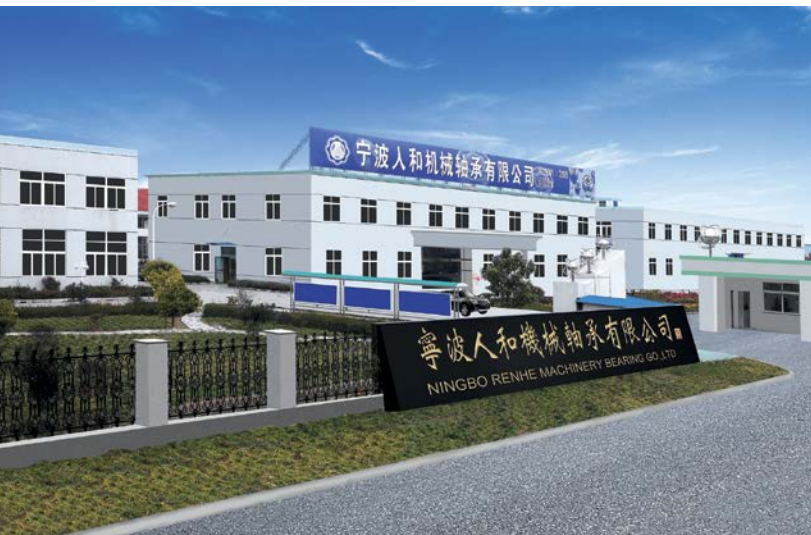
STZ grew its business with domestic and worldwide customers value quality, services, total cost, and as a reliable alternate to imported products. It is also recognized as a key product provider for China Strategic National Infrastructure.

CONTACT INFORMATION

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Ningbo Renhe Machinery Bearing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	NINGBO RENHE MACHINERY BEARING CO., LTD.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Deep groove ball bearing
<i>Inner Diameter (D)</i>	5 mm - 50 mm
<i>Outer Diameter (D)</i>	11 mm - 110 mm
<i>Precision Rating</i>	P5 P4
<i>Other Products</i>	Pin sleeve, pin shaft
<i>Total Employees</i>	400 People
<i>Year Established</i>	1967
<i>Certifications</i>	CE, ROHS, ISO9001, IATF16949, ISO14001, OHSAS18001 CE, ROHS, ISO9001, IATF16949, ISO14001, OHSAS18001
<i>Brand Name(s)</i>	RUWH
<i>Ownership</i>	Private
<i>Annual Turnover</i>	40 million USD
<i>Main Markets</i>	China Domestic, Europe, America
<i>Main Industries</i>	Motor, Car, Fitness Equipment

Established in 1967, with a total assets of 100 million RMB and more than 400 workers. Ningbo Renhe Bearing factory covers a land area of 55,000 square meters with 35,000 square meters of factory building. The precision of deep groove ball bearing is P6, P5, and the annual production capacity is more than one hundred fifty million sets. The company has CE, ROHS, ISO9001, IATF16949 certification and a rich stock, and can deliver the products in 24hours upon payment.

CONTACT INFORMATION

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Zhejiang XCC Group Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Zhejiang XCC Group Co.,Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Deep groove ball bearings
<i>Inner Diameter (D)</i>	10 mm - 140 mm
<i>Outer Diameter (D)</i>	30 mm - 210 mm
<i>Precision Rating</i>	P6 P5 P4
<i>Other Products</i>	Tapered bearings - Non-standard bearings Automotive bearings - High precision machine tool bearings - High speed textile machinery bearings - Motor bearings - Agriculture bearings
<i>Total Employees</i>	4000
<i>Year Established</i>	1998 年
<i>Certifications</i>	IATF 16949:2016, ISO 9001:2015, ISO 14001:2015, OHSAS18001:2007, GB/T29490- 2013, ISO IEC17025: 2005,ISO45001 2018
<i>Brand Name(s)</i>	ZXZ
<i>Ownership</i>	Private Enterprise
<i>Annual Turnover</i>	412 million USD
<i>Main Markets</i>	Asia 41%, Europe 37%, North America 17%
<i>Main Industries</i>	Automotive bearings - Motor bearings Agriculture bearings & Spare parts

XCC Group has always been committed to the construction of the vertically integrated production chain (which combined with R&D, tubing, forging, turning, heat treating, grinding, sale and customer service) in bearing manufacturing industry.

After more than 20 years of technology accumulation and high-end manufacturing equipment investment, it has become the leader of manufacturing technology from raw material to heat treatment in China's bearing industry; In recent years, XCC Group increased the development of finished bearing and production equipment investment, and significantly improved the level of its automation and intelligence, which has gradually become a main supplier of finished bearings and spare parts for manufacturers.

CONTACT INFORMATION

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Standard Bearings Industrial Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Standard Bearings Industrial Technology Co.,Ltd
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Bearing Unites
<i>Inner Diameter (D)</i>	10 mm - 100 mm
<i>Outer Diameter (D)</i>	25 mm - 200 mm
<i>Precision Rating</i>	P0 P6
<i>Other Products</i>	Plummer blocks, adapter sleeves
<i>Total Employees</i>	100
<i>Year Established</i>	2017
<i>Certifications</i>	ISO9001:2008, ISO14001:2004
<i>Brand Name(s)</i>	SLB
<i>Ownership</i>	Limited Company
<i>Annual Turnover</i>	5 million USD
<i>Main Markets</i>	Europe, Japan, South America and North America
<i>Main Industries</i>	-

SLB is the registered trademark of the SLB Bearing Unit and SLB Bearing brand of products which was established in 1985. The SLB Bearing Unit and Bearing brand was registered in 1997 to protect the premium quality reputation that was associated with its products and production capabilities. With the continuous expansion of the international market, we have registered the SLB trademark for Bearing Units and Bearings in the United States, the European Union, Mexico and other countries and regions.

SLB Bearing Unit was established in 1985 as a manufacturer of high quality bearing unit products and processes. With over 30 years experience in power transmission, SLB Bearing Unit has developed high levels of technical competence.

CONTACT INFORMATION

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CMI Bearing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	CMI Bearing Co., LTD
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	High Precision Ball Bearings
<i>Inner Diameter (D)</i>	Full range for Middle & Small Size Bearings
<i>Outer Diameter (D)</i>	Full range for Middle & Small Size Bearings
<i>Precision Rating</i>	Can meet most stringent industry standards or customized requirements
<i>Other Products</i>	Seals for bearing applications, Bearing Rings (machined and forged including high speed forging, green and black) and Finished Bearings (DGBB, TRB, SRB, and more)
<i>Total Employees</i>	1,200
<i>Year Established</i>	1999
<i>Certifications</i>	ISO9000, TS16949
<i>Brand Name(s)</i>	CMI Bearing
<i>Ownership</i>	Private
<i>Annual Turnover</i>	110 million USD
<i>Main Markets</i>	US, Europe, China Domestic
<i>Main Industries</i>	Agriculture, Automotive, and Equipment

Located in the renowned bearing town of Xinchang city, Zhejiang, China, CMI has been supplying high quality bearings and components/accessories to world customers including SKF, TIMKEN, and NSK etc. With best-in-class machining and measuring equipment and process expertise in forging, turning, grinding and assembly, and guided by our “respect customers and create values” philosophy, CMI has gained world bearing industry recognition as a reliable and creative manufacturer who can meet the most stringent requirements.

CONTACT INFORMATION

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Shenyang Zhongye Guangyang Bearing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Shenyang Zhongye Guangyang Bearing Co., Ltd
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Spherical roller bearings, cylindrical roller bearings;
<i>Inner Diameter (D)</i>	60 mm - 1600 mm
<i>Outer Diameter (D)</i>	100 mm - 2000 mm
<i>Precision Rating</i>	P0 P6 P5 P4 P2
<i>Other Products</i>	Tapered roller bearings, Deep groove ball bearings, Thrust roller bearings;
<i>Total Employees</i>	150
<i>Year Established</i>	2005
<i>Certifications</i>	ISO9001:2015
<i>Brand Name(s)</i>	SYB or customer brand
<i>Ownership</i>	Private Enterprise
<i>Annual Turnover</i>	15 million USD
<i>Main Markets</i>	China Domestic, Europe, Northeast countries.
<i>Main Industries</i>	Mining industry, Elevator industry, Metallurgical industry, Wind power

Shenyang Zhongye Guangyang Bearing Co., Ltd is one of leading manufacturer produces high quality medium-large size, large size and extra-large size bearings and bearing parts from 60mm inner diameter to 2000mm outer diameter. SYB has a senior technical team, strong technical force and production ability that can give customers perfect solutions and satisfaction.

SYB owns NC turning machines, grinding and super finishing machines for rings, grinding and super finishing machines for rollers, all these equipments make a strong base for SYB manufacturing high precision bearings.

The best materials used by SYB are Jiangyin Xingcheng Special steel etc, then these materials are done heat treatment by AICHILIN furnace.

CONTACT INFORMATION

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Shenyang Hanking Precision Bearing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Standard Bearings Industrial Technology Co.,Ltd
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Tapered roller bearings Cylindrical roller bearings Spherical roller bearings
<i>Inner Diameter (D)</i>	100 mm - 1200 mm
<i>Outer Diameter (D)</i>	120 mm - 1400 mm
<i>Precision Rating</i>	P0 P6 P5 P4
<i>Other Products</i>	Deep groove ball bearings, Thrust roller bearings Thrust ball bearings
<i>Total Employees</i>	98
<i>Year Established</i>	2010
<i>Certifications</i>	ISO9001:2008
<i>Brand Name(s)</i>	HANKING or customer brand
<i>Ownership</i>	Private owned company
<i>Annual Turnover</i>	12 million USD
<i>Main Markets</i>	China Domestic, Austria, Germany
<i>Main Industries</i>	Gear boxes for wind application, metallurgical industry, mining industry

Shenyang Hanking Precision Bearing Co., Ltd. (Hanking Bearing for short) was established in November 2010, as a subsidiary of the Hanking Industrial Group Co., Ltd. The floor space area is about 134,000 square meters. And it was rated as a high-tech enterprise. Hanking Bearing focuses on medium to large size, high precision rolling bearing, including: Tapered roller bearing, Cylindrical roller bearing, Spherical roller bearing. Bearing dimensions are from 200mm to 1.4 meters, accuracy can reach to P2/P4. Hanking Bearing aims to produce high life, high reliability roller bearing, suitable for different applications. Wholly-owned Hanking roller production base- Cylindrical roller, Tapered roller. The product dimensions are from 20mm to 200mm.

CONTACT INFORMATION

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<i>Mobile</i>	-



Wafangdian Bearing Group Corp.



GENERAL INFO

<i>Company Name</i>	Wafangdian Bearing Group Corp.
<i>Business Type</i>	Manufacturer, R&D
<i>Main Product</i>	Taper roller bearings, Cylindrical roller bearings, Spherical roller bearings, Ball bearings
<i>Inner Diameter (D)</i>	25 mm - 15000 mm
<i>Outer Diameter (D)</i>	50 mm - 16000 mm
<i>Precision Rating</i>	P6, P5, P4, P2
<i>Other Products</i>	Slewing bearings, Special bearings
<i>Total Employees</i>	11000
<i>Year Established</i>	1938
<i>Certifications</i>	ISO9001:2015, IATF 16949:2016, IRIS Certification™ rules:2017, CRCC,
<i>Brand Name(s)</i>	ZWZ, KRW
<i>Ownership</i>	Joint Venture
<i>Annual Turnover</i>	1 billion USD
<i>Main Markets</i>	China Domestic, Europe, India
<i>Main Industries</i>	Steel, Transmission Machinery, Wind Power

ZWZ is the biggest bearing manufacturer in China. With more than 80 years manufacturing experience, ZWZ has produced more than 20000 types of bearings. ZWZ's R&D center is the national large-size bearing R&D center. It has ZWZ-Romax global joint simulation center, ZWZ-Taylor Hobson joint testing laboratory and full-functional bearing life testing center. In addition, ZWZ has R&D sub-center in Bremer and Detroit.

ZWZ is serving to steel rolling mills, cement industries, mining industries, diversified transmission gearboxes, construction machineries, oil machineries, wind power, automobiles, railways, shipping, etc.

CONTACT INFORMATION

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KML Bearing



GENERAL INFO

<i>Company Name</i>	KML Bearing
<i>Business Type</i>	Trade and Product Development
<i>Main Product</i>	Standard and Corrosion Resistant Mounted Bearings
<i>Inner Diameter (D)</i>	Full range to meet standard and special requirements of global customers (small and medium sizes)
<i>Outer Diameter (D)</i>	Full range to meet standard and special requirements of global customers (small and medium sizes)
<i>Precision Rating</i>	Can meet stringent and customized requirements of worldwide customers
<i>Other Products</i>	Full range of small and medium size bearings, Power Transmission and Lubrication Products
<i>Total Employees</i>	50
<i>Year Established</i>	1980
<i>Certifications</i>	ISO 9001 and TS16949
<i>Brand Name(s)</i>	KML Bearing
<i>Ownership</i>	Private
<i>Annual Turnover</i>	N/A
<i>Main Markets</i>	North America, South America, Europe
<i>Main Industries</i>	Automotive, Truck/Trailer, Agriculture

Established in 1980, KML has grown to be a global supply chain covering 12,000 types of bearings and serving global market via its own outlet and agents in 50 countries. KML continues to build on its premium quality reputation with new bearing and power transmission product programs including Platinum Series Corrosion Resistant Products for Food Processing and High-Performance Polymer Solid Lubrication Programs. We have been actively participating in social responsibility programs including the Earth Partner Program since 2005.

CONTACT INFORMATION

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www.cmibearing.com



CMI BEARING CO., LTD

E-mail: sales@cmibearing.com
NanYan High & New Industry Park
Xinchang, Zhejiang, China





DFN, Inc.



GENERAL INFO

<i>Company Name</i>	DFN, INC.
<i>Business Type</i>	Manufacturing
<i>Main Product</i>	Hot Rolled Rings and Windmill (Slew) Bearing Flanges
<i>Inner Diameter (D)</i>	220 mm - 6925 mm
<i>Outer Diameter (D)</i>	800 mm - 7000 mm
<i>Precision Rating</i>	Can meet all precision requirements of leading global producers of windmills.
<i>Other Products</i>	Forged parts for high pressure containers
<i>Total Employees</i>	256
<i>Year Established</i>	2008.6.13
<i>Certifications</i>	ISO9001:2015, ISO45001:2018, certificate of IP protection and management GB/T24001-2016/ISO14001:2015, ASME SA105:2015 Permits for productions of specialty safety products,
<i>Brand Name(s)</i>	DFN
<i>Ownership</i>	Private
<i>Annual Turnover</i>	85 million USD
<i>Main Markets</i>	China, SE Asia, Europe
<i>Main Industries</i>	Windmill, Pressure Containers, other customized hot rolled products per customers' spec.

Established in 2008, the company is a key business unit within the group of companies held by Dalian Winning Ltd. that focus on high end equipment manufacturing, serving strategic industrial customers including Siemens Gamesa Renewable Energy, Vestas, China National Grid, Datang Group, Wafangdian Bearing, etc..

The annual output of 150K ton products is manufactured by world class equipment including 6000-ton Oil Hydro Presses, 7000 mm Hot Rolling Machines, and more than 30 sets of heat treatment devices and ovens.

CONTACT INFORMATION

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Jiangsu Lixing General Steel Ball Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Jiangsu Lixing General Steel Ball Co., LTD
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Steel Ball and Roller
<i>Diameter Range</i>	0.8 mm ~ 90.00 mm
<i>TRB Diameter (D)</i>	12.00 mm - 80.00 mm
<i>CRB Diameter (D)</i>	26.00 mm - 80.00 mm
<i>Precision Rating</i>	G3 G5 G10 G16 G40
<i>Precision Grade</i>	GN G1E I II III
<i>Other Products</i>	-
<i>Total Employees</i>	1100 People
<i>Year Established</i>	1989
<i>Certifications</i>	IATF16949:2019 ISO14001:2004
<i>Brand Name(s)</i>	JGBR LIXING
<i>Ownership</i>	Public Listed STOCK: 300421
<i>Annual Turnover</i>	1500 million USD
<i>Main Markets</i>	Europe America Japan
<i>Main Industries</i>	Industrial, Automotive, and Windmill

JGBR specializes on manufacturing and selling basic rolling elements, with registered capital of 251 million RMB, and covers an area of 270,000sq.m. As the largest professional steel ball production plant in China. The company now has more than 1100 employees, including 168 staff for technical Development. JGBR mainly produces a series of high precision bearing steel ball balls for motor, HUB bearing balls for car, CVJ Bearing balls for car, windmill steel balls, high precision TRB CRB and so on.

CONTACT INFORMATION

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Zhejiang Pinnuo Machinery Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Zhejiang Pinnuo Machinery Co., Ltd.
<i>Business Type</i>	Manufacturing and outside services (heat treatment, 16K Tons per year), DT&E, Sales
<i>Main Product</i>	Bearing Rings (green and black)
<i>Inner Diameter (D)</i>	15 mm - 280 mm
<i>Outer Diameter (D)</i>	30 mm - 300 mm
<i>Precision Rating</i>	Can meet required precision levels of world wide customers and industries
<i>Other Products</i>	Heat treatment service and DGBB, SRB, PB, ACBB, RIBB, TGBB bearings
<i>Total Employees</i>	350
<i>Year Established</i>	2002
<i>Certifications</i>	ISO9001:2008, ISO14001, IATF16949:2016
<i>Brand Name(s)</i>	Pinnuo Machinery
<i>Ownership</i>	Joint Venture
<i>Annual Turnover</i>	6 million USD
<i>Main Markets</i>	Europe, Rest of Asia, USA
<i>Main Industries</i>	Automotive, Industrial, and Agriculture

Established in 2002, Zhejiang Pinnuo specializes in manufacturing black rings and providing heat-treated services to world known bearing brands. Formerly known as "Xinchang Peer Machinery Parts Co.", Pinnuo has accumulated valuable knowledge and expertise in serving world customers and ready to meet toughest requirements of the industry.

CONTACT INFORMATION

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Xinchang Newsun Xintianlong Precision Bearing Manufacturing Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Xinchang Newsun Xintianlong Precision Bearing Manufacturing Co.,Ltd
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Bearing Rings
<i>Inner Diameter (D)</i>	N/A
<i>Outer Diameter (D)</i>	17 mm - 400 mm
<i>Precision Rating</i>	Can meet various requirements by world customers
<i>Other Products</i>	High Precision Machined Parts
<i>Total Employees</i>	261 People
<i>Year Established</i>	1996
<i>Certifications</i>	ISO9001:2008, ISO14001:2004 OHSAS18001:2007
<i>Brand Name(s)</i>	XTL
<i>Ownership</i>	Private
<i>Annual Turnover</i>	18 million USD
<i>Main Markets</i>	Europe, Rest of Asia, China
<i>Main Industries</i>	Automotive, Mining, High Precision Motors

Located in world famous bearing town Xinchang City, Zhejiang, XTL has been serving worldwide top bearing producers with its high quality and competitive total cost solution for bearing rings over 25 years (over 90% for export). Our talented and customer-oriented team has won national and regional technology awards, and established systems that meet IATF16949 and ISO14001 standards, as well as most stringent worldwide customers' requirements.

CONTACT INFORMATION

<i>Address</i>	Dashiju Industrial Zone, Dashiju Town Xinchang, Zhejiang province, China, 312580
<i>E-Mail</i>	plp@xtlbearing.com
<i>Website</i>	www.xtlbearing.com
<i>Contact Person</i>	Mr. Liping Pan
<i>Phone</i>	+86 575 86336750
<i>Mobile</i>	+86 13858593017



Wuhan Libei Plus Hydraulic Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Wuhan Libei Plus Hydraulic Technology Co., LTD
<i>Business Type</i>	Manufacturing and Trade
<i>Main Product</i>	Seals
<i>Inner Diameter (D)</i>	5 mm - 4000 mm
<i>Outer Diameter (D)</i>	5 mm - 4000 mm
<i>Precision Rating</i>	0.01 mm
<i>Other Products</i>	Hydraulic Cylinder Repair, maintenance, and re-manufacturing
<i>Total Employees</i>	35
<i>Year Established</i>	2015
<i>Certifications</i>	ISO9001:2015
<i>Brand Name(s)</i>	Libeijia
<i>Ownership</i>	Private
<i>Annual Turnover</i>	5 million USD
<i>Main Markets</i>	China domestic markets
<i>Main Industries</i>	Construction equipment, Energy, and Metal

Based in Wuhan, the center city of China, Libei Plus specializes in hydraulic cylinders re-manufacturing, and is an authorized sales/distribution by SKF. It combines world class products with local best in class services and provides unique values to customers via its total cost of ownership oriented programs. "Customer first, Integrity is everything" is our business philosophy.

CONTACT INFORMATION

<i>Address</i>	12 Jiangxia Avenue, Jiangxia District Wuhan, Hubei Province, China, 430000
<i>E-Mail</i>	232636801@qq.com
<i>Website</i>	www.libeijia.com
<i>Contact Person</i>	Xuan Luo
<i>Phone</i>	+86 027 87310018
<i>Mobile</i>	+86 15927530825



Ningbo Baoheng Bearing Fittings Manufacturing Co., Ltd.



GENERAL INFO

Company Name Ningbo Baoheng Bearing Fittings Manufacturing Co.,Ltd.

Business Type Manufacturer

Main Product Shields & Seals

Inner Diameter (D) 4 mm - 220 mm

Outer Diameter (D) 6 mm – 240 mm

Precision Rating -

Other Products Other stampings

Total Employees 120 People

Year Established 1994

Certifications ISO14001:2015 IATF 16949:2016

Brand Name(s) Customer brands

Ownership Joint Venture

Annual Turnover 10 million USD

Main Markets China Domestic, Europe, Asia

Main Industries Automobile, industrial

Located in Ningbo city, Zhejiang province, founded in 1994, is a leading professional manufactory that specializes in bearing shields and seals. Provides more than 1.2 billion pieces of shields and seals each year all over the world, including SKF, FAG and NSK.

CONTACT INFORMATION

Address Xuwang Station, Wenluo Road, Jiulonghu Town Ningbo City, Zhejiang Province, China, 312502

E-Mail cxg@nbbh.com.cn

Website www.nbbh.com.cn

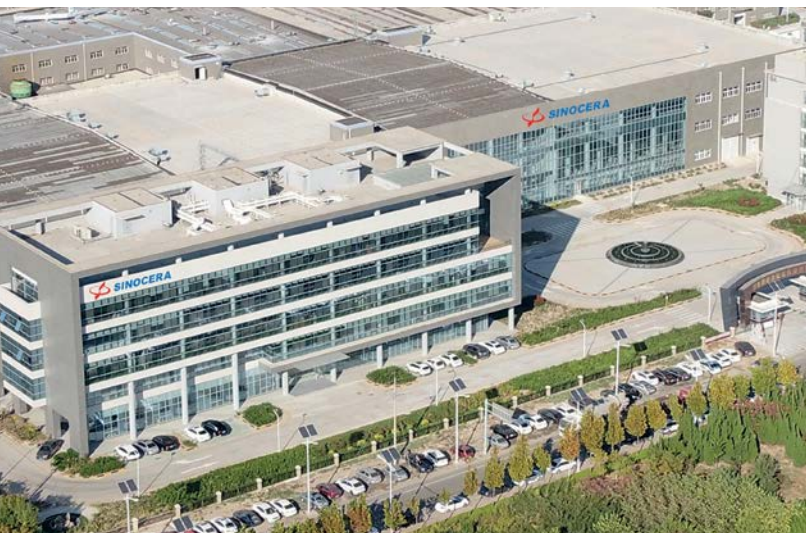
Contact Person Mr. Chen Xingguo

Phone +86 574 86525188

Mobile +86 139 06621300



Jiangsu Sinocera Jinsheng Ceramic Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Jiangsu Sinocera Jinsheng Ceramic Technology Co., Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	high performance ceramic balls in silicon nitride, zirconia, silicon carbide, alumina, and aluminum nitride, etc.
<i>Inner Diameter (D)</i>	-
<i>Outer Diameter (D)</i>	0.4 - 140 mm
<i>Precision Rating</i>	G5 G10 G16 etc.
<i>Other Products</i>	Ceramic bearing rings
<i>Total Employees</i>	132
<i>Year Established</i>	2013 - 05 - 02
<i>Certifications</i>	ISO 9001, ISO 14001, IATF 16949
<i>Brand Name(s)</i>	Sinocera
<i>Ownership</i>	Private Enterprise
<i>Annual Turnover</i>	10 million USD
<i>Main Markets</i>	China, Europe and North America
<i>Main Industries</i>	Bearings, valves and semi-conductors

Jinsheng Ceramics is a wholly-owned subsidiary of Sinocera group. It is one of the leading ceramic ball manufacturers in China, with independent intellectual property rights and rich experience in research, development and industrialization of high-end ceramic products and materials.

The company produces high performance ceramic products and powders in silicon nitride, zirconia, silicon carbide, alumina, and aluminum nitride, etc..

In 2018, it successfully mass-produced high fatigue life, high strength, high reliability silicon nitride ceramic balls in conformance with ASTM F2094 Class I, and successfully entered the high-end bearing market.

CONTACT INFORMATION

<i>Address</i>	No. 1, Simu Road, Jintan Economic Development Zone Jiangsu Province, China, 213200
<i>E-Mail</i>	js-sales@sinocera.cn
<i>Website</i>	http://gb.js-ceramic.com
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<i>Phone</i>	0519 82337240
<i>Mobile</i>	+86 159 90981792



Sinoma Advanced Nitride Ceramics Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Sinoma Advanced Nitride Ceramics Co., Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Silicon Nitride, Zirconia, Silicon Carbide, Alumina balls and parts
<i>Ball Diameter</i>	0.4 mm – 101.6 mm
<i>Parts Size</i>	Customized
<i>Precision Rating</i>	G3 G5 G10 G20 G40 G100
<i>Other Products</i>	Full ceramic bearings, Hybrid ceramic bearings, High temperature bearings
<i>Total Employees</i>	120
<i>Year Established</i>	2011
<i>Certifications</i>	IATF16949:2016, ISO9001:2015, ISO14001:2015 OHSAS18001:2007, RoHS, REACH
<i>Brand Name(s)</i>	Sinoma
<i>Ownership</i>	State-Owned Business
<i>Annual Turnover</i>	15 million USD
<i>Main Markets</i>	Germany, America, China Domestic
<i>Main Industries</i>	Bearing, Valve, Solar and Casting

Sinoma Advanced Nitride Ceramics Co., Ltd. is a national-level high and new technology enterprise affiliated to China National Building Materials Group Co., Ltd. Since the 1970s, the company has been committed to the research and production of advanced technical ceramics.

Relying on the research findings and superior resources inherited from the original Shandong Industrial Ceramics Research & Design Institute Co., Ltd. and SINOMA Synthetic Crystals Co., Ltd.

CONTACT INFORMATION

<i>Address</i>	No.128, Yumin Road, High-tech Zone Zibo City, Shandong Province, China, 255000
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<i>Website</i>	www.sinomac ceramic.com
<i>Contact Person</i>	Mr. Sun Feng
<i>Phone</i>	+86 533 2272810
<i>Mobile</i>	+86 186 15116787



Shandong Golden Empire Precision Machinery Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Shandong Golden Empire Precision Machinery Technology Co., Ltd
<i>Business Type</i>	Manufacturer, (other option: Trading Company)
<i>Main Product</i>	Bearing cages
<i>Inner Diameter (D)</i>	1 mm - 6000 mm
<i>Outer Diameter (D)</i>	1 mm - 6000 mm
<i>Precision Rating</i>	P0 P6 P5 P4 P2
<i>Other Products</i>	Bearing accessories, Automobiles parts, Medical instruments parts
<i>Total Employees</i>	1200 People
<i>Year Established</i>	1985
<i>Certifications</i>	IATF16949:2016, ISO14001:2015 ISO 45001:2018
<i>Brand Name(s)</i>	Own company brand or customer brands
<i>Ownership</i>	Stock corporation
<i>Annual Turnover</i>	100 million USD
<i>Main Markets</i>	Asia, Europe, America
<i>Main Industries</i>	Bearing, Automobiles, wind power

Shandong Golden Empire Precision Machinery Technology Co., LTD., founded in 1985, is named by the Ministry of Industry and Information Technology as a single champion cultivation enterprise of China's manufacturing industry, a national high-tech enterprise, and a key enterprise in Shandong Province for the conversion of old and new driving forces. The company mainly produces bearing cages for high-end equipment, such as household appliances, automobiles, rail transit, wind power generation, robots, aerospace, etc., as well as high-precision key parts for new-energy vehicles and high-end automobiles, as well as parts for medical apparatus and instruments. A number of products have reached the international advanced level. The company has always been adhering to the "quality is gold, customer is God" to wholeheartedly provide more efficient, more high-quality service to all the customers.

CONTACT INFORMATION

<i>Address</i>	No. 66, Zhengjia Development Zone Liaocheng City, Shandong Province, China, 252000
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<i>Contact Person</i>	Mr. Andy Lu
<i>Phone</i>	+86 0635 8638098
<i>Mobile</i>	+86 18063532281



Dalian Ruigu Science & Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Dalian Ruigu Science & Technology Co., Ltd
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Bearing Cages, Bearing Rollers
<i>Inner Diameter (D)</i>	20 mm - 3500 mm
<i>Outer Diameter (D)</i>	20 mm - 3500 mm
<i>Precision Rating</i>	IT7-IT6
<i>Other Products</i>	Axle boxes
<i>Total Employees</i>	500 Persons
<i>Year Established</i>	2006
<i>Certifications</i>	IATF 16949 ISO 14001:2015 OHSAS 18001:2007
<i>Brand Name(s)</i>	Customer Brands
<i>Ownership</i>	Private Enterprise
<i>Annual Turnover</i>	61 million (2019)
<i>Main Markets</i>	China, Europe, USA
<i>Main Industries</i>	Wind Power, Railway, Mining

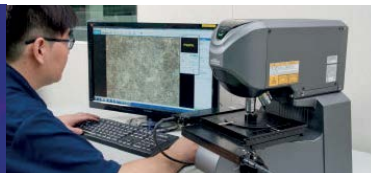
As a high-tech private enterprise, RGtech is located in Wafangdian City, Liaoning Province, which is renowned as "The Capital of The Bearing Industry of China". The company's main products are bearing cages and bearing rollers used for wind power, railway, ship, aviation, metallurgy, mining and other industries, and axleboxes used for railway locomotives. RGtech has become the leading enterprise in the bearing cage industry, and the annual production capacity is 1.7 million units. Our customers are distributed all over the world, including SKF, Schaeffler, Timken, NSK, ZWZ, LYC and so on.

CONTACT INFORMATION

<i>Address</i>	1 Xinggong Road Wafangdian, Liaoning, China, 116300
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<i>Contact Person</i>	Ms. Sun Wei
<i>Phone</i>	+86 411 85570337
<i>Mobile</i>	+86 135 04252196



Tan Kong Precision Tech Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Tan Kong Precision Tech Co., Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Precision balls and rollers in various material and grade
<i>Inner Diameter (D)</i>	N/A
<i>Outer Diameter (D)</i>	Ball: diameter 1.0 mm ~ 12.7 mm Rollers: D 2.0 mm ~ 12.0 mm L: 2.0 mm ~ 12.0 mm
<i>Precision Rating</i>	ISO 3290 Grade 5 and up
<i>Other Products</i>	We specialize in rolling elements products are balls and rollers
<i>Total Employees</i>	300 People
<i>Year Established</i>	1981
<i>Certifications</i>	IATF 16949 ISO14001
<i>Brand Name(s)</i>	Own company brand (OEM Welcomed)
<i>Ownership</i>	Private
<i>Annual Turnover</i>	16 million USD
<i>Main Markets</i>	Europe, North America and Taiwan
<i>Main Industries</i>	Linear Motion Bearing Ball Bearing Automotive

With two production facility Located in Taichung city, Taiwan and Shandong Qingdao, China, We are specialist of precision balls and rollers established in 1981. We supply more than 300 tons of balls and rollers to customers worldwide in bearing and automotive industries.

CONTACT INFORMATION

<i>Address</i>	24 Alley 8, Lane 44, Section 1, Hsin Jen Road, Taiping District, Taichung City, Taiwan, 41143
<i>E-Mail</i>	info@tankong.com
<i>Website</i>	www.tankong.com
<i>Contact Person</i>	Christine Lin
<i>Phone</i>	+886 4 22785523
<i>Mobile</i>	+886 937 740 318



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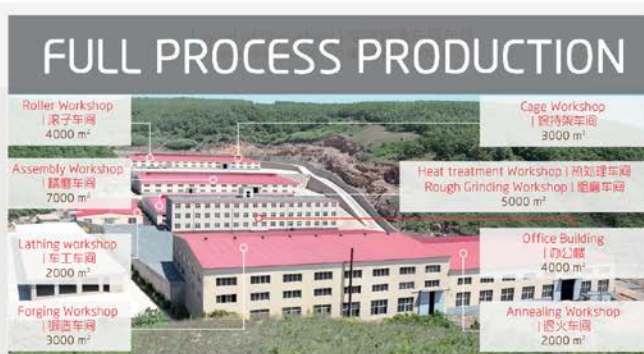
Rings: 2 μ m
Rollers: up to Grade I
Roughness: up to Ra 0.2
Hardness: within 1 HRC deviation

HIGHER PRECISION SRB



Staff: 200 people
Quality system: ISO 9001
Area: 60,000 Square meters
Products: SRB, CRB, TRB, DGBB
Annual output: 8000 tons of SRB
Range: bore dia. 150mm to 1200mm

LOWER PRODUCTION COST



DALIAN CHENG FENG BEARING GROUP CO., LTD.
Add: Dongchangchun Road, Wafangdian, Liaoning, China
Export manager: Michael
Mobile, whatsapp, wechat: (+86) 137 000 43141
Email: m8108@qq.com website: www.dwcfo.co

YOUR NEW
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Zhejiang Sanji Steel Tube Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Zhejiang Sanji Steel Tube Co., LTD.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	Cold Drawn/Rolled Seamless Precision Steel Tubes and High Precision Polished Bars
<i>Inner Diameter (D)</i>	11 mm – 130 mm
<i>Outer Diameter (D)</i>	12 mm – 150 mm
<i>Precision Rating</i>	Meet worldwide customers' requirements on steel tubes for all precision bearings grades
<i>Other Products</i>	Shaped tubes for lineal bearings, tubes for CV Joint Cages and other automotive applications
<i>Total Employees</i>	758
<i>Year Established</i>	2004
<i>Certifications</i>	IATF 16949, ISO14001, ISO9001
<i>Brand Name(s)</i>	Sanji Tube
<i>Ownership</i>	Private
<i>Annual Turnover</i>	145 million USD
<i>Main Markets</i>	Europe, USA, China
<i>Main Industries</i>	Automotive, Industrial Machines, Aerospace

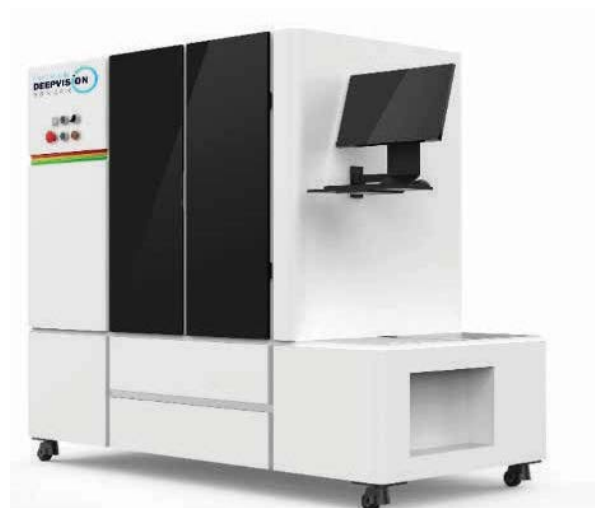
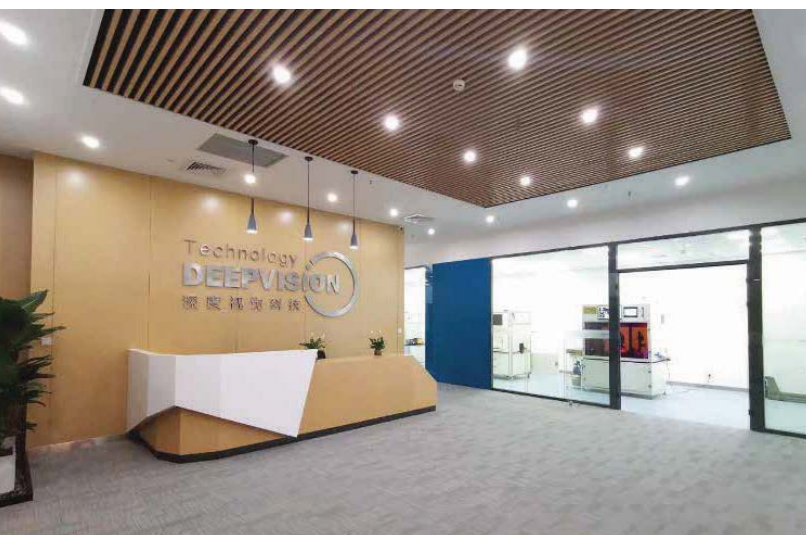
Located in Ningbo city, a short 2 hours' drive to Shanghai, Sanji is now one of largest seamless steel tube manufacturing for world bearing industry, supplying to all top global bearing producers, with an annual output of 100K tons.

It has a full range world class processes and equipment of manufacturing and inspections including NDT and is awarded as a model factory of technology advancement, environmental protection, and workplace safety by local government.

CONTACT INFORMATION

<i>Address</i>	128 Jinxi Road, Ningbo Hang-zhou-wan New Zone, Ningbo, Zhejiang, China, 315336
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<i>Mobile</i>	+86 139 0662 3811

Hangzhou DeepVision Technology Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Hangzhou DeepVision Technology Co., Ltd.
<i>Business Type</i>	Manufacturer and Solution Provider
<i>Main Product</i>	Visual Defect Inspection Machines and Solutions
<i>Inner Diameter (D)</i>	-
<i>Outer Diameter (D)</i>	-
<i>Precision Rating</i>	-
<i>Other Products</i>	-
<i>Total Employees</i>	40 – 50
<i>Year Established</i>	Deepvision Beijing – 2017 Deepvision Hangzhou - 2018
<i>Certifications</i>	-
<i>Brand Name(s)</i>	DeepVision
<i>Ownership</i>	Joint Venture
<i>Annual Turnover</i>	8 - 10 million USD (Forecast 2021)
<i>Main Markets</i>	China, Asia and Europe
<i>Main Industries</i>	Bearing industry, automotive components and 3C.

Hangzhou DeepVision Technology Co., Ltd. is a high technology company able to integrate various frontier technologies including machine vision, computer image processing, artificial intelligence and so on.

The company can independently develop intelligent CCD and AI cameras, research into image acquisition based on FPGA platform, manufacture automated equipment, and provide software and hardware for image pre-processing and feature identification.

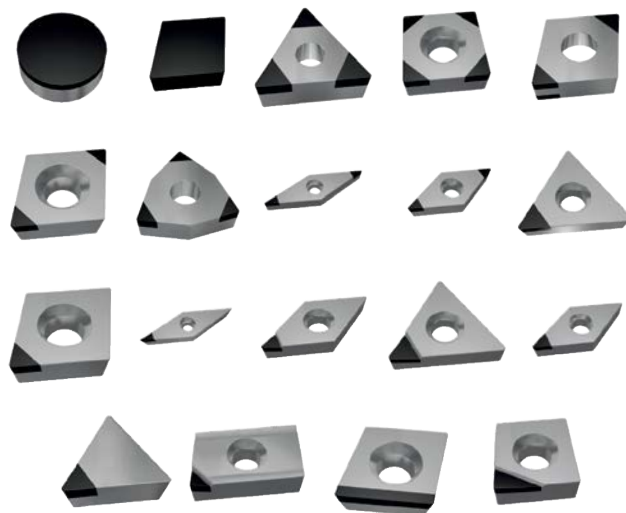
The company provides visual defect inspection solutions and machines to customers, who manufacture bearings and bearing components, such as rollers and rings.

CONTACT INFORMATION

<i>Address</i>	B5, North Building, No. 368, Liuhe Road, Binjiang District, Hangzhou, Zhejiang, P.R.China 310011
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<i>Contact Person</i>	Mr. Shuailin Wang
<i>Phone</i>	+86 571 86970597
<i>Mobile</i>	+86 13810380539



Dalian TianYi Cutting Tool Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Dalian TianYi Cutting Tool Co.,Ltd.
<i>Business Type</i>	Manufacturing and Service
<i>Main Product</i>	Cutting Tool (Diamond and PCBN)
<i>Inner Diameter (D)</i>	Can meet customized size requirements
<i>Outer Diameter (D)</i>	Can meet customized size requirements
<i>Precision Rating</i>	Can meet customized and stringent requirements of world bearing industry
<i>Other Products</i>	Cutting Tool Re-sharpening
<i>Total Employees</i>	33
<i>Year Established</i>	2009
<i>Certifications</i>	ISO9001
<i>Brand Name(s)</i>	Dalian TianYi
<i>Ownership</i>	Private
<i>Annual Turnover</i>	\$ 1.5 M
<i>Main Markets</i>	China, Europe and North America
<i>Main Industries</i>	Bearing Industry

Our company is in the beautiful coastal city of Dalian, an important industrial hub in northeastern part of China. We started our business by providing services for re-sharpening cutting tool used by bearing manufacturers in our region and, today has developed into a full metal cutting solution provider with both products and services on cutting tools (diamond & PCBN). Our top quality, customer-oriented service, and competitive total cost have gained trust and business from world renowned bearing producers as well as industrial leaders in other types of manufacturing.

We look forward to serving more customers in the world by using our tightly controlled processes, flexible systems, world class equipment and testing apparatus, as well as our knowledge.

CONTACT INFORMATION

<i>Address</i>	1-3-1 Shuang D Haina Business Incubator Park, Dalian Economic Development Zone, China, 116600
<i>E-Mail</i>	wangyuansheng73@163.com
<i>Website</i>	-
<i>Contact Person</i>	Yuansheng Wang
<i>Phone</i>	-
<i>Mobile</i>	+8613998631489



High-Tech production for High-Precision Bearings

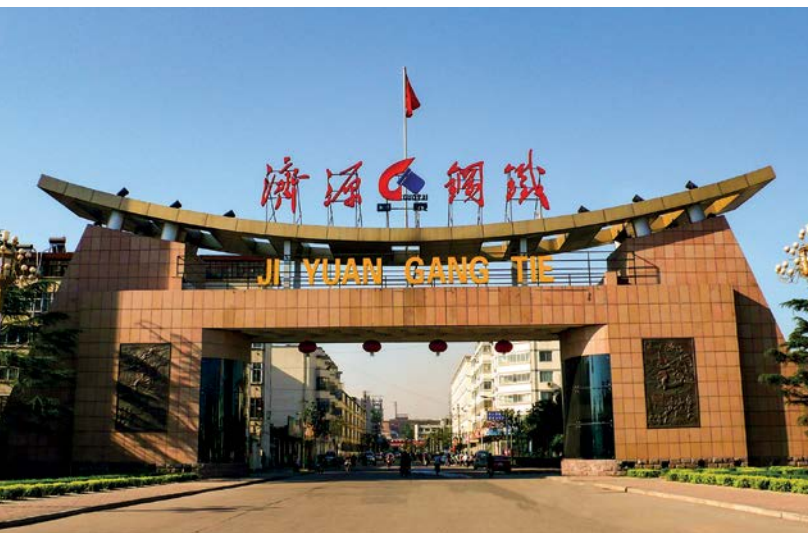


Wafangdian Jinfeng Bearing Manufacturing Co. Ltd.
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Liaoning Province, CHINA

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P: +86 411 39107728/39107338
F: +86 411 39107007/39107728



Henan Jiyuan Iron & Steel (Group) Co., Ltd.



GENERAL INFO

<i>Company Name</i>	Henan Jiyuan Iron & Steel (Group) Co.,Ltd.
<i>Business Type</i>	Manufacturer
<i>Main Product</i>	bearing steel, spring steel, cord steel, cold heading steel, gear steel and non-quenched steel, etc.
<i>Inner Diameter (D)</i>	-
<i>Outer Diameter (D)</i>	Coil: \varnothing 5.5 mm ~ 42 mm ; Bar: \varnothing 12 mm ~ 300 mm
<i>Precision Rating</i>	1/4~1/5 DIN1013
<i>Other Products</i>	Rebar, Cold drawn wire, Heat treatment bar, bright bar, fastener, etc.,
<i>Total Employees</i>	8000
<i>Year Established</i>	1958
<i>Certifications</i>	ISO9001, ISO14001, GB/T28001, IATF16949
<i>Brand Name(s)</i>	GUO TAI
<i>Ownership</i>	Private enterprise
<i>Annual Turnover</i>	3 billion USD
<i>Main Markets</i>	China Domestic, Korea
<i>Main Industries</i>	Auto, Construction machinery, and Bearing

Henan Jiyuan Iron and steel (Group) Co.,Ltd., founded in 1958, is one of Chinese large scale iron and steel enterprises. The main line of the company's iron and steel production is long process, with excellent irons, steels, materials and testing equipments, advanced technology, with international advanced level, annual production capacity of 5 million tons, which is the best production base of the most varieties and specifications of special steel bars and wires in China.

The products are widely used in automobile, construction machinery, wind power generation, petrochemical, Marine engineering, railway and rail transit industries.

CONTACT INFORMATION

<i>Address</i>	Huling high tech zone, Industry city integration demonstration zone, Jiyuan, Henan, China, 459000
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<i>Phone</i>	+0391 668888
<i>Mobile</i>	+86 185 39119199



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W: www.xccbearing.com
P: 0086 575-86938111
F: 0086 575-86024308

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