

Aftermarket Business

Aiming at both share expansion and profit ratio improvement

Executive Officer **Etsu Harima**



In our aftermarket business results in the fiscal year ended March 2023, both sales and operating income marked a record high, with an operating margin of 16.6%. We understand these results as outcomes of our continued price increase activities, including price list revision, to enable us to reflect higher prices of raw materials, energies, etc. in selling prices, as we did in the previous fiscal year. However, we are still behind global competitors in terms of the market share in the global market, and I think there is room for us to increase the sales profit ratio further.

With regard to standard catalog products, expansion of fast-moving items inventory and development of a prompt delivery system will lead to a wider sales opportunity. Therefore, we will increase the number of sales companies accessible to FIRST, a system for the immediate delivery of popular products, while expanding inventories of popular products for the aftermarket. I think we can increase our sales further by improving inventories of popular products and developing an immediate delivery system for orders from all over the world.

As for MRO (Maintenance, Repair and Overhaul) projects, we put our focus on relatively large bearings such as those for steel manufacturing and paper manufacturing machines. In addition to standard products, which are facing harsher price competition under commoditization, we will strengthen sales activities for high value-added bearings by leveraging NTN's strengths. We will also focus on responding to new demands by enhancing our supply capacity for the aftermarket through production transfer to overseas, as

well as expanding our production capacity at domestic plants. In response to demand for replacement of automotive-related bearings and constant-velocity joints, we are implementing activities appropriate for each locality, with a view to transferring our headquarters functions to Europe, a center place of our sales.

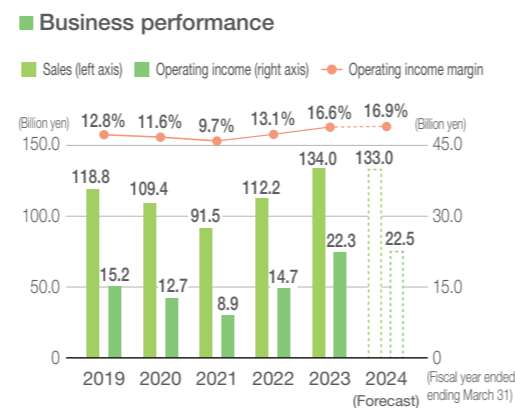
We are also promoting expansion from products to services, in other words, innovation to businesses that will make profit by adding various services to bearings. More specifically, we have started measurement of operating data of industrial machinery and facilities using "Talking Bearing™" with built-in sensors and generators, and analytical and diagnostic report services for measurement data obtained by using NTN Portable Vibroscope. In remote technical support services, we have enabled engineers in Japan to provide advice on equipment for overseas users via monitors. Through steady implementation of a series of these initiatives, we will establish a business model for providing even better services, beyond simply selling bearings.

In our future aftermarket business, we will focus on providing high added-value by not only enhancing the "availability" of inventories through the FIRST immediate delivery system for general-purpose products but also improving "solutions" through combination of various services. In the aftermarket business, which is indispensable for higher productivity and stable operation of customer equipment, we are creating a system that is not significantly affected by fluctuations in market demand. With our eyes on capturing further global demand, etc., we will strive to achieve an even higher profit ratio.

Results for the fiscal year ended March 31, 2023 and forecast for the fiscal year ending March 31, 2024

Net sales for the fiscal year ended March 31, 2023 totaled 134.0 billion yen as a result of year-on-year growth in all regions, including overseas and Japan, due to a recovery in demand from the COVID-19 pandemic and strengthened supply capacity, despite the impact of the situation in Ukraine. Operating income was 22.3 billion yen, a record high for both net sales and operating income, as a result of efforts to absorb cost increases caused by external factors such as surging raw material and energy prices, which were passed on to selling prices.

For the fiscal year ending March 31, 2024, we are forecasting net sales of 133 billion yen, down 1 billion yen year on year, due to the still uncertain situation in Ukraine and the risk of a global economic recession, but excluding the impact of exchange rates, we are forecasting 103% year on year volume growth. In the current fiscal year, we will continue to strengthen our supply capacity for the aftermarket, as we did in the previous fiscal year, and at the same time, we will continue to raise prices by revising the price list and other means in order to pass on higher inflationary costs to selling prices, aiming to improve profit margins.



"DRIVE NTN100" Phase 2 strategy

Initiatives to be focused on during the three-year period (From the fiscal year ended March 31, 2022 to the fiscal year ending March 31, 2024)

- By sharing sales strategies across different types of businesses, concentrate resources on important industries
- Strengthen organizational structure to improve supply capacity, service response, and profitability
- Strengthen e-commerce
- Promote business development in the service-oriented business

2020	2021-2023	2024-
Rebuild revenue base		From products to services
Increasing the brand value		
Strengthen product-and-service business Expand bearing refurbish business Use of NTN Portable Vibroscope (In addition to sales of devices, analysis report business)		Commercialize the condition monitoring of customers' equipment by utilizing sensor technology and IoT and grasp the demand for bearing aftermarket
Strengthen service response Strengthen technical support functions in overseas sales companies (ASEAN and India regions) Technical service units activities and technical seminars for distributors Further strengthen measures against counterfeit bearings		Develop and expand technical service through the use of remote support cameras
Strengthen the ability to supply Maintain available stock for aftermarket Prioritize production capacity for aftermarket (use of new IT core system) Expand use of overseas manufacturing sites and external procurement		Accelerate "Made by NTN" by actively utilizing products manufactured overseas Strengthen the network system with distributors and expand e-commerce
Strengthen structure and organization Expand sales in growing industries through integrated response from OEM to aftermarket Improve profitability by short-term concentration through task force activities for key market Strengthen sales structure in the Middle East and Africa (A sales company established in UAE in January 2021)		Relocate automotive aftermarket's headquarters functions to Europe Expand sales in potential markets such as China through the use of resources in Europe

TOPICS

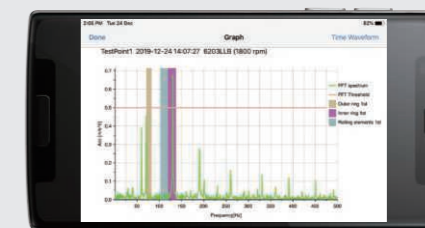
Initiatives to strengthen supply capacity

We are working to enhance our brand value to expand our aftermarket business. One of these measures is to strengthen supply capacity for the aftermarket. In order to ensure a stable supply of popular products to our global distributor network, which is one of NTN's strengths, we are expanding our "FIRST" system for immediate delivery of popular products for the aftermarket. FIRST is a system that keeps an inventory of popular products for aftermarket and automatically supplies bearings to NTN Group sales companies according to actual sales.

In terms of production, we are shifting to overseas production of standard small radial ball bearings in order to expand supply capacity. We promise to provide global quality by "Made by NTN", maintaining the same quality as products manufactured in Japan even if they

are manufactured overseas. We are also expanding our production facilities in Japan for medium-sized radial ball bearings to supply for the aftermarket in a timelier manner.

In addition to product supply, we are also working to strengthen our aftermarket service. NTN Portable Vibroscope is easily portable and can be used to diagnose the condition of equipment and bearings periodically. For the purpose of preventive maintenance of operating facilities, we have started a business to provide customers with a "diagnostic report service" in Japan by analyzing the data measured by this device. We have received numerous inquiries since we launched promotional activities for this business on the web in March 2023. We plan to expand this business globally.





Industrial Machinery Business

Enhancing the profitability through strategic expansion

Executive Officer **Etsu Harima**

In the industrial machinery business, both of our sales and operating income hit a record high in the fiscal year ended March 31, 2023. The operating margin was over 5%, partly due to our continuous cost reduction activities, price increases in unprofitable businesses, and influence of exchange rates. However, we are far from satisfied with these figures, and have already recognized issues for improvement in all fields of production, sales, and technologies. By addressing these issues properly, we think that the operating margin will improve further.

As specific measures, we will shift from the strategy of pursuing the scale of sales through low-margin, high-volume sales. In terms of bearings, we regard ourselves to be reaching a point of transition from offering a comprehensive collection of products, like department stores, to focusing on markets where we can demonstrate our value.

On the other hand, we are also required to respond to higher costs, such as raw materials, fuels, and labor. We need to take a two-way strategy of continuing activities for productivity improvement and cost reduction while reflecting higher costs in product prices. For unprofitable businesses, price increase and scale reduction are required, together with strategies for fighting out in focused growth markets. As for general bearings, we will concentrate on offering added value, by assuming growth of competitors in China and India.

Markets we think we should focus on in the future include construction machinery, agricultural machinery, and industrial robots, for which growing demand are expected, as well as infrastructure-related markets such as wind power generation and rolling stock.

With the current trend of decarbonization, big business opportunities will emerge if a shift from

internal combustion engines to motors advances also in construction machinery and agricultural machinery. This is because many of motor manufacturers are already our customers in the industrial machinery industry, so we are promoting initiatives that will surely connect this competitive advantage to outcomes.

With regard to industrial robots, the demand has been growing for the purpose of labor-saving, and robot arm reducers, one of its indispensable components, are indeed a collection of bearings. We will respond to new demands by providing bearings necessary for realizing high-accuracy movement.

As for wind power generation, a long design life of 20 years or more is required, and thus extra-large sized bearings to be built into such equipment must ensure an extremely high quality and reliability. In this regard, we have strength of our competitive advantage recognized in the big Chinese market. We will differentiate ourselves and provide high added value by using CMSs (condition monitoring systems) that realize timely replacement of bearings through monitoring. We consider wind power generation to be a promising market, partly because Japan also seems to focus on offshore power generation in the future.

For rolling stock application, which requires high quality and reliability, China is likewise an important market for us. In the Chinese market, domestic production of main parts such as bearings has been promoted as a national policy, to which we need to pay attention regarding its future development. We will continue to focus on launching new products and services in growing markets to further improve our operating margin.

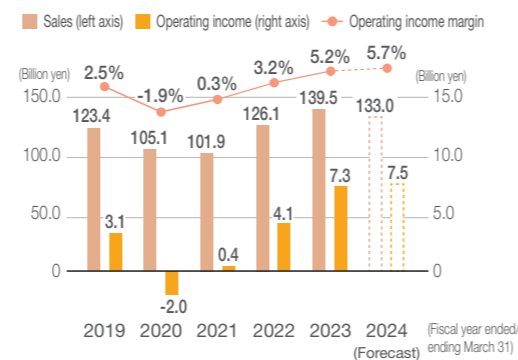
Results for the fiscal year ended March 31, 2023 and forecast for the fiscal year ending March 31, 2024

In the fiscal year ended March 31, 2023, sales reached a record high of 139.5 billion yen on the back of increased sales for construction machinery due to increased mining demand and for aircraft due to a recovery in passenger demand. Although there were increases in proportional costs such as steel and energy prices, record operating income of 7.3 billion yen was achieved due to activities to pass on selling prices and the impact of foreign exchange rates.

In the fiscal year ending March 31, 2024, the demands of aircraft and gearbox are expected to remain strong. On the other hand, for wind power generation, with the peak demand in 2020, the demand adjustment phase is expected to continue in the current fiscal year.

Under these assumptions, we will work to further improve profit margins. We will continue to pass on inflationary costs, raise prices and withdraw from unprofitable businesses, and engage in cost reduction activities such as procurement of low-cost parts, including those made in India, mainly for bearings for wind power generation and rolling stock.

Business performance



“DRIVE NTN100” Phase 2 strategy

Initiatives to be focused on during the three-year period (From the fiscal year ended March 31, 2022 to the fiscal year ending March 31, 2024)

- Select target areas
- Improve selling price and reduce or withdraw from unprofitable areas
- Reduce costs by procuring materials and parts from optimal locations (actively utilize materials from China and India)
- Expand sales of Wrist Joint Module “i-WRIST™”
- Expand service / solution business (CMS)
- Expand renewable energy-related products

	2020	2021-2023	2024-	
		Rebuild the revenue base	VS FY2020	
			Growth strategy to respond to market change	
Creation sector	Robot-related business (i-WRIST™)	Gain large customers Promote acquisition of overseas certified standard	↑↑↑	Expand overseas business Develop new applications and derivatives
	Service / solution business (CMS)	Establish maintenance service for wind turbine bearings and overseas expansion	↑↑↑	Gain bearing demand by leveraging CMS technology
	Gearbox	Develop RV gearbox bearing Expand sales of elastic bearings for wave motion gears	↑↑↑	Expand sales in China (Follow changes in the industry)
Growth sector	Wind turbine	Focus on capturing demand in China Drive sales and profit increase	↑↑↑	Improve profitability by capturing aftermarket demand Expand production capacity
	Machine tools	Expand sales of machine tools in China and India Utilize products manufactured in a plant in Germany to sell them on the European market	↑↑	Expand CMS needs due to spread of IoT Expand sales of bearings with sensors
	Rolling stock	Promote drastic cost reduction measures including local production in China	↑↑	Capture demand for railway network expansion and subway in China
Harvest sector	Construction machinery	Utilize competitive materials and components Adapt to electrification, shift to high function products	↑	Follow changes in social structure and infrastructure Make sure to capture demand for electrification
	Agricultural machinery	Expand sales of high value-added products Expand sales of CVJ for industrial machinery	↑	
	Aerospace	Withdraw from or reduce unprofitable projects Improve profitability by concentrating production in NTN Europe	→	Earn profits in MRO market Expand sales for space industry

TOPICS

Wrist joint module “i-WRIST™” IWS series improved portability

A new grade “IWS-C01” with improved portability of the “IWS series” of i-WRIST™ wrist joint modules has been developed. The maximum payload has been increased from 1 kg to 3 kg, enabling a wider range of end-effectors to be mounted and products to be handled than in the past, and contributing to automation and streamlining of various manufacturing processes as well as labor savings at production sites.

Specifically, when controlling the posture of products with i-WRIST™ in visual inspection applications, it is possible to handle not only small and lightweight plastic parts, but also most products that are heavy enough to be handled by human hands, such as small aluminum die-cast parts. In addition, when “i-WRIST™” is controlled by an end-effector attached to it, it can be equipped with large lighting and a high-performance camera, enabling detection of finer scratches and dents. In addition to visual inspection, the system can also be utilized in processes where the load on the end-effector fluctuates greatly, such as deburring.

Through further performance improvement and application development of “i-WRIST™”, NTN will contribute to automation, efficiency, and quality stabilization at manufacturing sites.

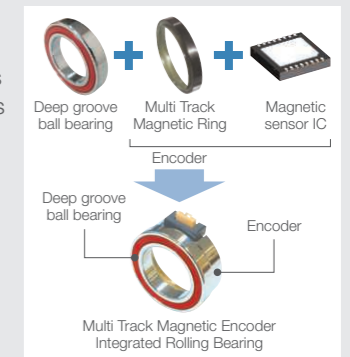


Development of “Multi Track Magnetic Encoder Integrated Rolling Bearing”

As a product that supports the expansion and diversification of robot demand, we have developed a “Multi Track Magnetic Encoder Integrated Rolling Bearing” that has excellent environmental resistance and is capable of high-precision angle detection. A magnetic ring and sensor are attached to the deep groove ball bearing that supports the joint mechanism of the robot to provide detection of rotational speed, direction, and absolute angle, contributing to improved robot performance, smaller and lighter weight, and reduced man-hours for assembly and set-up. In addition, magnetic encoders have excellent environmental resistance, enabling high detection accuracy even in operating environments where dust and oil are present.

The developed product integrates a bearing and a magnetic encoder, eliminating the need for mounting and setup work for the rotary encoder and coupling, and facilitating robot assembly. The bearing dimensions and load capacity are the same as those of general bearings and can be applied to a wide range of robot types.

NTN will propose this new product to robot manufacturers, etc., and promote the expansion of the robot peripheral module field.



Automotive Business

Provide unique suggestions to quickly resolve customer issues
Aiming to be a leading manufacturer in the power/drive train system

Executive Officer **Hideaki Miyazawa**



The automotive business has been in the red for four consecutive fiscal years since 2019. Two main reasons exist for this: the external environment and internal responses. External factors, which had a great impact, were the spread of the COVID-19 pandemic, subsequent semiconductor shortages, and unprecedented cost increases. First of all, due to the COVID-19 pandemic, the production of automobiles itself shrank from 95 million units to 75 million units per year, and demand for our products disappeared as a result.

Just as the COVID-19 pandemic subsided and automotive manufacturers were about to ramp up production, they were hit with a semiconductor shortage. The semiconductor shortage has become more of an issue as the shift from ICEs to EVs and electrification has increased the number of semiconductors needed per vehicle to about seven times the previous number.

In addition, the rising cost of steel and other materials, as well as rising energy costs, have rapidly increased our manufacturing costs.

The failure to respond adequately to these changes in the external environment was another major reason for the deficit. In other words, we were unable to pass on increased costs to customers during the period, and, on the production side, we were unable to respond flexibly to rapid changes in demand, which resulted in a build-up of work in progress. Although we have been affected by many external circumstances, we are still ashamed of the fact that we have been in the red for some time.

So how will NTN's automotive business withstand the revitalization in the future? The shortage of semiconductors is not yet over. However, automobile production is recovering, reaching 85 million units. We are determined to make a profit in the fiscal year ending March 31, 2024, and we are determined to promote our business.

Fortunately, the trend toward EVs and electrification is a positive factor for us. In EV and electrification, demand for hub bearings and driveshafts, which account for about 80% of sales in the automotive business,

is expected to increase as the shift to all-wheel drive continues. Despite increased battery weight due to electrification, reasonable electric cost is required, so reducing parts weight is essential. Also, unlike ICEs, EVs increase output simultaneously and require each part to be rigid against larger torque. This allows us to leverage our technological strengths to meet the conflicting weight reduction demands and improved durability.

In parts supply, price competition with Low Cost Countries (LCCs), mainly from emerging countries, is intensifying. In this competitive environment, we will develop a differentiation strategy based on value, not price. Our unique value proposition lies in our ability to deliver proposals that directly solve customer problems with an amazing speed. The backbone of our problem-solving capabilities is the accumulation of technical expertise that we have gained over many years of handling global projects, a level of expertise that is unrivaled by LCCs. We will develop our business at an appropriate price by having our customers recognize the unique added value that we offer as value.

At the same time, by promoting procurement and production reforms within the company and working to shorten and appropriate the supply chain, we will strive to reduce the retention time of semi-finished products, quickly cash in merchandise, and reduce inventories. In particular, we will accelerate the use of low-cost materials and parts that we have not yet been able to penetrate deeply. On the production side, we will further strengthen productivity improvement activities to minimize total cost increases even as unit prices of procured goods and energy rise, thereby promoting a different design and production philosophy from the past.

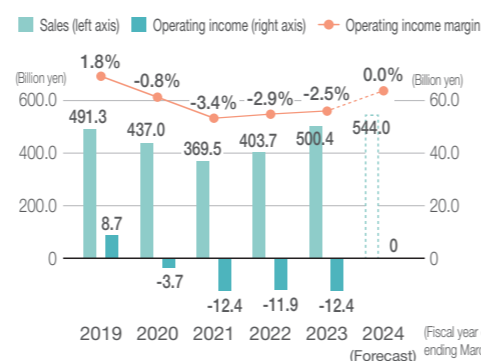
In order to promote a series of measures, negotiations with customers are essential. As I did before the COVID-19 pandemic, I will personally travel overseas to meet with customers to deepen my understanding of this issue. Return to profitability at all costs through continuously implementing a series of measures. I know it is my responsibility.

Results for the fiscal year ended March 31, 2023 and forecast for the fiscal year ending March 31, 2024

For the fiscal year ended March 31, 2023, net sales were 500.4 billion yen due to a gradual recovery in automobile production and the impact of passing on inflationary costs to selling prices, although semiconductor supply shortages continue. However, in addition to soaring energy and procurement material costs globally, sales in the China region fell more than 50% below expectations due to the disruption caused by the zero-COVID-19 policy and the termination of the passenger car purchase tax reduction program, resulting in a significant decline in operating income of -12.4 billion yen.

Although the outlook for sales in the fiscal year ending March 31, 2024 remains uncertain, we expect sales to increase as the supply shortage of semiconductors gradually eases and automobile production is expected to recover as in the previous fiscal year. To improve profits, we will continue to thoroughly implement price revisions, including withdrawal from unprofitable businesses, as well as 100% price shifting of inflationary costs, including those carried over from the previous fiscal year. Furthermore, we will accelerate procurement reforms and expand our procurement network, especially in emerging countries, while ensuring quality.

Business performance



“DRIVE NTN100” Phase 2 strategy

Initiatives to be focused on during the three-year period (From the fiscal year ended March 31, 2022 to the fiscal year ending March 31, 2024)

1 Strengthen the profit structure

- Promote variable cost reduction through procurement reformation
- Reduce manufacturing fixed cost by reforming Monozukuri and improving productivity
- Reduce fixed cost by utilizing RPAs and improving the organizational structure and systems
- Thorough selling price management, reduction and withdrawal from unprofitable areas (regions and products)

2 Optimize portfolio to support sustainable growth

- Develop high performance and high value-added products responding to the environment, EVs, and electrification
- Expand sales of electrification products
- Order winning activities aimed at portfolio optimization and concentrated investment in focus segments

	2020	2021-2023	2024-	Estimated effects of EV/electrification
	Promote earning improvement NOT relying on the merit of scale		Strategy for sustainable growth	
Basic products	Driveshafts (CVJ) 	Deepen production reforms (streamlining) under way in Japan Horizontal expansion of production reforms to global manufacturing bases Concentrated investment in high-performance products and automation	Shift to large-sized SUV/PUP and EVs Secure volume in growth markets Advantage Small, lightweight, high efficiency, low vibration	No effects, stable growth
	Axle / hub bearings 	Carefully select capital investments that are directly linked to differentiation and competitiveness Devote energy into enhancing cost-competitiveness with a focus on variable cost Develop differentiated products complying with regulations for EVs, fuel efficiency and CO ₂	Develop differentiated high value-added products Realign portfolio based on customers and vehicle segments Advantage Super low friction	No effects, stable growth
	Bearings 	Strengthen sales activities especially for high-performance applications especially in Japan and China Focus on enhancing production capacity and cost competitiveness Promote use of external partners on production of standard type products	Invest resources in high performance bearings through the selection Advantage Super high speed, ultra-low friction	Flat sales, Toward high performance products
New areas (Electrification)		Increase production of gearboxes for electric hydraulic brakes Promote cost reduction (Shorten assembly CT / Promote production in China / Use Chinese materials) Develop new products for integrated electrical modules	Expand sales of electric oil pumps Commercialize eHUB/ sHUB Commercialize electric brakes	Increase volume Grow together

TOPICS

We have been shifting our sales to BEVs and large SUVs, where we can take advantage of the technological superiority of our products, and our activities are beginning to bear fruit.

(1) Started mass production of highly efficient fixed type constant velocity joint “CFJ”

With stricter CO₂ regulations and the rapid shift to BEVs, we have begun mass production of high-efficiency fixed constant velocity joints (CFJs), which contribute significantly to reducing vehicle CO₂ emissions and improving electricity costs.



(2) Expand sales of compact and lightweight “R series” driveshafts for rear end

The “R Series” is the world’s smallest and lightest rear CVJ product, with a 30% weight reduction and a 3 to 5% reduction in outer ring outer diameter compared to conventional products. Since the start of mass production in 2018, sales have steadily increased, and this year, the adoption of BEVs for European premium brands is expanding.



(3) Started mass production of “3rd Generation Tapered Roller Hub Bearings”

Mass production of the third generation tapered roller hub bearing with integrated hub shaft and inner ring for front wheels of commercial vehicles for Europe, which combines high rigidity and light weight.

(4) Started mass production of driveshafts and hub bearings for BEVs of Japanese automobile manufacturers

Mass production of driveshafts and hub bearings for flagship BEVs of several Japanese automakers has started in Japan and overseas.

(5) Development of various solution bearings for e-Axle

High-speed rotating bearing dmn value*2.2 million achieved

Our high-speed deep groove ball bearings for e-Axle have achieved a high-speed rotation dmn value* of 2.2 million under oil lubrication.

*dmn value: An index of bearing rotational performance; bearing pitch circle diameter (mm) x rotational speed (min⁻¹)

CreepLess Bearing Development

For e-Axle, which is becoming smaller and lighter, we have developed a creep-less bearing that uses the industry’s first method to stop progressive wave type creep generated by outer ring distortion.

Development of bearings with insulating coatings

By applying an insulating coating to the outer ring outer diameter and width surface of the bearing, we have developed a bearing with an insulating coating that can withstand voltages of 100 V or more, thereby suppressing the occurrence of electrical corrosion and making it suitable for 800 V batteries.