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BEARING THE LOAD

ACMA SAYS AUTO COMPONENTS INDUSTRY WILL REGISTER A TURNOVER OF $100 BN BY 2020. INDUSTRIAL BEARINGS PLAY AN IMPORTANT PART

BY BINDU GOPAL RAO

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THE INDIAN AUTO COMPONENTS INDUSTRY has witnessed a robust growth last few decades. The growth of bearings industry is expected to be driven by industrial production as well as demand from automobile sector.

In the present technology propelled society, bearing makers are also leaving no stone unturned to keep the evolution process continuous. They are responsible in helping customers meet efficiency goals, reduce unplanned downtime, longer maintenance cycles and increased productivity. Bearings play a significant role in machineries and depending on the application, appropriate selection of material and design is critical.

NEW VISTAS

The industry is seeing high levels of innovation and technological advancements. In the automobile industry mostly ball bearings and tapered roller bearings are used and re-designed through R&D to reduce friction by almost 30%. This not only saves energy by making them more efficient but enables them to stay cooler at higher speeds. The use of elements and materials such as chrome and tungsten have increased over the years to make bearings quieter and relatively more efficient.

With technological advancements, the functionalities and applications of bearings are evolving continuously. In order to keep pace with the changing norms, the auto components industry is making use of the latest technologies in every possible aspect, be it lowering CO_2 emissions and reduce the weight of vehicles for greater fuel efficiency.

The industry is preparing itself for the upcoming developments such as the future of electric vehicles (EVs). The bearings industry is progressively working towards reducing the size of bearings and delivering more load bearing capacities. "NEIL is totally adaptive to the Industry 4.0-readiness in response to changing standards and makes use of technologies such as sensor tagged bearings that record and relay operation data. We also offer a wide variety and range of bearing with special internal design with respect to the application for reduced contact stress, misalignment and better lubrication and limiting speed. The company has developed special heat treatment process for bearings to help them stand high temperatures. We organise in-house and on-site training/technical seminars, software for calculation and FEA module for design improvement," says **Sanjeev Taparia, sr. VP-marketing, National Engineering Industries (NBC Bearings India)**.

NEIL makes use of low carbon steel has developed carbo-nitriding process to protect bearing from contamination and special bearing seals that prevent foreign particles from entering bearing in transmission system. Over a period, it has developed wear-resistant bearings with higher load carrying capacity within same size /dimensions (running 24 x7), bearing lubricated for life and integrated units. It worked towards the friction reduction by targeting emission norms and improvement in NVH and also aim to provide assistance in on-site industrial bearing repair.

TREND CHECK

The leading bearing makers in India are consistently working towards new advancements and enhancements to address the issues of the smooth motion industry. **Harsha Kadam, president, industry business, Schaeffler India**, says, "We see new trends in terms of materials such as graphite, ceramic, alloys such as chrome and stainless steel among others. These materials provide flexibility to users and manufacturers based on special applications. Companies are streamlining the raw material in harmony with the market necessity to work on the drive of weight reduction, inclining towards customers demand for more efficiency, reliability and safety."

With ever increasing focus on CO_2 emissions and carbon footprint, it is all but imperative that optimisation would be the driving force for bearing manufacturers. Optimisation of both the product and the process would become the way forward. As overall equipment efficiencies go up, bearings would contribute with reduced weight, improved performance and reduced friction. "Efforts are being made to incorporate advanced sensor units in products. Introduction of smart bearings

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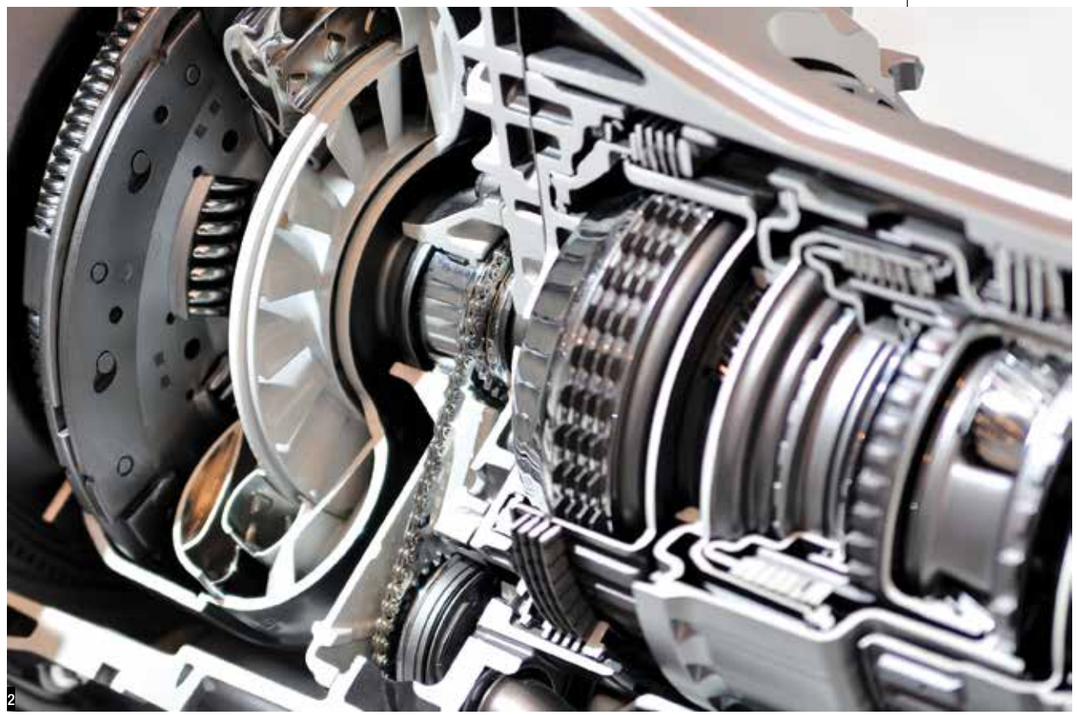

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whose conditions can be monitored constantly to predict faults prior to occurrence is being adopted to delivery uniform higher quality, eliminate human errors and lower the cost of production. More and more efforts are being made to deliver comprehensive solutions integrating bearings with mating parts to serve additional functionalities," adds Kadam.

TECH TALK

The manufacturers of the auto components industry are focused on improving product designs. Use of special material for rolling elements, cages, raceways and redesigned raceway profiles is all over the place. Furthermore, technological advancements in the use of lightweight materials and high-performance products seal and lubrication technologies are generating huge prospects for manufacturers. Integration of electro-mechanical features directly into the bearings helps in reduction in terms of size, cost, and performance improvement.

The rising demand for high-performance bearings has resulted in creating a need of integrating advanced sensor units in their products and the manufacturers are very well keeping in pace with the changing technologies with reference to the changing needs. "We design insulated bearings, uses wear-resistant bearing technology and low torque to improve fuel efficiency. NEIL has been constantly working towards the standardisation of bearing using advanced manufacturing technology for longer life in high-load, high-temperature environments and adverse operating conditions. The company also designs bearings with light weight alloys and better forging techniques along with coatings to withstand dirt and dust," says Taparia.

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Shaheen Khan, CEO and founder, CEDP Skill Institute, adds, "The most recent technological advancement is with magnetic bearings which are used in costlier machines as well as in the automobile industry. These bearings are unique as they adjust according to the distance required by applying a suitable electromagnetic force. This makes systems much more efficient. Another such type of innovation in bearing technology is rubber bearings. They are 100% friction free and require little maintenance and are also corrosion free. Hence, they are cost effective in systems especially in the automobile industry."

GOING GREEN

Sustainability and the environment are of increasing concern and to actively work towards minimising negative effect on our natural world is our moral responsibility. In order to meet this, the bearing manufacturers are coming up with imaginative ways of achieving both sustainable and functional bearings. Because of an increase in environmental awareness, more companies are trying to manufacture sustainable bearings.

"The new Iglidur N54 is made of almost 54% of sustainable raw materials. The biopolymer in the N54 is made of crop oil instead of crude oil which offers a cheaper solution as well as an eco-friendly one. Many bearings also use water instead of oil for lubrication which eradicates the risk of oil leaks and reduces abnormal vibrations in the equipment, thereby making the equipment less noisy. The industry still needs more technological advancements to manufacture a bearing which comprises 100% sustainable raw materials," says Khan.

The government wants to control emission, noise and waste generation, hence is promoting manufactures to design products that contribute in reducing carbon emission and sound reduction in environment. "With the industrial revolution, energy consumption has also grown significantly. Most energy requirements are filled by the consumption of fossil fuels, such as petroleum products, and coal. Though these energy sources are limited, it will eventually be depleted in the future. Rolling bearings, which we produce, play a significant role in energy conservation. This has been our contribution since ancient times. Using rollers could reduce frictional resistance, thus contributing to energy conservation. Though indirect, our products make enormous contribution to industries in regard to the energy conservation," says Taparia.

A rolling bearing is regarded as environmentally-friendly as its application draws high energy savings, majorly by reducing friction. According to estimates, a 10% reduction of friction in all the rolling bearings in use today can lead to energy savings equivalent to the combined output of 18 large power stations. "At NEIL, we aim to go green. The company is environment conscious right from the procurement of raw material to manufacturing and final product dispatched to the customer. In order to contribute to the eco-friendly environment and conserve energy, NEIL designs optimised bearings in order to develop light-weighted, low-noise bearings with the least friction, the bearings are then sealed with grease quantity control. The company makes use of renewable sources of energy in order to ensure a healthy and clean environment. The generated waste is recycled and disposed as per the norms and NEIL also conducts environmental audit," adds Taparia.

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CHALLENGE FACTOR

The need of the hour is to deliver on innovation and development of customised bearings with extended life. "In my opinion, the biggest challenge in industrial bearings is the presence of counterfeit bearings from Chinese markets. Chinese bearings resemble other higher grade bearings but are produced using low quality raw materials. These counterfeit bearings reduce the performance of the overall industrial unit. Over 70% of the Chinese bearings are ball bearings which are used widely in the automotive sector. These counterfeit bearings are highly prone to breakage as well as being very inefficient," says Khan.

The other key challenges include safety in applications, reliability of system, market fluctuation, lower operation cost and downtime, price and delivery, competition from outside supplier and reduced impact on environment. "With an aim to achieve a higher level of precision in designing, manufacturers are using techniques such as 'process gauzing' to

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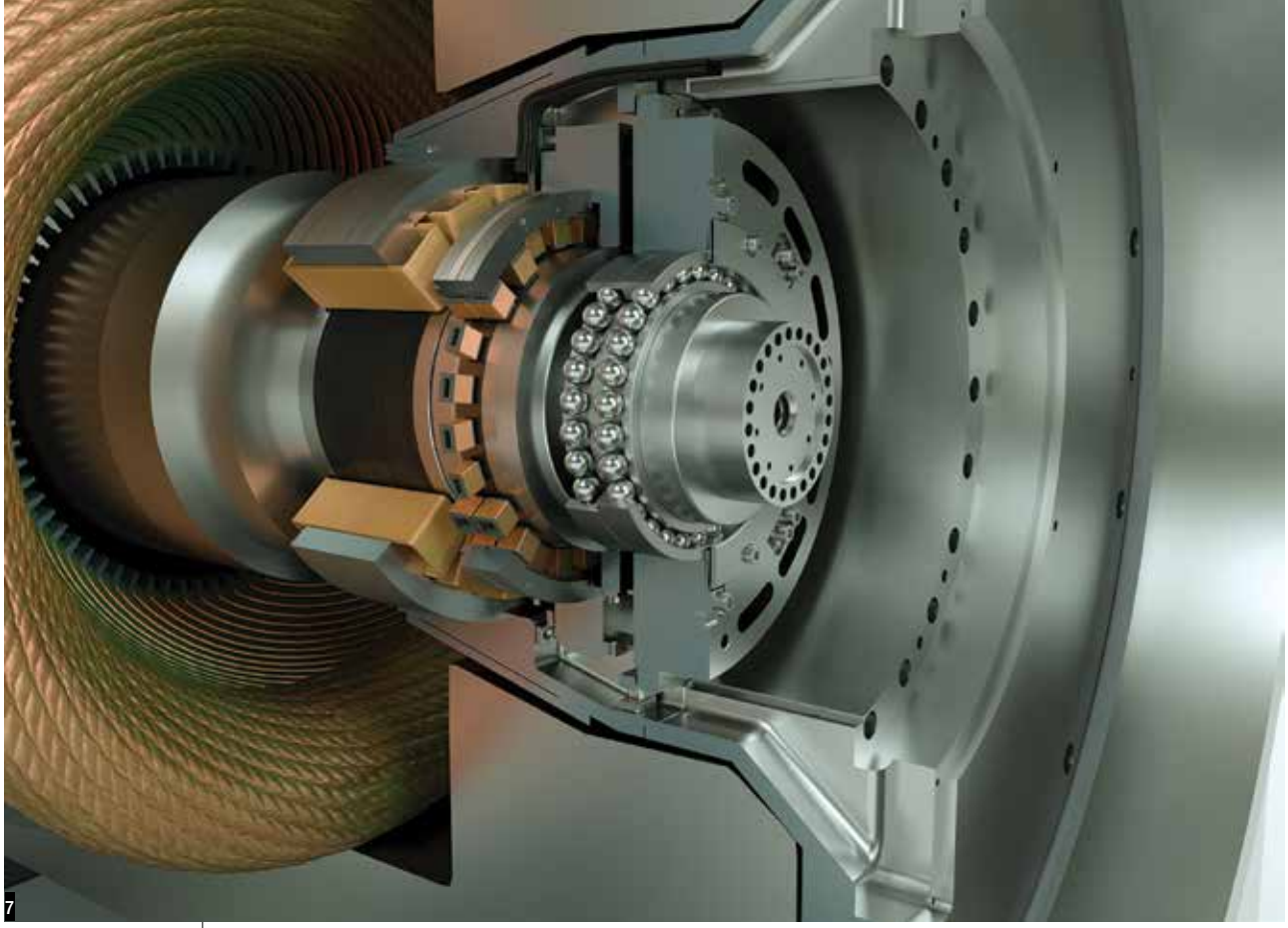

7. Automation also holds tremendous significance however, its precision with automated operations are challenges.

8. Innovations in bearing technology such as customisation are generating huge prospects for component manufacturers.

improve the smoothness of the bearings. Keeping fuel consumption and environmental factors in mind, the demand for low friction bearings or low torque bearings are on the top of the chart. A greater level of importance is now being laid on the testing of the bearings and companies are increasing investments in research and development (R&D) to transform the bearings design with techniques. In manufacturing, the use of hi-tech materials and nanotechnology to help develop lighter but stronger and safer parts are some of the major offshoots of R&D," says Taparia.

LOOKING AHEAD

With markets worldwide moving towards cost-effective products and solutions, manufacturing technology has also grown exponentially as auto components industry segments have adopted methods aimed at reducing labour and material costs while increasing productivity, efficiency and component quality.

Tikam Chand Jain, founder & CEO, Fleeca India, says, "It is important to maintain the quality of bearings while sourcing raw materials, because If wheel bearing fails or works poorly due to manufacturing from cheap raw material, than more friction will happen. Therefore, while manufacturing bearings with technological advancements. Companies should maintain quality and compliance."

Automation also holds tremendous significance however, precision in automation and machine accuracy with entire automated operation are major challenges the Indian industry is still grappling with. "In an ever-shortening innovation cycle, a good product line is very important to meet the global market trends. Bearings are one of them and are an integral part of almost every industrial application. Likewise, innovations in bearing technology such as customisation and integration of sensing IoT are generating huge prospects for the component manufacturers. Electro-mechanical features with detailed optimisation are playing vital roles in improving the performance and reducing cost of products," adds Kadam.

Adoption of advanced technology solutions will be a key enabler to achieve the required goals as it will provide the necessary productivity benefits. The technological advancements can further open doors for newer designs; cleaner, lighter, and safer products, within shorter lead times and lower costs. MT