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A JOURNAL ON FERROUS AND ALLIED SECTORS

Bearing Industry

September 2022



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Sakuntala, Editor & Publisher

To reduce CO₂ emissions, bearing sector development is imperative.

Simple yet sophisticated, the humble ball bearing is arguably one of the greatest technological developments of all time. However, the story is far from written, over the last few decades, the design of bearings has advanced significantly. The need for reduced friction, high carrying capacity, a longer service life and downsizing has led to new material uses, advanced lubrication techniques and sophisticated computer analysis.

The Indian auto components industry has witnessed robust growth in the last few decades. The growth of the bearings industry is expected to be driven by industrial production as well as demand from the automobile sector.

In the present technology-driven society, bearing makers are also leaving no stone unturned to keep the evolution process continuous. They are responsible for helping customers meet efficiency goals, reduce unplanned downtime, longer maintenance cycles, and increase productivity. Bearings play a significant role in machineries and depending on the application, appropriate selection of material and design is critical. 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 CO₂ emissions or reducing the weight of vehicles for greater fuel efficiency. The industry is seeing high levels of innovation and technological advancement. 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%.

Government policies and stringent fuel efficiency and emission regulations, along with increasing customer demand, have enabled the electrified vehicles (EVs) market to boom. The automobile industry is going through a technology transformation from ICE to EV. With an ever-increasing emphasis on CO₂ emissions and carbon footprint, it is almost unavoidable that bearing manufacturers will be driven by optimisation. 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 into products. The introduction of smart bearings whose conditions can be monitored constantly to predict faults prior to their occurrence is being adopted to deliver 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.

EVs are the future. Though they currently account for only a small part of the vehicle market, demand for them is building fast. EV powertrain performance can be enhanced to make them more efficient and reliable with components like bearings. The right selection of bearings designed with the right specifications and manufactured consistently with the right manufacturing set-up will impact powertrain reliability and performance.

“ Government policies and stringent fuel efficiency and emission regulations, along with increasing customer demand, have enabled the electrified vehicles (EVs) market to boom. ”

The development and adoption of new bearing technologies in mature markets and the increasing use of more sophisticated bearings in developing countries will be among the key drivers of growth in the \$78 billion global bearing market through 2025. Developments in the global manufacturing sector have a profound impact on R&D activity in the bearings industry.

·Global production of hybrid and electric vehicles (HEVs) is expected to rise significantly through 2025, resulting in a surging demand for bearings that promote electrical grounding.

·Similarly, the surging use of robots in the automotive, electronic, pharmaceutical, and aerospace industries is driving the development of specialty bearings for robotics applications, such as high-precision miniature bearings and thin-section bearings.

Improved production methods and progressing knowledge in the fields of steel melting and heat treatment of rolling bearing steel have resulted in a steady increase in the capacity of rolling bearings. This development is also reflected by the higher load ratings published recently. The new and advanced development of entire bearing series as well as the development of special bearings made to specifications are of equal importance. Such specially designed bearings have opened up many modern and advanced fields of application, for example in space exploration and offshore technology. It can be said that, to date, the rolling bearing technology has fulfilled all requirements. In many cases, the use of rolling bearings has resulted in more economical overall designs and constructions.

S. Chanda

Sakuntala Chanda

Bearing market on a roll

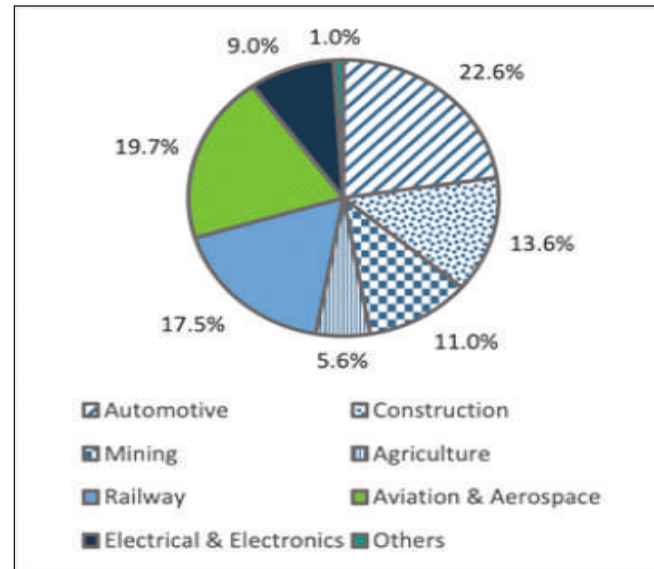
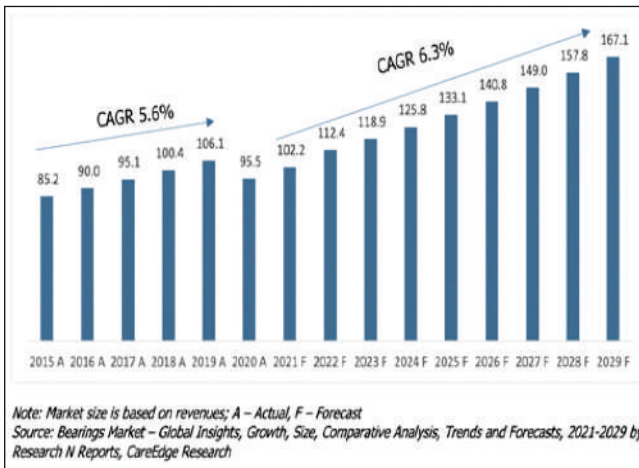
By Steel Scenario Bureau

The wheel is a commonly used metaphor. Over time, the wheels of our lives or fortunes keep turning, we say. Upwards or downwards, maybe even sideways; sometimes fast, sometimes slow. This metaphor for motion has evolved from the actual function of a wheel that turns when energised, and is still when resting. But the analogy cannot go further, for, apart from energy, there are several other components that help to make modern wheels turn efficiently, such as wheel hubs, bearings, rims, tires, and fasteners. And with the wheel being ubiquitous in industry, all these components too derive significant economic values in a globalised market where the word automotive represents high growth, scientific advancement, refinement, in short, futuristic. In this article, Steel Scenario takes a detailed look at the ball bearing industry and its status as an important segment in the automotive and metals sectors.

Though the use of ball bearings has been found to have existed since around 3000 BC, their evolution as an important, and often integral, part of many types of machines since the Industrial Revolution imparts them with niche value. Obviously, there is no single type of ball bearing; they are available in a variety of shapes, sizes, weights, durabilities, and chemical compositions, depending upon the utilisation of machines they are part of. However, their most elementary and primary use is to prevent direct contact between two parts of a machine that are in relative motion – to eliminate friction, and consequently exclude the possibility of heat generation as well.

According to market studies, the global bearings market had grown at a compounded annual growth rate (CAGR) of 5.6% between 2015 and 2019, reaching a level of US\$ 106.1 billion. As experienced by most industrial segments, the market for ball bearings too suffered a setback due to decline in demand and supply chain constraints on account of Covid-19 induced restrictions in 2020, and contracted to a level of US\$ 95.5 billion. However, in 2021, the market managed to bounce back to around US\$ 102 billion, following revival of industrial activity and demand growth from the main consuming sectors – automotive, railways, heavy machinery, infrastructure development, power generation, mining, electrical & electronics, and construction. Analysts at CareEdge Research have forecast that the market for bearings is likely to grow at a CAGR of over 6% right up to the end of this decade, i.e., 2029, and exceed US\$ 167 billion in terms of value.

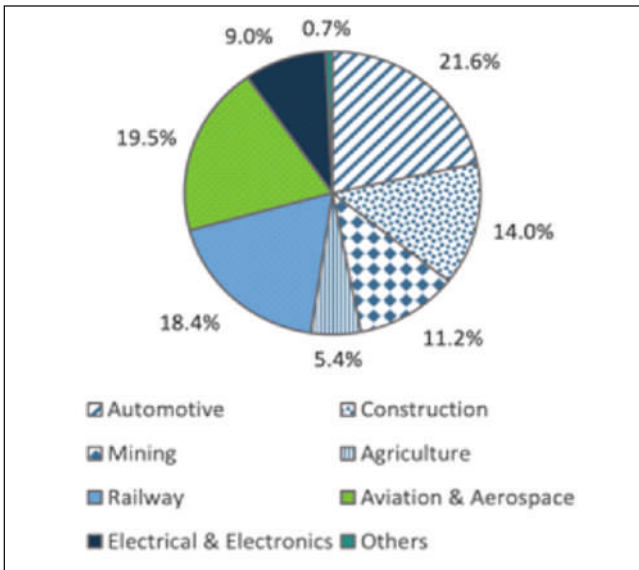
Graphics on below-left shows end-user sectors in 2020 (actual) and on left bottom their expected status in 2029 (forecast).



Growth drivers

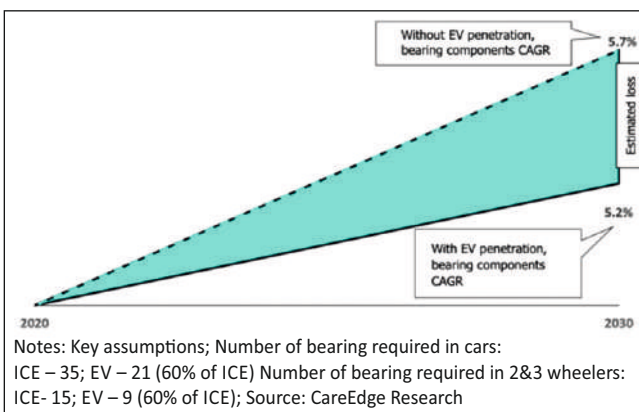
Globally, the trend of increasing vehicle sales across all categories, and growing preference for electric and hybrid vehicles will primarily drive this growth, it is anticipated, with the highest offtake being in the Asia Pacific region, where the production activity will be concentrated. Ball bearings and taper head bearings

are widely used in a number of automotive moving parts like doors, wipers, bonnet hinges, rear mirrors, etc., for smooth performance. As a result, the automotive application of bearings “is set to account for US\$ 38 billion by 2027” alone, says a recent report.



According to a Global Market Insights report published in December 2021, “On an average, a passenger car uses a minimum of 35 bearings, which vary greatly based on the car model and the widely distributed technology. The latest development in automatic dual-clutch transmissions requires three additional bearings, i.e., two on the second gearbox on the main shaft and one on the double-clutch. Moreover, the introduction of high-capacity bearings combined with improved lubrication performance will enhance the market expansion (for bearings).” With demand for EVs growing across the globe, requirement of EV-specific bearings with low noise and friction is also expected to increase.

Estimated impact of EV on bearing components volumes



The report adds that since bearings “not only reduce friction but also play a key role in transmitting energy to

a few rotating parts and supporting load-bearing features of various mechanical devices”, substantial offtake is likely from many small but significant end-user segments requiring “specialised solutions to meet industry-specific needs” such as gas meters, aircraft support systems, and medical imaging equipment. Demand for specialised, low-maintenance, high-durability bearings that provide more efficient performance is going to be the major growth driver in the global bearing market.

Other analysts feel that, among the main user segments, there will be increasing demand for bearings from railways, as technologies for high-speed trains and higher load-bearing wheels & axels get adopted more uniformly across the globe. The construction and heavy machinery sectors too have been identified as high demand segments for bearings.

Again, with energy preservation consciousness spreading rapidly worldwide, growth has been observed in number of wind installations internationally. The consequent rise in demand for high-capacity wind turbines has also triggered a hike in orders for the bearings industry. Wind turbine bearings help to improve performance and reliability of wind installations.

The prospect of high growth in the bearing market is so certain that leading global players are going in for expansion projects, through both organic and inorganic routes. For instance, in the last two years alone, US-headquartered The Timken Company has acquired two niche bearing solution providers – the Aurora Bearing Company and Intelligent Machine Solutions – to expand its capacity in the specialised bearing area.

Effect of changing technologies

All over the world, supply chains and logistics control mechanisms are progressively undergoing rapid digitisation and automation of processes, in order to provide customers of goods and services a seamless experience. Digitalisation of production processes are also enabling greater flexibility of production and maintenance plans. Advanced digital technology also takes care of the need for continuous monitoring of bearings for assessment of their performance, efficiency, consistency and reliability over their entire lifespan. Today, smart bearings equipped with internal sensors and other tracking systems are available in the international market. These bearings can self-diagnose faults and provide predictive maintenance signals. There are also mobile apps available that can facilitate replacement and installation of bearings.

All these high-end digital technologies are fast gaining popularity in the bearings market due to their ability to

reduce installation, maintenance and replacement costs along with time. Installation of bearings using digital technology also provides the benefit of proper mounting that helps to extend the lifecycle of bearings. Bearing manufacturers are not only adapting to the changing market requirements, they also have to constantly update their production technologies for improving product designs that can deliver better performance and energy efficiency. Many variables and choices exist for mixing and matching requirements, such as materials used (for raceways, cages and rolling elements), seal and lubrication technologies, etc. Using lightweight materials in high-performance products is gaining ground fast, as is integration of digital and electro-mechanical features within the bearings themselves to enhance performance in a cost-effective manner. Besides traditional metals like steel, materials like ceramics and even plastics have entered the design fray of bearing manufacturers.

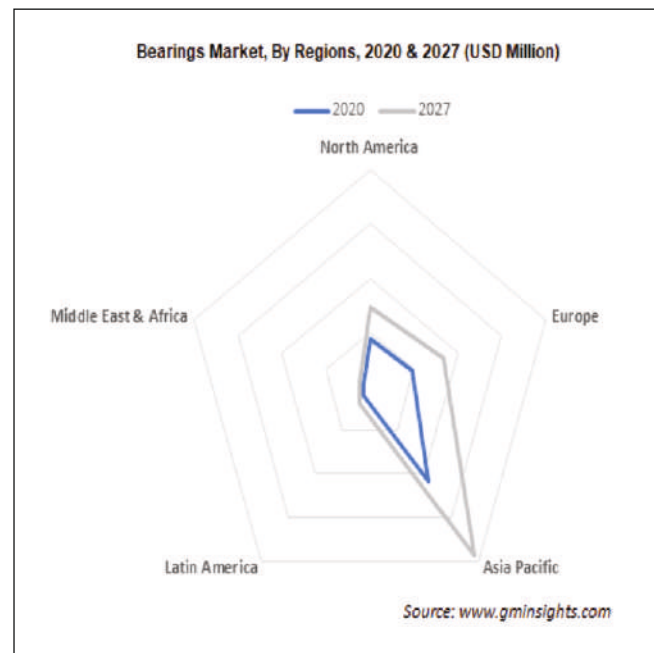
Challenges

Among the biggest challenges faced by bearing manufacturers is availability and pricing of material. Prices of steel, which is one of the most widely used materials for bearing components, fluctuates regularly and impacts production plans of manufacturers. Also, since bearing steel is of a specialised category with high-strength properties, suppliers often charge premium rates. If export markets become attractive, due to domestic policy interventions or volatile events like a war on foreign shores affecting their neighbouring markets, non-availability of material locally can affect production plans and budgets, eventually impacting profits of a bearing manufacturer. Another often overlooked problem is the existence and easy availability of low-cost counterfeit products, especially in a country like India. With a large number of players (the bearings industry in India is quite old but is concentrated in pockets), competition is strong in the market, and margins remain low. The big producers that sell branded products cater to OEMs (Original Equipment Manufacturers) have a larger share of the market. The secondary producers (or After-market) supply to small businesses and service the rest of the market demand. It is in this generic market, that is not so quality-conscious, where supply of counterfeit products, mainly of Chinese origin, is not uncommon.

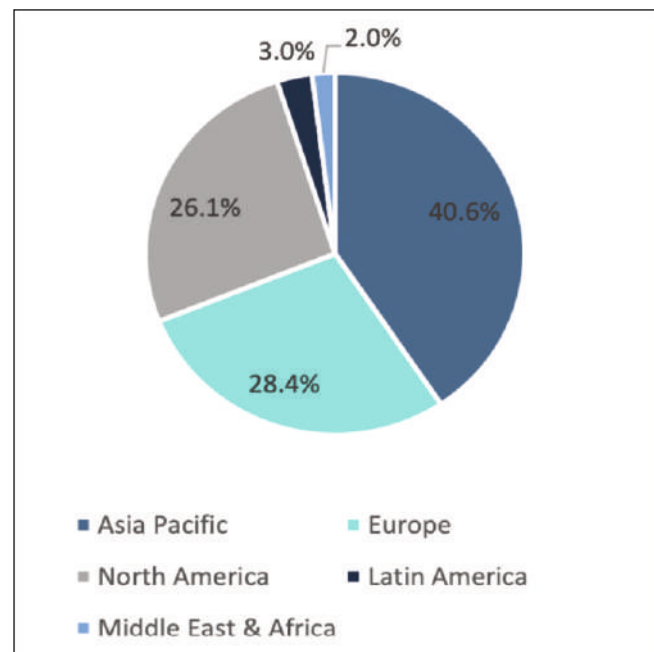
Asia Pacific region to lead growth

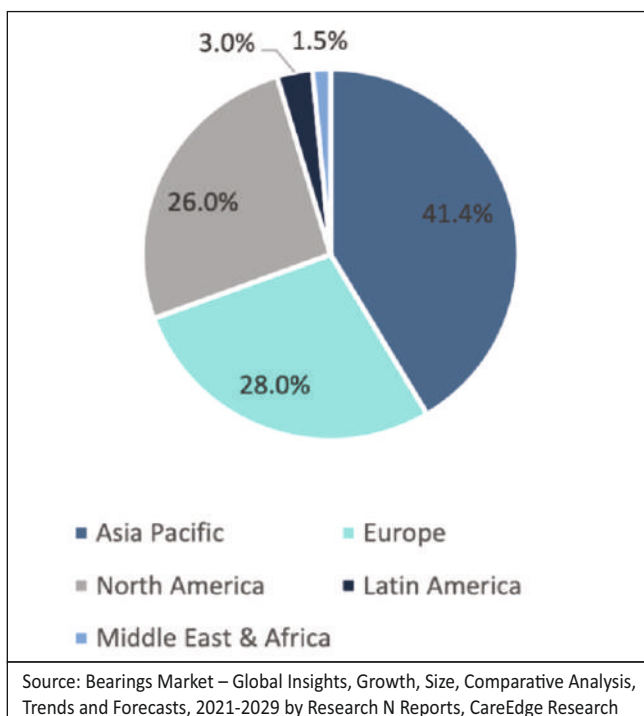
Global Market Insights, the well-known global research and management consultancy company, says that, amongst the world's regional industrial groupings, the Asia Pacific region will see the maximum growth. It correlates the dominance of the Asia Pacific region in

the world bearing industry with “the automotive industry expansion in various economies including China, India, Japan, and South Korea”. Qualifying that the region contributed more than half of the total demand for bearings worldwide in 2020, a report by GMI states that the “increasing purchase of cars in various developing countries, such as India, Indonesia, and Thailand, will boost regional growth. The easy availability of raw materials and inexpensive production along with the presence of many industry stakeholders in the region will also support growing production.”



The comparative region-wise percentage breakup of the global bearings market in 2020 (actual) and 2029 (projected) is given below:





Region-wise revenues of the global bearing market, according to CareEdge Research, is given below:

Asia Pacific: The bearing market in Asia Pacific region is forecast to grow at a CAGR of 6.6% during the period 2021 to 2029 and is expected to be valued at US\$ 69.2 billion in 2029. Within the Asia Pacific market, China enjoyed the largest market share of 29.7% in 2020 in terms of revenue. India, which accounted for a revenue share of 11.6%, is expected to grow the bearing market at the highest CAGR of 7.9% amongst other countries in the region till 2029, reaching an estimated valued of US\$ 9 billion.

Europe: The bearing market in Europe is expected to grow at a CAGR of 6.2% to reach a value of US\$ 46.7 billion during 2021-29. Within Europe, the demand for bearings is expected to be driven via increasing demand from Germany, UK and France. Moreover, the market has demonstrated growing demand for sophisticated, high-performance bearings for a variety of high-end applications.

North America: High-value bearings or customised bearing solutions that are used in heavy machinery and wind turbines drive demand in this region. The presence of major bearing suppliers in countries like USA, Mexico and Canada is aiding the demand growth. Revenue in this market is forecast to increase at a CAGR of 6.3% during the period 2021-29, at the end of which the market is set to reach a value of US\$ 43.5 billion.

Latin America: The market for bearings is expected to grow at a CAGR of 6.5% during 2021-29, to reach a value of US\$ 5.1 billion.

Middle East & Africa: With respect to revenue, the

bearing market in Middle East & Africa region is forecast to grow at a CAGR of 3.6% during the period 2021 to 2029 and is expected to be valued at US\$ 2.6 billion in 2029.

The Indian panorama

Based largely in industrial belts in India, the bearing manufacturers have never suffered major setbacks. According to market studies by Astute Analytica, the Indian bearings market was valued at US\$ 1772.6 million in 2021 and is expected to grow to a level of US\$ 3374.4 million by 2027, at a CAGR of 10.9% during the period 2022-27. Astute Analytica lists the major bearing players in India as follows: SKF India Ltd., Schaeffle, Timken India Limited, NRB Bearings Ltd, National Engineering Industries Ltd, JTEKT India Ltd and others.

The recent spurt and high growth projections of the bearing market coincides with the growth in the automotive sector in the country and expectations of EVs and more sophisticated transport machinery arriving in the market within the short term. Government initiatives like Make in India and Atmanirbhar Bharat have also fanned interest and brought in a lot of new manufacturing setups that supply machines and equipment to customers in specialised fields of medicare, aerospace, industrial robotics, etc., requiring precision or miniature bearings. Following the incentive given for production of automotive components under the Government's PLI Scheme, too, a number of global companies have set up bearing units in the country.

With the new entrants the market has entered the playfield of customised bearings for different purposes and use for specific requirements in various applications such as textile looms, agricultural machinery, vacuum pumps, turbochargers, etc., as per 6Wresearch consultancy, which also foresees bearing market growth but at a slower pace. The main growth drivers stated in the report include "the increasing requirement for high-performance, lightweight smart bearings in automobiles coupled with the requirement of anti-friction bearings in pumps, gearboxes, heavy earth moving equipment, and industries".

Bright outlook for automotive bearings

According to Businesswire, valuation of the Indian automotive bearing market stood at Rs. 70 billion in 2019 and is estimated to grow to Rs. 156.8 billion by 2024 at a CAGR of ~18% between 2020 and 2024. The projection is based on the response to the Government's Make in India initiative that is boosting production of automotive components. Also, the commercial vehicle (CV) market in India, a direct

indicator of economic activity, is expected to experience a CAGR of ~3% from 2018 to 2030, as per PR Newswire. India is expected to emerge as a leader in the CV market on the support of Government initiatives, a strong supplier ecosystem, availability of raw materials and skilled human resources, it maintains.

At another level, better road connectivity due to expansion of the road network in the country has raised demand for various kinds of three- and four-wheeler commercial vehicles. Following the Covid pandemic, there has been high demand for two-wheelers as well with people generally tending to reject sharing regular commuting spaces. The Government initiative to raise support prices of agricultural produce has raised expectations of Indians engaged in agriculture, as a result of which tractors are once again in high demand. All the above factors bode a promising market for automotive bearings in India.

Besides demand from the automotive segment, the bearing industry is set to receive large orders from OEMs that look to service requirements of the Indian Railways, which has already undertaken a number of high-speed projects. Metro Rail projects in Tier-2 and 3 cities are also attracting many global players to set up manufacturing units in India. Demand for industrial bearings used in general machines/motors, electrical equipment (fans/appliances) as well as heavy industries, mining and construction equipment are also set to see better days ahead, say market observers. The Government's constant focus on bolstering the Make in India initiative and favourable policy support to boost infrastructure, expand power and fuel networks, increase connectivity and trade & commercial activities through establishment of new airports and ports will also drive industrial growth and, consequently, strengthen the domestic bearing market scenario.

Bearings: Simple facts

- **Ball bearing**, as the name suggests, has solid balls in a row as the rolling element that significantly reduces friction, carries loads of specific capacity according to its size, and directs the movement and position of moving machine parts. It has a protective seal that prevents leaks and ingress of foreign particles into the casing, thus reducing the cost of repair. Additionally, simple design, low cost, and high durability make it work with radial and thrust load, increasing its need in different applications and end-use areas.

Ball bearings are again classified into two types: deep groove bearings and others. Deep groove ball bearings are likely to register significant growth rate of about 8.7% through 2027 due to their simplicity, design, low-operating temperature, and low friction features. The

ability of deep groove ball bearings to carry axial & radial loads with high durability and low maintenance time will have a positive impact on product penetration in agriculture, rail, and aerospace systems.

Ball bearings accounted for the largest share of about 43% in the global bearings market when split by type and stood at US\$ 40.7 billion in 2020.

- **Rolling element (roller) bearings** is a type of bearing that includes rolling components in the form of either balls or cylinders. These types of bearings aid in the free movement of parts in a rotational motion and can support greater loads in comparison to ball bearings. The rolling element bearings usually consist of the following components:

- Inner ring
- Outer ring
- Rolling elements (rollers or balls)
- Cage
- Other elements of bearing apparatus.

The rolling elements are trapped in between the rings and the cage holds the rolling elements in place. Roller bearings can be of various types: split, tapered, cylindrical, spherical, needle or other.

Roller bearings accounted for the second largest share of about 34% in the global bearings market when split by type and stood at US\$ 32.3 billion in 2020.

- 22% of the remaining (Others) share of the market is constituted by bearing units (consisting of an insert bearing mounted in a housing), and 1% is comprised by Pillow block or Mounted bearings.

On the basis of application or end-use, bearings can be used in varied industries as given below:

Railways: Auxiliary, axel box, engine, final drive, gear box, main tractor motion, propeller shaft, transmission, wheel, etc.

Bearings form an important, even critical, role in both passenger and goods rail transport, in terms of safety features of the trains and for withstanding heavy loads while running at high speeds. The growing expansion of rail networks coupled with increasing demand for low maintenance and high reliability bearings is expected to drive demand for usage of bearings in the railways industry.

In terms of revenues, the railway bearings market is expected to grow at a CAGR of 7% during 2021 to 2029 and is estimated to be valued at US\$ 30.8 billion in 2029.

Aviation & Aerospace: Passenger aircraft bodies, freight aircraft, helicopters, drones, aerospace engines, conveyors, etc. This segment includes defence segment as well.

In this segment of industry, bearings are used as a

component in aircraft landing gear struts, shock absorbers, rotors of an aircraft, engines, space shuttles, rockets and so on. The growing demand for customised bearings with features such as reduced weight and space is expected to boost the aviation and aerospace bearings market. Expansion of the aviation industry in emerging economies, especially in the Asia Pacific region, is a cause for growth in demand of these bearings. Countries like China, India, the US, Israel, etc., are investing heavily in developing aerospace engines and aircraft for defence purposes and there has been a significant spike in military aircraft demand, especially in the Asia Pacific region.

The global Aviation & Aerospace bearings market is forecast to grow at a CAGR of about 6.2% during 2021 to 2029 and is likely to be valued at US\$ 32.6 billion in 2029.

Automotive: Passenger cars, passenger trucks, bus, commercial trucks, scooters, bikes, bicycles, etc.

Bearings play a critical role in the smooth functioning of the rotating parts of automobiles. They support in carrying heavy load and also aid in reducing friction. Some sub-components where bearings are used in an automobile are wheels, steering, pumps apart from internal combustion engines, etc. The global automotive bearings market is estimated to grow at a CAGR of 5.8% during 2021 to 2029 to reach a value of US\$ 36 billion.

Agriculture: Agriculture trucks, tractors, loaders, hay and forage equipment, planting machines, floaters, tillage machines, etc.

Bearings are required in agricultural machinery in large volumes.

The agriculture bearings market is forecast to grow at a CAGR of 5.9% during 2021 to 2029, by when it is estimated to be valued at US\$ 9.1 billion.

Electrical & Electronics: Alternators, blowers, compressors, fans, machine tools, power tools, pumps, air conditioners, rolling mills, semiconductor manufacturing, computer fans, etc.

In the electrical & electronics industry, technology advancement is one of the major reasons for either replacing or upgrading existing equipment designs. The Covid pandemic kept a lot of people home and changed consumer preferences to enhance personal conveniences, with higher effectiveness at reduced costs. All of these factors provided an inspiring fillip to the industry. This, in turn, is expected to drive demand for bearings used in this industry.

The industry-specific bearings market is expected to grow at a CAGR of 6.4% during 2021-29 and to attain a value of around US\$ 15.1 billion in 2029.

Construction: Cranes, hydraulic excavators, asphalt pavers, motor graders, wheel loaders, off-highway trucks, etc.

In the construction industry, bearings form part of the construction equipment. The growing demand for creation and improvement of existing infrastructure coupled with demand for customised bearings is expected to drive demand for usage of bearings in construction industry.

The global construction bearing market is expected to grow at a CAGR of 6.8% during 2021 to 2029 and is estimated to be valued at US\$ 23.6 billion in 2029.

Mining: Crushers, shaker screens, pulverisers, shuttle cars, feeders, mining trucks, excavators, etc.

Mining remains on forward drive in most parts of the world and manufacture of mining equipment, mostly in the heavy machinery category, is expected to continue steadily.

The market for mining and heavy machinery bearings is forecast to grow at a CAGR of 6.5% during 2021 to 2029 and is estimated to be valued at US\$ 18.8 billion in 2029.

Others: This category includes the industries not classified above, including the wind sector.

Impact of EVs on bearings industry

The bearing industry is looking at the global euphoria over the rapidly expanding market for electric vehicles (EVs) with considerable mixed feelings. While the development is being considered as a great opportunity for bringing in new automotive bearing designs incorporating features and elements that can be specifically suitable for electric motors, a plethora of hindering factors are lining up to tone down the optimism.

What is worrying existing bearing manufacturers is that the number of bearings required in an EV is likely to be far lower than those required in an internal combustion engine (ICE) model. Moreover, an electric motor is attributed with higher speed, acceleration and temperature as compared with ICE. Bearing manufacturers have to develop bearings and its apparatus that is suitable to the requirements of an electric motor.

For instance, they need to develop bearings that have optimised friction, as an EV motor is capable of running at higher rotational speeds. Higher rotation of bearings leads to generation of heat which can heat up the components. Moreover, higher speed means creating more effective lubrication solutions to ensure smooth running of the vehicle. Needle cages bearings used in engines and small cage bearing used in two- and three-wheelers are therefore likely to be the most impacted

type of bearings due to increasing penetration of EVs. Speed is not the only worry. An electric motor inverter can be associated with the risk of stray current leakages that can affect the components and cause damage or sudden failure. Therefore, bearing manufacturers need to develop lightweight bearings by altering its material, design and heat treatment levels. Such bearings require customised cage designs amongst other requirements. Further, manufacturers need to develop bearings that have improved reliability and enhanced bearing life so that they can operate efficiently throughout the life cycle of the EV.

The future of the automotive industry is acknowledging EVs, and EV-specific bearings are going to play a critical role in enhancing the performance of electric vehicles. Some of the bearing manufacturers have started coming up with innovative solutions such as using hybrid or ceramic bearings as ceramic is an

electrical insulating material and more suitable for EVs than steel rolling elements. These bearings are less dense than the ones made of steel and hence can function in lower temperature. They also require less lubrication.

Hence, as the automobile segment is shifting focus to EVs, the need for more silent and lighter bearings and its components will be felt, and the demand is likely to increasingly shift towards precise dimension and dirt-free bearing steel and polyamide cages as a probable solution at a premium value. Going forward, bearing manufacturers are expected to continue to innovate and develop application specific bearings and allied components which in turn is expected to drive the demand for bearing cages industry.

Tata Steel UK contracts Danieli Corus

The blast furnace hot-blast system is essential for efficient ironmaking. Stoves heat the blast air, but underperforming stoves mean higher gas consumption at the burners or result in the need for increased quantities of metallurgical coke in the furnace – all at a cost, financially as well as ecologically.

Hot-blast systems can achieve very long lifetimes if key components such as parts of the vessel shell and the refractories are designed, manufactured and installed properly. Burner replacements and partial repair jobs then become an accepted reality of campaign management.

The hot-blast stoves at both blast furnaces at Tata Steel's Port Talbot Works have achieved very long campaign lives with the support of multiple life-extension repairs, the most recent of which was the repair of stove #10 of blast furnace #4.

The current contract between Danieli Corus and Tata Steel for the repairs of stove #11 at blast furnace #4 (with a 2388 m³ working volume) and stove #13 at blast furnace #5 (with a 2134 m³ working volume) is a continuation of the strong and fruitful relationship built up over many years between the companies, and confirms the value of executing such projects with an experienced technology partner.





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Eco-Friendly Miner

'EHS systems help to reduce energy consumption': Concentric Hydraulics

Electrification of the global commercial vehicle segment will gain serious momentum over the next 10 to 20 years, according to a study by ACT Research which predicts that 24% of commercial vehicle demand (Class 4 to Class 8 trucks, including transit, coach, school and refuse trucks) in the US, and medium and heavy-duty vehicles in Europe, China and elsewhere in the world, will be all-electric in the future. The report forecasts this number to rise to 28% in 2031, and further to 53% by 2035.

"This growth in fully electrified and hybrid commercial vehicles presents excellent long-term opportunities for electro-hydraulic steering systems (EHS), which supply hydraulic pressure via a fully electronic and software-controlled electric motor, in combination with a high performance and low-noise hydraulic gear pump (e-pump) unit. This does not draw power from the engine and reduces parasitic losses in steering systems," states Concentric Hydraulics Engineering Director Matthias Fuchs. Concentric is well known as a leader in hydraulic gear products, including pumps, motors, power packs and flow dividers for mobile equipment.

"On a conventional truck or bus, as well as for many off-highway applications, the hydraulic power assistance for the steering comes from an internal combustion (IC) engine driven pump, following the engine speed. Typically, the pump is dimensioned to provide power steering function even at the idle speed of the IC engine, so it is constantly running at full capacity and consuming power from the engine. The controllability of an EHS system reduces the power drain and so increases efficiency in IC vehicles and machines. In addition, in a hybrid application, the conventional power steering system cannot be used since the IC engine is turned off when the vehicle is operating in pure electric mode. EHS systems are able to assist here, as they can be used for both hybrid and electric platforms, helping to reduce energy consumption by utilising power on demand technology," he continues.

"This is of particular significance, as energy saving and efficiency are key focuses in the development of new heavy-duty vehicles, in particular in steering systems, where according to Mordor Intelligence, more than 70% of the fuel consumed by a conventional hydraulic power steering (HPS) system is unnecessary and can be avoided."

As an expert in hydraulics with deep knowledge and experience in transportation markets, Concentric's EHS system has been designed, developed and tested over many years for use in a range of on-road and off-road commercial vehicles globally.

"The Concentric EHS unit replaces the traditional power steering pump, providing only the required power on demand and is able to operate during the electric mode for hybrid applications," Fuchs observes. "Our EHS system has been proven over time to operate well in harsh environments, winning production nominations with established OEMs entering the electric vehicle market."

The compact Concentric system offers power savings through its pressure-on-demand and variable speed control capability, delivering the primary benefit of reduced energy consumption – up to 50% in certain applications. Typically placed close to the steering gear, it also allows for reduced installation costs. The requirement for less noise pollution in urban areas can also be catered for, with the option of low-noise pump technology, as well as direct electronic control features through Controller Area Network (CAN) Bus communications.

"And while Concentric has a rich history in power-on-demand hydraulic steering solutions since 2014, as the first provider to introduce electro-hydraulic systems for steering, we are also continually looking for new opportunities for innovation. Recently, Concentric developed and introduced a new generation of low noise internal gear pumps, which provide an additional up to 30% noise reduction from the previous generation. Currently, Concentric is leveraging our deep knowledge for 24V technology experience to develop and launch a high voltage unit for heavy duty on and off-road applications."

The organisation has also recently announced steps to facilitate integration between its own offerings and that of Engineered Machined Products (EMP), acquired by Concentric in 2021, providing a 'one face to the customer' approach for all Concentric products, including EHS technology. "The acquisition of EMP has been a key part of Concentric's electrification strategy, as EMP's product portfolio, technological know-how, and strong relationships have helped to accelerate our growth in electrical products," informs Fuchs.

(Source: Concentric News)

'SMPK will play a vital role in development of the steel sector in the eastern region'

Mr. Samrat Rahi gives a bird's-eye view of the on-ground improvements being undertaken to make port operations faster and efficient and provide stakeholders a seamless experience.



Mr. Samrat Rahi

Deputy Chairman, Syama Prasad Mookerjee Port

Steel Scenario: Once considered as the most important port in the country, the Kolkata Port is rightly called the gateway to eastern India today. On what basis does it retain its premier position?

Samrat Rahi: Renamed as Syama Prasad Mookerjee Port, Kolkata (SMPK) in June 2020, it is India's first major port, established in 1870. It is also the only riverine all-weather major port in the country, located on the eastern coast of India in the state of West Bengal. SMPK is ranked sixth among the 12 major ports in India and is the gateway port of both eastern and north-eastern India.

The traffic at SMPK has grown from 50.3 million tonnes in FY16 to 64 million tonnes in FY20, registering a growth rate of 6.2%. During the Covid pandemic which saw a major disruption in movement of goods across the world, though, cargo at SMP declined by 9.17% compared to FY20. However, in keeping with the trend in all other major ports, container traffic at SMPK grew by 7.1% compared to FY20. SMPK secured 4th rank among all major ports in container handling.

SMPK, by virtue of its geographical location, is

strategically close to the originating points for steel cargo. This facilitates export of steel products to Nepal, Southwest Asia, the Middle East, Far East and even Europe. Steel mills in the eastern part of the country are also able to easily access their imported input material such as coking coal, via SMPK. The port's location, infrastructure and facilities make it an ideal choice for shipping of commodities and goods by business enterprises in eastern India at extremely economical logistics costs.

SS: After taking up office as Deputy Chairman of SMPK what measures or initiatives have you planned to improve operational ease and other positive changes?

SR: Some of the ongoing initiatives in this direction include

- Digitisation of processes to make operations faster and efficient, and to provide a seamless experience for our stakeholders;
- Expansion of infrastructure and execution of capacity addition projects to be future-ready for coping with higher demand of cargo traffic; and
- Manpower rationalisation.

SS: Huge volumes of raw materials are imported by the steel producers in eastern India through SMPK. What special support facilities does the port extend to the industry?

SR: The port has adequate storage area and robust rail network which enables smooth handling and despatch of imported cargo. SMPK has always extended several benefits, remissions and facilities to support dry bulk/containerised cargo movement, along with all necessary conveniences to the trade for significantly reducing their overall logistics cost.

SMPK's container terminal with 800,000 TEUs handling capacity (TEU or twenty-foot equivalent unit is an inexact unit of cargo capacity, often used for container ships and container ports) is supported by 17,000 TEUs yard stacking capacity equipped with four mobile harbour cranes. In addition, there are 30 transit sheds with 100,000 sq. mtr. of covered area, which are available for storage. More hardstand (paved area for parking commercial vehicles or cargo storage) can also be allotted on requirement.

Further, SMPK has steady shipping connections with countries in the East and Far East as well as Bangladesh, and regular shipments of cargo are made to these countries.

All these provide a wholesome experience for both importers and exporters.

SS: What steps do you think SMPK should take to bring the port on par with other busy ports in eastern and southern India?

SR: SMPK is taking all possible measures to connect eastern India with neighbouring countries through waterways. Under the Government's Sagarmala initiative, there are a number of ongoing projects for port modernisation, port connectivity, port-led industrialisation and coastal community development. As a part of 'ease of doing business', the Government and SMPK have employed a number of digital initiatives to provide logistics solutions and strengthen supply chain management. The entire import-export process has been digitised and a paperless system has been devised. A lot of infrastructure work is going on for improvement of road connectivity and removal of traffic congestion points.

Some berths are already given to regular customers with high turnover operations on the PPP model or

landlord model to ensure provision of technologically advanced services. Similarly, for facilitating handling of rakes in a seamless and efficient manner and aggregation / evacuation of cargo, SMPK has several railway sidings within the port area.

SMPK, being a tidal port, has variable draft which differs from day to day and tide to tide. To overcome this hindrance to smooth operations, SMPK is going in for handling of fully laden ships by deploying floating cranes with associated facilities.

SS: Is there any specific message you would like to share with readers of Steel Scenario and Industry Scenario?

SR: The Government had quite early in the day realised the untapped potential of the East and made strong policy interventions by way of the Act East and Look East connectivity initiatives. I am very hopeful that SMPK will play a vital role in the development and transformation of the steel sector in the eastern region. The centuries-old ties and mutual collaboration in trade and commerce will intensify in the coming years, considering the availability of resources in the eastern states, and a clear road map drawn to develop eastern India as a national hub for steel export.

Tata Metaliks Limited - Ductile Iron Pipe Plant #2 inaugurated

Kolkata, Sep 15, 2022: Ms Mamata Banerjee, Hon'ble Chief Minister of West Bengal today inaugurated Phase-I of expansion project of Ductile Iron (DI) Pipe plant of Tata Metaliks Limited at Kharagpur. This Rs 600 crore expansion project will take Company's Ductile Iron Pipe plant capacity to over 4 lakh tonnes per annum in two phases.

The new plant is one of the most advanced DI Pipe plants with high levels of automation & robotics to make the operations safe and efficient. This new plant will help the company expand its product range and enhance its presence in the fast-growing water infrastructure space that is witnessing a major thrust by the Govt of India through its Jal Jeevan Mission scheme.

Besides supplying superior quality Pig Iron and Ductile Iron Pipes in domestic and internal markets for several years now, the Company, as a responsible corporate citizen, has been carrying out various community welfare initiatives mainly in Kharagpur in the villages close to its plant. Two of its flagship Welfare projects include (a) TML 300 Schools Project — to enhance access and quality of education to children in the age of 3 to 16 years covering approx. 300 villages with the goal of making the community child labour free and (b) Jal Se Jeevan - Build water conservation & harvesting structures besides providing toilets and drinking water to 25 villages. This will also lead to the Company being one of the first in the iron & steel industry to become water positive. Tata Metaliks also runs a Skill Development Centre at Midnapore to train ~700 youths annually to make them employable.

গড়ে তুলুন দেবীপক্ষের নতুন উৎসব



শারদ শুভেচ্ছায়

RASHMI
CEMENT

Auto sector set to generate maximum demand for lubes in short term

By Ritwik Mukherjee

For the past so many years, the engine oil segment (comprising mostly three typical types – full synthetic oil, semi-synthetic oil and mineral oil) has dominated the demand for lubricants (lubes) in India. The demand, however, seems to be moving increasingly towards end-user industries, particularly the automotive industry, which is the largest end-user market for lubricants in India. Because of their anti-wear properties like corrosion resistance and other qualities, lubricants are also utilised in construction equipment. In the steel industry, they are utilised in a variety of applications such as hydraulic fluids, compressor oils, and other substances during operation of equipment, including blast furnaces, continuous casting rollers and other processing machinery, to lower downtime and boost operational efficiencies.

During the projection period, these factors will continue to fuel market expansion, though factors such as fluctuations in crude oil prices may impede market growth. However, experts feel that in the years to come, the end-user industries will dominate the demand for the lube market. And that's not without reasons.

The automotive segment, particularly light-duty vehicles including two-wheelers and passenger cars, form the largest end-user market for lubricants in India. Automotive engine oils, gear oils, transmission oils, greases and compressor oils are the most widely used lubricants in these markets. Lubricants have a good share in both the OEM and the aftermarket. The potential of demand growth for lubricants in India between 2021 and 2026 has been estimated to be as high as 0.81 million tonnes.

Significantly, the Indian finished lubricants market is the third largest and one of the fastest growing lubricants markets in the world. Valued at over 2,610 kilotonne in 2020, the market is projected to register a CAGR of over 1.5% during the period 2021-2026 and with the growing trade of vehicles and their spare parts, is anticipated to grow at a CAGR of 4.77% by 2027 in India. According to projections, demand for lubricants from the automotive industry alone will see growth at a CAGR of 3.9% by 2027.

This has to be seen in the wake of the latest report by Moody's, which suggests that India is set to see the strongest growth in automotive sales in the coming

years which will boost the demand for automotive lubricants. The demand for automotive lubricants has a direct correlation with on-road vehicle movement, as well as growth of vehicle population and automobile sales. Automotive sales will be further fuelled by the consumers' preference for personal vehicles over public transportation in the post-pandemic world. India's automotive industry accounts for around 7.1% of the country's GDP, in which the two-wheeler segment accounts for a share of around 81%, owing to the growing young and middle-class population. Besides, with the consistent economic development and rising incomes, the automotive industry has been witnessing a continued shift in vehicle preferences, from two- to four-wheelers, which helps to augment the demand for passenger car motor oils (PCMO).

Some more facts: According to Kline's assessment report of the Indian finished lubricants market, the total estimated 'vehicle parc' (also called vehicle population; details the total number of on-road vehicles at a particular moment in time, taking into account how many vehicles get scrapped over the years due to accidents, old age, lack of parts, etc.) in FY2019 was 294.1 million units. Growing disposable income and spending power among the middle class and youth population have resulted in a high share of two-wheelers and four-wheelers in the total vehicle parc. Untapped potential and under-penetration of vehicles in urban and rural areas present a huge growth potential for auto players. Improving infrastructure with well-connected roads and highways would further propel the demand for automobiles and the rural market will contribute a huge market share in the coming years. Adding to the market, the used car industry is huge and according to the Indian Pre-Owned Car Market Study, the used car market is set to touch 8.2 million units per year by FY25. This growing demand from the automobile industry is driving the automotive lubricant demand in the country.

By 2022, the Centre aims to construct 65,000 kms of national highways at a cost of Rs. 5.35 lakh crore (US\$ 741.51 billion). With the transformation of road infrastructure, more and more vehicles are expected to hit the roads. Moreover, the infrastructure lubricant market will also get a boost in the whole growth story.

The Government of India has planned to spend US\$ 1.4 trillion in the next 10 years in the infrastructure sector. Government's continued emphasis to drive India's Infrastructure sector will provide impetus to the commercial vehicles segment. Beyond the increased need for lubricants in a commercial vehicle, there will be an increase in demand for industrial lubricants too. The need for gear oil, transmission fluid, metalworking fluid, and grease will see an upsurge in demand. The Indian industrial lubricant market was worth US\$ 1.4 billion in 2020 and is further projected to reach US\$ 1.8 billion by the year 2027, growing at a CAGR of 3.8% during the period.

And then how can one be oblivious of another emerging sector – that of electric vehicles (EVs)? Experts are of the view that new EVs and the need for products that reduce friction, prevent corrosion and coolants constantly demand that the lubricant industry innovate. New inventions and technological advances are boosting the demand for innovative and sustainable products like EV fluids, Ad Blue products, long drain products, and India's first EV tyres for cars, bikes and scooters.

Currently, the country that has the highest number of EVs on road is China. Roughly around 1.1 million electric cars were sold in China in 2018. By 2019 more than 3.5 million electric vehicles were on the roads in China. Irrespective of that, as of 2021, EVs in the Chinese market only accounted for 13.3% of the automobile market. But the China lubricants market continues to register a CAGR of over 2%.

EV is still at a very nascent stage in India and the lubricant industry would still have a lot to serve the already existing market. In hindsight, the EV market comes with its own opportunity. It is not just demanding new EV solutions but also pushing the lubricant industry to evolve and go beyond providing solutions with lubricants. With so much rapidly shifting and changing in the lubricant industry, the coming years will mark milestone years for the lubricant players.

There are already more indications than one about how things are shaping up for the Indian lube industry and how leading players are gearing up to face the Indian lubricants market scenario in the days to come. In December 2019, Exxon Mobil Corp., which sells Mobil lubricants, announced its plans to set up a lubes blending plant in India. Around the same time, Honda Motorcycle & Scooter India Pvt Ltd tied up with Indian Oil Corporation Ltd to launch a new range of 'Servo Honda' engine oil. In February 2020, HPCL rolled out the entire range of lubricants and specialty fluids for the BS VI, electric, and hybrid vehicles. Then in June 2021, IOCL signed an MoU for "investment promotion"

between the Gujarat government and IndianOil for setting up a petrochemical and lube integration (LuPech) project as well as a acrylics/oxo alcohol project, along with other infrastructure projects at its Gujarat refinery at Vadodara.

It is not just automotive lubes, different types (product categories) of lubricants are available in the market. They include engine oil, transmission and hydraulic fluid, metal working fluid, general industrial oil, gear oil, grease, process oil. The end-user industry category includes: automotive, industrial, agriculture, and other end-users.

One also has to keep in mind that the Indian lubricants market is consolidated, with the top six players dominating the market. The top companies are engaging in competitive strategies and investments to retain and expand their shares. The top six players, namely, Indian Oil Corporation Ltd, Hindustan Petroleum Corporation Ltd, Castrol Ltd, Bharat Petroleum Corporation Ltd, Gulf Oil Lubricants India Ltd, and Shell India Markets Pvt Ltd, account for around 73% of the market studied.

Now a look at the global lubes market would reveal that the global lubricants market size was valued at \$125.81 billion in 2020 and is expected to grow at a CAGR of 3.7% from 2021 to 2028. The global aviation lubricants market, on its parts, reached a value of \$1.95 billion in 2021. Thanks to a number of favourable factors, the market is anticipated to reach a value of US\$ 2.86 billion by 2027, growing at a CAGR of 6.99% during 2022-2027. Aviation lubricants represent a set of fluids, oils and greasing substances that are designed to lubricate various moving parts of the engine, including camshaft, piston rings, cylinder walls and bearings associated with propulsion systems. They aid in reducing friction between surfaces, while functioning under varying temperature ranges. This, in turn, allows better movement between metal parts, enhances the energy efficiency of an aircraft, mitigates wear and tear, and ensures safer operations. Apart from this, aviation lubricants are extensively used for transmitting forces, inhibiting deposit formation, heating and cooling the surfaces, and protecting several engine parts, from corrosion. Based on these properties, aviation lubricants are utilised by original equipment manufacturers (OEM) and maintenance, repair, and operations (MRO) companies to optimise workflow and maintain aircraft conditions.

India is no exception. And therefore, one will have to take into consideration the country's aviation sector and its growth prospects while studying the growing demand for lubes by end-user sectors, going forward.

The Surging Hydrogen Economy that Oil and Gas Companies are Tiptoeing into

As reported two years ago, Rystad Energy said that liquid hydrogen would find a place as a niche fuel for cement and metal industries, aviation, and seagoing vessels. But these sectors would add up to only about 7% of the global energy market.

But then bp opened the door with its Teesside hydrogen project, a massive venture in the UK where both green and blue hydrogen will be generated and used to fuel heavy industries in the area, long-haul trucks, and even add to natural gas pipelines to fuel homes and businesses.

This was followed recently when bp acquired a 40% stake in AREH (Asian Renewable Energy Hub) in the massive iron-ore mining region of Pilbara in Western Australia. bp will be the operator for 26 GW of green power capacity, which is about a third of all electricity generated by Australia. The project will also generate 1.6 million tonnes of green hydrogen or 9 million tonnes of green ammonia each year.

US Congress pushes hydrogen.

Lots of funding dollars and tax breaks have appeared in two bills approved by the US Congress:

First, the Infrastructure Investment Act (IIA) in 2021 provided \$9.5 billion for hydrogen development and a big chunk of this, \$8 billion, was to build 4 hydrogen hubs across the US. There was also \$1.5 billion for R&D projects. My state, New Mexico, are joining with Colorado, Utah and Wyoming to propose a regional hub.

Second, the Inflation Reduction Act (IRA), that was signed in August 2022, has \$370 billion for investment in clean energies and includes funding and tax breaks for hydrogen and for carbon capture and sequestration (CCS) which is needed to dispose of the CO₂ byproduct of blue hydrogen.

Two new federal tax credits plus one subsidy could make a difference also. A production tax credit offers up to \$3 for each kilogram of hydrogen that's produced with near-zero carbon emissions (e.g. green hydrogen) but the credit is lower for non-zero emissions (e.g. blue hydrogen without CCS).

An investment tax credit of 30% will be available for investing in clean hydrogen.

Last, an almost doubling of the CCS subsidy, from \$45 to \$85 per metric ton of CO₂ that is sequestered.

With the biggest tax breaks going to the cleanest hydrogen production, this will improve the economics of generating green compared to blue hydrogen.

Surging across the world and the US.

One observer speculated that green hydrogen and ammonia will become the new energy industry.

bp is taking the lead in the \$36 billion AREH, an enterprise producing solar and wind energy then using this to generate green hydrogen and green ammonia for use within Australia and for export to southeast Asia.

TotalEnergies has joined an Indian venture that may invest \$50 billion over 10 years to produce green hydrogen. In India, there is great demand for fertilizer and green ammonia should have a thriving market there.

ChevronCVX is getting ready to produce green and blue hydrogen, and to spend billions of dollars to do it.

Shell are looking for a big hydrogen project, according to an insider.

In the US, Amazon has a deal with Plug PowerPLUG - 6.1% to provide green hydrogen to power 800 long-haul trucks or 30,000 forklifts beginning in 2025. Other examples from that report include:

Air Products will produce green hydrogen in Casa Grande, Arizona, to the tune of 10 metric tons per day.

Libertad Power announced a deal with Hyundai — they will produce green hydrogen from a new plant in Farmington, New Mexico. Diesel Direct will distribute the fuel to trucking fleets along an east-west corridor between Los Angeles and West Texas.

An international business, Universal Hydrogen will invest over \$250 million to produce green hydrogen in a new facility in Albuquerque to provide aviation fuel.

Tallgrass Energy is aiming to convert a coal-fired power plant into a blue hydrogen generating facility. The Escalante plant near Grants, New Mexico, was closed in 2020. Tallgrass wants to obtain methane feedstock from the local San Juan basin and dispose of the CO₂ byproduct into underground layers of the same basin.

BayoTech is a company that actually produces hydrogen fuel in New Mexico. The BayoGas Hub has a smaller and more efficient generator that makes hydrogen cheaper. Feedstocks can be clean natural gas or other renewable biogas sources that can make hydrogen that is carbon-zero or even carbon-negative.

Three hydrogen hubs are being deployed in the US in 2022, with plans to expand the network into the UK and globally. Each of the hydrogen hubs in BayoTech's network produces 1-5 tons of hydrogen each day. Hydrogen is delivered locally in high-pressure transport trailers carrying gas cylinders.

The capstone for BayoTech is that the giant manufacturer CaterpillarCAT -0.7% upped the company's investment to hundreds of millions of dollars.

"We're seeing tremendous demand for hydrogen, especially with the IRA and last year's infrastructure bill," a spokesman said. "We're operating now in a very big-growth environment."

Hydrogen is not efficient.

Hydrogen fuel burns to water so is emissionless – a huge advantage where batteries are too large to store energy such as planes, ships, and long-haul trucks.

But hydrogen production is inefficient because, first, green hydrogen requires green electricity that drives an electrolysis process that breaks down water into hydrogen and oxygen. But electrolysis is only 55-80% efficient according to Shell.

Second, blue hydrogen requires very hot steam to break down methane into hydrogen, and methane is a fossil fuel that is associated with leaks in wellheads, pipelines and storage tanks. Methane is many times more warming in the atmosphere than CO₂. Further, the byproduct is CO₂ that has to be disposed of by injecting deep underground. Blue hydrogen is a zero-emission energy source that is squeezed in its production between two heavy emitters – methane and CO₂, so blue hydrogen is not truly zero-emission.

Third, hydrogen can be burned like natural gas to heat

homes and offices. bp have suggested some of the hydrogen that will be generated at Teesside in the UK could be added to pipeline gas that is used by customers for heating and cooking.

But how does hydrogen fuel compare with heat pumps, which the government is offering to replace fossil fuel boilers with along with a subsidy of £5,000? A new report looked at over 30 separate studies that concluded hydrogen was much less efficient and more costly.

It takes a lot of energy to create solar or wind electricity and then convert it to hydrogen and then burn it to heat a home. A lot more energy than using the same amount of electricity to run a heat pump – six times more energy according to the report.

Takeaways.

Hydrogen has one big advantage: the energy is contained in a dense form. But there is one main drawback — it is inefficient.

But as Rystad Energy predicted, liquid hydrogen in 2050 will find a place as a niche fuel for aviation, ocean vessels, and cement and steel industries.

Hydrogen is well-suited for manufacture by large oil and gas companies because they already know how to produce and distribute natural gas, and they have deep pockets.

Despite the limited scope, clean hydrogen could be a silver bullet for major oil and gas companies wanting to provide Rystad's 7% global energy market for hydrogen by 2050. The oil and gas industry could exhibit their reach for Paris climate goals, and without having to stop drilling.

On a smaller scale, hydrogen production is surging – from school buses to long-haul trucks and from forklifts to airplanes. One commercial enterprise is setting up hubs across the US to deliver hydrogen fuel in transportable trucks on a scale much smaller than existing big production units at refineries.

(Source: Forbes)

How Hydraulic and Pneumatic Cylinder Market in India is Achieving Sustainability

The Hydraulic Equipment Market was valued at 42.04 billion in 2021 and is expected to register a CAGR of 3.87% over the forecast period (2022-2027). The primary drivers of the hydraulics market are the expansion of process industries, rising demand for material handling equipment, and expanding construction sector potential.

Over the last 70 years, material handling has undergone various transformations that have changed the outlook of the industry. Material-handling machines and robots have replaced individual workers. Owing to this transformation, many industries have grown, especially the automotive industry, which has experienced a 10-fold growth.

The growing construction industry is expected to augment the hydraulic equipment market demand over the forecast period. For instance, according to the World Bank report, the construction expenditure worldwide in 2021 was USD 12.4 trillion. Further, In emerging economies, such as India, the possibility of 100% foreign direct investments (FDI) in townships and settlement projects is estimated to boost the demand for hydraulic construction equipment such as hydraulic cranes, excavators, and loaders during the forecast period.

The major challenge impeding the hydraulic equipment market's growth is the volatility in maintenance costs over the equipment's lifespan. Fluctuations in prices of raw materials such as stainless steel, iron ore, aluminum, bronze, and other metal alloys have caused volatility in the arrangement cost of hydraulic equipment. This, in turn, has led to a demand-supply gap.

Many new infrastructure development plans and projects are in the pipeline which are likely to drive the demand for construction equipment. In the construction industry, hydraulic cylinders are used in equipment such as backhoes, excavators, trenchers, road construction planners, grinders, concrete or asphalt laying machines, concrete cutting saws, dozers, motor graders, dumpers and skid steers. These cylinders offer resistance against corrosion, abrasion, extreme temperature conditions, weather changes and can be used continuously for extended periods.

Key Market Trends

Construction Segment to Witness Significant Growth

Hydraulic equipment function and perform the tasks via a pressurized fluid. The pressure applied to a contained fluid is transmitted undiminished. That pressurized fluid acts upon every part of a section of the holding vessel and creates force or power. As the technology continued to mature, hydraulics made it possible to achieve far more precise motions. Such precision has gained momentum for more optimization of the construction processes.

The introduction of hydraulics into the construction industry has allowed more work to be finished in less time by significantly increasing productivity. The science of hydraulics enabled the equipment to achieve a range of motion and be controlled with high levels of precision. Hydraulic power is an indispensable part of the modern construction industry, and continuing technological advancements will make the usage of hydraulic equipment even more important in the future.

The hydraulic equipment can withstand and transfer high loads. Compared to other systems that mainly rely on mechanical components, hydraulic equipment has fewer moving and load-bearing components. The hydraulic fluid, motors, and pumps at either end handle most functional limitations. Adopting smart valves, smart pumps, and other parts ensures more efficient operation and controlled performance of the hydraulic equipment. Furthermore, it helps in automating the process. Nowadays, construction projects are becoming larger and more complex. Though the COVID-19 pandemic had affected the construction industry, post the pandemic, there has been a significant revival in the industry which is driven by the increasing infrastructure spending in India and rebounding Asian infrastructure investments.

Demand in Shipping Industry

Shipping is the most important mode of transport in the country that facilitates international trade. The majority of items from electronics, automobiles, textiles and raw materials to oil & gas are transported by ships. The facilitating institutional and technological

factors such as the adoption of industrial IoT and support from government is propelling the growth of the shipping industry, which fuels the need for lifting equipment at ports. Though the adoption of lifting equipment is still at a nascent stage, it is expected to rise significantly in the coming years and therefore is expected to be a potent source of demand for hydraulic cylinders.

Restraints in the Way

High Manufacturing and Maintenance Costs: The manufacturing of a hydraulic cylinder requires metal forging and precise engineering to create a high quality hydraulic cylinder. Hydraulic cylinders consists of several components which include pistons, cylinder barrels, piston rods, cylinder bases, cylinder heads and cylinder seals to be fitted together. There are cost barriers for small and medium sized enterprises (SMES) to enter the hydraulic cylinder market. Besides the initial manufacturing cost of hydraulic cylinders, they also incur maintenance costs over time.

Regular Need of Maintenance: Hydraulic cylinders need to be maintained regularly to avoid oil leakages and other malfunctions. The quality and finish of the cylinder rod need to be examined regularly. If the rod is bent, it can cause a load shift. Additionally, incorrect rod strength or diameter can also cause failure. The cylinder tube needs to be examined regularly, as the cylinder walls might undergo wear and tear decreasing its thickness. This condition is known as a balloon tube. These factors lead to increased maintenance costs, thus posing a restraint in the adoption of hydraulic cylinders.

Increasing Uses of Heavy Construction Vehicles

The market's growth can be attributed majorly to the increasing demand for heavy construction and mining vehicles from construction, mining and oil & gas industries. Increasing adoption of material handling equipment across industries is a major booster for the growth of the market. There is an increasing potential of the construction industry, which induces increased adoption of automated heavy construction vehicles equipped with hydraulic cylinders for various operations. The increasing adoption of material handling equipment across industries such as agriculture, construction and mining has also increased the demand for hydraulic cylinders.

Favourable Government Initiatives

Government initiatives to revive infrastructural projects across the country have helped the demand for hydraulic cylinders to grow, owing to their increased adoption in construction and material handling industries. Increasing farm mechanization across regions, especially in all the Asia Pacific countries and increasing mining exploration activities have also promoted the growth of this market.

Expectations from Future

Steady growth is expected to define the hydraulics, pneumatics and overall fluid power industry for the next few years. These cylinders' retraction properties benefit a variety of industries including automotive and agriculture and tend to be in high demand for mobile applications such as earth moving equipment, forklifts and heavy trucks. With the growing population, there will be more desire for industrialization which will eventually necessitate the use of hydraulic and pneumatic cylinders.

The global hydraulic and pneumatic cylinder market size was valued at \$13,375.8 million in 2020 and is projected to reach \$23,850.4 million by 2030, registering a CAGR of 5.8 per cent from 2021 to 2030. The demand for hydraulic and pneumatic cylinders is on the rise at an exponential pace, owing to increase in number of manufacturing and other sectors, which is expected to propel the cylinder market.

Furthermore, incorporation of IoT into pneumatic cylinders is expected to boost the pneumatic cylinder market by 2025. IoT is employed in fluid power systems, even though its typical applications revolve around electric systems. Electronics for intelligent mobility and sensors for data collection is becoming more and more common in hydraulic equipment. Additionally, manufacturers promote the digitization of hydraulic goods by providing a wide range of electro-hydraulics modules and components with digital interfaces and sensor intelligence. Manufacturers benefit from the intelligent design, configurability, and precision control for hydraulic systems that modern technology in hydraulic applications enables. End users can now monitor, manage, and maintain a complete computer from a single display interface. Pneumatic cylinder is known as faster, stronger and uses less energy to perform an operation.

2021

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Bengal govt is extremely focused on industrial devt. : Dr. Shashi Panja

By Steel Scenario Bureau



“West Bengal is a business hub and it continues to grow. We have many favourable factors, including climate, location, huge consumer base, plentiful water and electricity, skilled workforce in Bengal, along with access to neighbouring states and the North-East,” observed Dr. Shashi Panja, Minister for Industry, Commerce & Enterprises, Public Enterprises & Industrial Reconstruction, Women & Child Development and Social Welfare, Government of West Bengal, while speaking at a special session organised by the Merchants' Chamber of Commerce & Industry (MCCI) on 'Prospects for Industrial Growth in West Bengal – The Road Ahead' at Kolkata.

Addressing Bengal's captains of industry, Dr. Panja made special mention of the coal mine at Deocha Pachami and the deep seaport at Tajpur being developed and informed that they would soon be operational. “A creative economy is the key to generating huge employment and revenue from different avenues,” she said. “We have a dedicated MSME industry and we are extremely focused on industrial development. We are very interested in logistics.” Emphasising the huge potential of electric vehicles in energy conservation, Dr. Panja said the state

government was looking forward to investments for setting up manufacturing centres. She also spoke about the numerous social welfare schemes undertaken by the Bengal government.

Dr. Panja applauded MCCI's initiatives to promote industrial development in the state, with focus on the need to facilitate start-ups and next-gen businesses. “Successful industrialists in West Bengal should be our goodwill ambassadors when they travel outside our state and abroad,” she felt.

Mr. Rishabh C. Kothari, MCCI President, welcomed the initiative of the state government for setting up a wholesale apparel hub at Nungi, Maheshtala in South 24-Parganas. “West Bengal has played an important role in the development of the textile and apparel industry and till date, it is a major manufacturer of hosiery products, garments, and technical textiles. The state is among the top producers in these segments, which would receive further boost with the support of the state government,” he added.



Inequality in DVC power tariffs impact industrial units in Asansol-Durgapur belt

By Steel Scenario Bureau



Iron & steel companies and other industrial units in the Asansol-Durgapur area of West Bengal are extremely upset by the continued high power tariff being charged by the Damodar Valley Corporation (DVC) for supplying power to them. There is a difference of more than Rs. 2 per unit between the retail power tariffs charged by DVC in Bengal and its neighbouring state Jharkhand, they allege. As on date, DVC industrial power rate in West Bengal is Rs 6.50 per unit, whereas it is Rs. 4.25 per unit in Jharkhand.

With standing contracts of over 1,000 MVA, these Bengal firms are finding it extremely difficult to compete with similar industries in Jharkhand, as their final products are all sold in a common market. As a result, the West Bengal industries are rapidly losing business to their Jharkhand competitors, and many of them are on the brink of insolvency. DVC has also added salt to the already wounded Bengal industries in the area by demanding payment of past arrears totalling to over Rs. 1,500 crore.

Reportedly, many of these industries are on the verge of closure. This means that their financial partners/banks will also have to bear huge losses in the form of NPAs, and to the state exchequer too shall lose out on GST and other taxes.

Many industries have started reducing their production levels and submitted letters to DVC to reduce their contracted demand by 30% to 40% to make ends meet. “We are anticipating such move from others also, if the situation does not improve. This will affect employment of more than 50,000 workforce in the state earning their livelihood, directly or indirectly, from these industries,” feels Mr. Vivek Adukia, Chairman of the Steel Rolling Mills Association (SRMA).

The small industrial units in the Asansol-Durgapur belt are also unable to calculate their actual cost of production (and subsequent profit/loss) with DVC regularly announcing increased cost of power tariffs retrospectively. Nor are they able to realise the increased cost on account of the retrospective imposition from their customers.



As a solution, Mr. Adukia suggests that “DVC should realise power tariff from its consumers in both the states in a synchronised manner on month-to-month basis, with apple-to-apple comparison, without favouring any particular state.”

September 2022

STEEL MARKET PRICE (thousand tonnes)

CITY	INGOT	BILLETS	TMT 12MM	WIRE	SCRAP	COIL/CR/HR	SPONGE IRON		PIG IRON	
							Foundry Grade	Steel Grade	Foundry Grade	Steel Grade
ALANG					42000					
AHMEDABAD	50600	51200			40500	65700/57000				
BHIWARI	50800									
BHAVNAGAR	50800	51000	54500		41000					
DELHI					44000	65000/56300				
DURGAPUR	47400	47800	50200	5.5mm-51500/12G HB-53500	42600		34800	49200	45000	
GOA	48200	48500	54300							
GAZIABAD	49900	50200	53500		45000	64700/57000				
INDORE MELTING										
INDORE	49600	48900	55100		40700					
JALNA		49500	55200		40500					
JAIPUR	49200	49500	54100		41400	64000/56000	37000			
JAMMU	51600				40000					
KANPUR	49500		56500		39000					
KOLKATA	48100	48600	50200		43100	63500/54000				
LUDHIANA	50700	50900			43300	65100/55900	38500	48300	44800	
MANDI GOBINDGARH	50600	50900	55400		39800			48500	45000	
MUMBAI	50100	50500	55100		39000	65700				
MUZAFRAGAR	49700	50000	52600		45000					
RAIGARH	47200	47700	51900				34200		44000	
RAIPUR	47900	48100	52700	5.5mm-52700/12G HB-55200	42900		34000		44000	
ROURKELA	47000	47500	52900				34000		43000	

Source: Metal Market

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