

The Future of the Automotive Society and Tires

How will the automotive society, the performance required of tires and their roles change due to the widespread adoption of electric vehicles (EVs)? We invited Mr. Tadashi Tateuchi, who has been dedicated to the development of EVs in Japan for around three decades, as a guest to speak with YOKOHAMA's chief tire technical officer.

YOKOHAMA's Initiatives Related to the Environmental Performance of Tires

Tateuchi I think YOKOHAMA began pursuing environmental initiatives quite early on compared with tire manufacturers in Japan and abroad. The Japan EV Club was established in 1994. We have received support for many years up to this point for annual events such as the Japan EV Festival, a major EV racing event, since 1995, and the Japan EV Rally Hakuba in Hakuba village in Nagano Prefecture since 2014.



20th Japan EV Festival (2014)
(Photo courtesy of Japan Electric Vehicle Club, Photographer: Yasushi Miura)



Mr. Tadashi Tateuchi

Managing Director of Japan Electric Vehicle Club and Motor Journalist

Seimiya At YOKOHAMA, we have embraced the idea of pursuing environmental performance ahead of the times as a key concept and launched the DNA Project in 1996 to develop a new core tire that would lead to improved fuel efficiency and reduce CO₂ emissions. This was right about when the Japan Electric Vehicle Club was beginning its activities.

At the time, we had long been focused on reducing tires' roll resistance without compromising their gripping force. The year 1998 saw the release of the DNA series, Japan's first fuel-efficient tire which brought those two conflicting properties into balance.

Tateuchi What particularly impressed me was the 2001 Electric Charging Journey made using an EV-A class. For around half a year, we charged 621 times and managed to drive around Japan. We also received support from YOKOHAMA engineers and achieved the feat after a process of trial and error.



3rd Japan EV Really 2016 Hakuba - Norikura - Takayama (Norikura Skyline)
(Photo courtesy of Japan Electric Vehicle Club, Photographer: Yasushi Miura)

Seimiya It was the DNA dB tires that were fitted on the EV-A class. YOKOHAMA has continued to promote technological development for EVs based on the themes of harmony between the joy of driving and the environment, and R&D into tires for EVs.

Shinji Seimiya

Member of the Board and Officer, Chief Technical Officer, in charge of Corporate Quality Assurance Div., Head of Tire Development Div.



In 2013, we developed the AERO-Y EV concept car and unveiled it at Tokyo Auto Salon 2013 with NAPAC. It was produced out of a desire to employ eco-friendly technologies in every aspect while offering the joy of intuitive driving to advance the growth of EV motorization. During the development process, we concentrated on reducing air resistance and adopted tire and body designs based on aerodynamics. We also combined the latest technologies from various departments that had been cultivated through the development of aerospace components and other products.

Tateuchi That year we took on the challenge of driving an EV around Japan only using rapid charging. It had been said that EVs will never take off because there is not a rapid charging infrastructure in place, but over the course of around two months, we covered a distance of 8,160 km with a cruising range of 80 km. This time we once again embarked on the journey with a vehicle fitted with YOKOHAMA's eco tires.

Seimiya Up until around 20 years ago, the major development themes concerning the environmental performance of tires were roll resistance and lighter weight, but now all kinds of performance metrics need to be met. The features offered by a tire don't change dramatically just because it is equipped on an EV, but the level of requirements connected with fuel economy (cruising range) have gotten very high. Also, since EVs characteristically generate a lot of torque, the tires need to exhibit sufficient abrasion resistance to withstand those forces. There are also requirements for quietness so that the quiet running sound of an EV is not disturbed.

Tateuchi Generally speaking, the issue of global warming gained attention in Japan following COP3 (Third Conference of the Parties to the UN Framework Convention on Climate Change) held in Kyoto in 1998, but around this time YOKOHAMA was already pursuing

R&D into improved fuel economic and low CO₂ emissions, including the structure of the tires and the materials used in them. The insights accumulated during that time are connected with the products we have today.

Seimiya Now DNA has been inherited by the BluEarth brand, and we are achieving even more improved environmental performance. Recently, we have also been promoting tire development in cooperation with raw material manufacturers to increase the percentage of renewable or recycled raw materials used in our products.

The Bond of Motorsports Bringing Us Together

Seimiya I think the reason we have had such a good cooperative relationship over many years is because motorsports is rooted in our efforts. I of course love to drive, and I always wanted to learn about EVs while test driving them around a circuit. I think those things are what made us a good match.

Tateuchi I'm happy to hear that. Only your company would say something like that. In fact, my first encounter with YOKOHAMA dates back to the 1970s. At the time I was involved with the design of racing cars, and since our team was going to enter F2, YOKOHAMA provided the racing tires. That was the beginning of my relationship with YOKOHAMA. This was around the time that ADVAN was coming on the scene with a lot of momentum.

It's no exaggeration to say that motorsports are the lifeblood of cars. It was my starting point. In addition, there is huge potential in cars that can be charged with electricity to drive. By organizing races with EVs, we can improve EV recognition and communicate their potential to even more people. Driving, competing and having fun are at the heart of motorsports, and I believe they fulfill an important role in people's lives.

Seimiya In the world of formula car racing, we have launched the SUPER FORMULA NEXT50 project to build a sustainable motorsports industry. Toward the goal of increasing the percentage of renewable raw materials used, YOKOHAMA is also taking on various challenges as it goes through these steps. Demonstration testing in the world of speeds exceeding 300 km/h is extremely valuable, and I think it plays a big part in moving technological development forward.

In the future, rather than testing existing things to take them to the next level, I feel that we need to discover entirely new things through motorsports. Of course, there is the problem of cost barriers to feeding those technologies back into commercial tires, but I hope the different teams can share their wisdom with each other.

Tateuchi I'm very glad that the people developing tires understand the essence of motorsports. I'm certain the tires YOKOHAMA has developed will save the world.



BluEarth brand

How Autonomous Driving and Car Sharing May Change the Role of Tires

Tateuchi In future society, I don't think the phenomenon of vehicles driving through town will change that much, but due to autonomous driving, I think the concept of operating a vehicle may change. I also think the concept of owning a car may change due to car sharing. The terms "driving" and "family car" could become things of the past. Under such circumstances, can you imagine how tires may change?

Seimiya If autonomous driving and car sharing become widely adopted, I think tires for passenger vehicles will shift to being used like commercial tires in a sense. The elements of enjoyment with respect to tires would be reduced, but on the other hand, there would be needs for maintenance-free operation and sensing technologies, and that could lead to the development of tires based on data that has never been available until now. However, I still think there will continue to be users who own cars and who want to savor the joy of driving.

Tateuchi Those who operate vehicles in the future may be part of a privileged class. Those who drive on circuits could be a class of particularly lucky people. My personal view is that a society that loses the desire to move around will end in ruin. I think we must not lose the sense of excitement that comes from moving around.

Even so, tires will continue to be an integral component of vehicles. I believe that no matter how much cars change, shock absorbers, brakes and tires will be the three aspects that survive.

Seimiya In terms of commercial tires, even in the world of trucks and buses, the shift to EVs has advanced, and commercial tires will continue to change to respond to needs for improved fuel economy and environmental performance.

Expectations of YOKOHAMA

Seimiya Due to the COVID-19 pandemic, YOKOHAMA has also introduced remote work practices, but when it comes to manufacturing, it is important to see, touch and experience things in the field, and I think it is important to find a balance in working styles.

Tateuchi There's nothing like touching a car or tires. In the Let's Drive Electric Formula Cars!, EV classes for junior high school students run by the Japan Electric Vehicle Club, we disassemble and assemble two-passenger electric formula cars and test drive them on a circuit as part of hands-on classes. There are high barriers to doing this with an engine-powered car, but motor-driven cars are comparatively simple. How does YOKOHAMA feel about creating a sports EV?



EV SIDE by SIDE, two-passenger electric formula car (2007 / Vehicle created in EV class for junior high school students)
(Photo courtesy of Japan Electric Vehicle Club, Photographer: Yasushi Miura)

Seimiya You mean creating a production car rather than a concept car?

Tateuchi The only manufacturer I know that is this passionate about energy and environmental issues related to cars is YOKOHAMA. In the future, it will be possible to create EVs without a factory, even for companies that are not traditional auto makers. By developing a sports EV equipped with ultra-high performance eco tires, you could challenge the eco-car category at the 24 Hours of Le Mans. I think it could spark dreams and courage in many children.

Seimiya So you're saying we should be looking that far ahead in our work. As someone involved with cars, I feel that there is a great deal of potential in EVs, so that prospect is something I want to think positively about.



Research & Development

Yokohama Rubber engages in multi-faceted and comprehensive research and development activities from material design to product design, testing and evaluation along the themes of ingenuity, application and greater sophistication of technologies, and has pursued the possibilities of various technologies and products, including rubber polymer technologies.

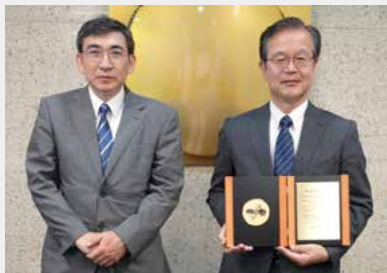
In the development of tires, which play a vital role in safeguarding people's lives, we always adopt a "people" perspective and engage in diligent research that accounts for every aspect, including safety, drivability and comfort. An enormous volume of data is obtained from testing facilities maintained by Yokohama including the Daigo Proving-ground and Research Center (D-PARC) comprehensive tire test course, Tire Test Center of Asia, the Tire Test Center of Hokkaido course for WINTER tires, and the Yokohama Test Center of Sweden. This data is instantly transmitted to the Research and Development Integrated Center (RADIC) within the Hiratsuka Factory located in Hiratsuka City, Kanagawa Prefecture, where it is used to improve tire performance and develop next-generation tires. In addition, outside the field of tires we use innovative ideas unconstrained by conventional thinking and cutting-edge technologies to pursue the development of new materials and the design of products with a view toward the next generation.



Major R&D Achievements of Recent Years

Winning an Award from the Society of Rubber Science and Technology, Japan (SRIJ) for Research and Development of Rubber Materials Using Sustainable Resources

In May 2022, two engineers from Yokohama won the 34th SRIJ Award from the Society of Rubber Science and Technology, Japan for research and development of rubber materials using sustainable resources. The research resulted from the Ultra High-Throughput Design and Prototyping Technology for Ultra Advanced Materials Development Project organized by the New Energy and Industrial Technology Development Organization (NEDO). In January 2022, the research was adopted under Development of Technology for Manufacturing Plastic Raw Materials Using CO₂, a Green Innovation Fund Project and development of the technology is ongoing.

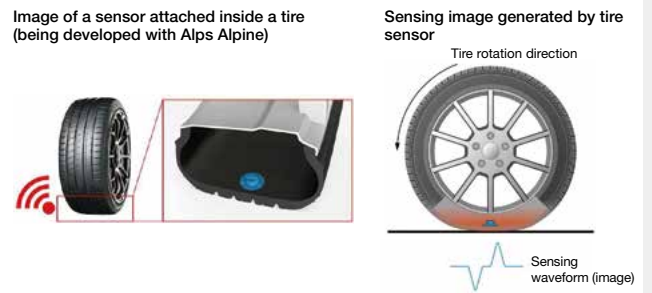


Hiromu Saito, President of SRIJ (professor of Tokyo University of Agriculture and Technology; pictured left) presents the commendation plaque to Yokohama employee Misao Hiza

Development of a New Technology to Estimate the State of Wear Based on In-Tire Sensing Waveforms

In April 2022, we developed a new technology that detects the state of wear in a tire based on sensing waveforms in the tire while running. Visualizing the state of wear in a tire enables tire maintenance that takes into account safety, economy and the need to reduce environmental impact. The technology works by taking sensing waveforms obtained from a sensor affixed to the inner surface of the tire that was jointly developed with Alps Alpine Co., Ltd. and performing analysis using proprietary signal processing technologies.

In February 2021, Yokohama announced its SensorTire Technology Vision, its medium- and long-term technological development vision, and has conducted practical testing with various industries as a part of those activities.



Motorsports Activities

Yokohama takes part in a wide range of motorsports including races and rallies. We supply competition tires in Japan and overseas and have achieved spectacular results and outstanding achievements in each motorsport category.

For example, YOKOHAMA tires have been fitted on both Toyota and Nissan entries in the SUPER GT GT500, we have competed in the Nürburgring 24 Hours with the Walkenhorst Motorsport BMW customer racing team, and in off-road racing we have competed in series held in North America and Asia in efforts to strengthen the ADVAN and GEOLANDAR brands.

These activities play a significant role in the development of high-performance consumer tires and in the development of technologies for future tires. Motorsports are truly a spectacular proving ground for tire development.



Circular Economy Initiatives Pursued through Participation in Motorsports

Development of Racing Tires Utilizing Sustainable Materials for the Japanese SUPER FORMULA Championship

Yokohama has been the supplier of the control tire for the Japanese SUPER FORMULA Championship series since 2016. For the 2023 series, Yokohama is pursuing development of a racing tire that uses sustainable materials. The newly developed tire utilizes naturally derived formulations such as silica produced from rice hulls and oil produced from oil palm fruit and orange peel, and also reuses rubber recycled from waste tires. By 2025, we aim for the percentage of sustainable materials used in our tires to be at least 35%.

Tires with Sustainable Specifications Used in Hill Climb Race in the US

At the 100th Pikes Peak International Hill Climb held in the United States in June 2022, the ADVAN A052 street sport tire which uses sustainable materials was used.

The rubber in the side walls of these tires, which undergo the most deformation during driving, have been switched to biomass-derived butadiene rubber from the conventional petroleum-derived butadiene rubber. Going forward, we will continue to accelerate the development of technologies that reduce environmental impact through actual participation in grueling hill climb races.



Racing tire under development that increases the percentage of sustainable materials used



An EV that competed in the race equipped with ADVAN A052 tires, which use sustainable materials



Biomass-derived butadiene rubber material

Consumer Tires Business Strategy



Our Strategy Is to Maximize the Percentage of High-Value-Added Products ADVAN, GEOLANDAR and WINTER Tires.

We aim to increase the percentage that our three major high-value-added product brands (ADVAN, GEOLANDAR and WINTER tires) account for from 40% in 2019 to 50% and are strengthening three initiatives to do so.

Takayoshi Omae General Manager, Head of Consumer Tire Product Planning Dept.

Key Measures

1	Expanding the fitting of ADVAN and GEOLANDAR on new vehicles	<ul style="list-style-type: none"> Promote the fitting of these tires on new premium cars, which appeals to strong brand power and technological capabilities, and produces high return effects in the replacement market.
2	Strengthening of return sales and update of products and sizes in the replacement market	<ul style="list-style-type: none"> Strengthen return sales in the replacement market for delivered vehicles. Expand the size lineup of products including WINTER tires.
3	Product and regional business strategy	<ul style="list-style-type: none"> Strengthen sales of products in line with market trends in each region. We will expand sales of high-value-added products that reflect the characteristics of each market, focusing on GEOLANDAR in North America, WINTER tires (studless tires) in Japan and ADVAN and WINTER tires in Europe.

Results in Fiscal 2021 and Future Measures (Challenges)

Results

In 2021, we strengthened sales of WINTER tires based on a “Winter Offensive” theme. In addition to WINTER tires, sales of ADVAN, GEOLANDAR and 18 inch plus size tires also grew, improving sales of AGW high-value-added products as a percentage of total sales.

- Japan: Release of iceGUARD 7 new studless tire for passenger vehicles
- Europe: Full rollout of BluEarth™ WINTER V906 European winter tires for passenger vehicles
- Europe: Release of BluEarth-Van All Season RY61, a new tire for commercial vans
- Europe and Japan: Expanded the range of sizes for BluEarth-4S AW21 all-season tire for passenger vehicles

Future Measures (Challenges)

In 2022, we will work to strengthen sales of summer tires with a focus on ADVAN based on a “Summer Offensive” theme.

- Worldwide: Release of the global flagship tire ADVAN Sport V107
- Japan and other countries: Release of the high-performance street sport tire ADVAN NEOVA AD09
- Japan and other countries: Release of the dedicated minivan fuel efficient tire BluEarth-RV RV03 and the dedicated compact minivan and Kei tall wagon fuel efficient tire BluEarth-RV RV03CK

Main Products and Results in Fiscal 2021 and Fiscal 2022

Three Priority Product Lines

ADVAN



GEOLANDAR

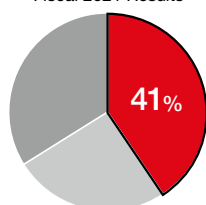


WINTER (iceGUARD etc.)



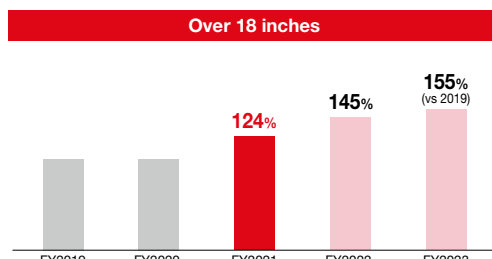
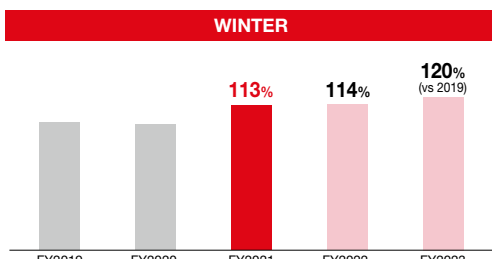
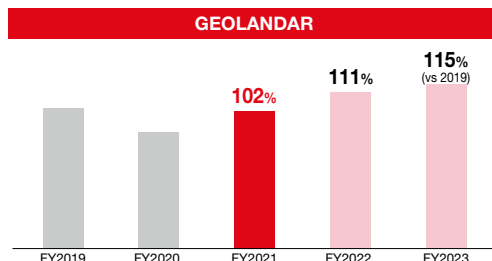
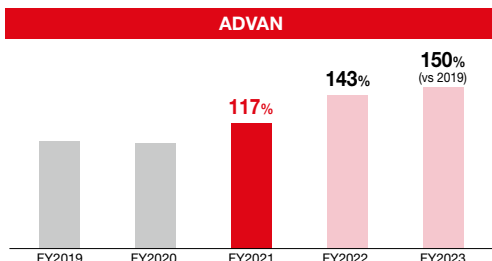
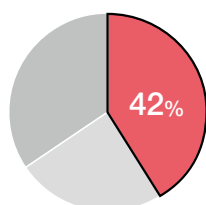
Sales Ratio of Flagship Products (Results for Fiscal 2021, Plans for Fiscal 2022 and Fiscal 2023)

AGW Sales Ratio
Fiscal 2021 Results



Up 1% compared with fiscal 2019

AGW Sales Ratio
Fiscal 2022 Plan



Equipping on New Premium Cars, SUVs and EVs

Premium Cars		(2021) BMW M3/M4: ADVAN Sport V107		(2022) BMW X5/X6: ADVAN Sport V107
SUVs		(2022) LEXUS LX: GEOLANDAR X-CV		(2021) TOYOTA LAND CRUISER: GEOLANDAR X-CV, GEOLANDAR A/T
EVs		(2022) Mercedes-AMG EQS 53 4MATIC +: ADVAN Sport V107		(2022) TOYOTA bZ4X: ADVAN V61

TOPICS

Release of iceGUARD 7 Studless Tire for Passenger Cars (2021)

Yokohama's 7th generation studless tire, iceGUARD 7, further improves the performance on ice that has consistently been pursued through the synergistic effects of a special newly developed pattern and ultra water-absorbing compound, and in addition to tire's well-established long-lasting effectiveness, performance on snow has also been improved. Performance on ice has been improved by 14%, and performance on snow has been increased by 3% compared with previous models.



iceGUARD 7
1370

* Performance data has been submitted to the Tire Fair Trade Council in Japan.

Release of the Global Flagship Tire ADVAN Sport V107 (2022)

Products target three premium car categories: premium high-performance cars, premium high-performance SUVs and premium EVs. We have refined our tires through joint development with car manufacturers as well as at the Nürburgring circuit, to be called the most unforgiving test course in the world. We have already begun delivery for new vehicles, with a focus on special models for premium cars including the Mercedes AMG and BMW M, and will use this as a base of development for the size expansion of replacement market.



ADVAN Sport V107

Release of the High-Performance Street Sport Tire ADVAN NEOVA AD09 (2022)

Based on the concept of producing the strongest ADVAN street sport tire with roots in motorsports and circuit driving, the latest iteration carries over the series' greatest feature of being "the fastest and most enjoyable," producing a street tire that offers the ultimate in dry grip, controllability and anti-wear performance. The external appearance has also been focused on for custom tuning, producing a stylish and highly original design.



ADVAN NEOVA AD09

Commercial Tires Business Strategy

TBR (Truck and Bus Tires) Business



Making YOKOHAMA TBR an Indispensable Product Line
We Provide High-Quality Products and Services that Reflect Customer Needs.

TBR is a product line expected to enjoy stable growth. We will focus on improving supply capabilities to meet growth in demand while promoting the provision of solutions that utilize unique digital technologies.

Mitsuyuki Yumoto Associate Officer, Head of TBR Tire Div.

Key Measures

1	Providing solutions through unique digital technologies	<ul style="list-style-type: none"> • Solving customer issues through the expanded provision of the Tire Management System (TMS) that was revamped in 2020 • Providing support for tire inspections using unique digital technologies to address the issues of safety, cost and labor shortages facing the transportation industry
2	Actively releasing new products to the market	<ul style="list-style-type: none"> • Continue to launch low fuel consumption tires with the best levels of low rolling resistance in the industry in domestic and overseas markets • Continue to double the number of new products launched for each categories in three regions: Japan, North America and Europe
3	Developing supply capabilities to meet vigorous demand	<ul style="list-style-type: none"> • We will continue to expand supply volume from overseas plants to serve the North American and European markets, which are experiencing pronounced growth in demand. • At plants in Japan, we will also invest in increased production for categories experiencing growth in demand.

Results in Fiscal 2021 and Future Measures (Challenges)

Results

- Sales in Japan and overseas grew at an annual rate of over 8%, turning the business into one that can be profitable alongside growth.
- Through TMS, the number of vehicles undergoing tire inspections increased by over 300% year on year, showing success in resolving customer issues.
- For the domestic market, the new flagship Comprehensive Performance-centric Studless Tire 904W was released.

Future Measures (Challenges)

- We will maximize supply volume at existing plants in Japan and overseas using existing facilities, and also make investments in increased production based on rising demand.
- We will further incorporate the latest technologies such as AI and continue to make improvements to the tools for tire inspections through TMS.
- We will continue to release large-scaled products featuring studless design, fuel efficiency and high load resistance.

Major Commercial Tire Products



BluEarth 711L

BluEarth 711L fuel efficiency and performance-oriented all-season tire for trucks



Tire inspections through TMS



Tires for construction and industrial vehicles and agricultural and forestry machinery

Off-Highway Tire Division



Leading Company's Growth as Key Revenue and Profit Driver

We have consistently grown by around 10% annually in Off-Highway Tire (OHT) after ATG acquisition in 2016. We are aiming to lead company's future growth continuously through our entrepreneurial culture, superior products and cost competitiveness.

Nitin Mantri Member of the Board, Managing Officer, Head of OHT Div.

Key Measures

1	Continue high growth	<ul style="list-style-type: none"> • Adding OHT production capacity (Early launch of new Visakhapatnam plant in India) • Strengthen customer relationships
2	Continuous quality improvement	<ul style="list-style-type: none"> • Design quality (Review product planning and design process) • Production quality (Upgrade production machinery and implement various improvement initiatives) • Perceived quality (Improve product appearance etc.)
3	Business synergy realization	<ul style="list-style-type: none"> • Multi-brand / multi channel strategy • Move to the top of the value brands

Results in Fiscal 2021 and Future Measures (Challenges)

Results

- Despite COVID-19 second wave in India where we have major production facilities, raw material cost increase and logistics disruption, we set new records for both sales and profit
- Integrated Yokohama's OHT business, ATG and Aichi tire under the name of Yokohama Off-Highway Tires

Future Measures (Challenges)

- Speedy production capacity increase to respond strong OHT demand
- Developing unique products to respond various customer needs and bringing into the market
- Response to raw material cost increase and logistics disruption
- Reaping synergies from OHT business integration

TOPIC

Acquisition of the Wheel Systems Business Producing and Selling Tires and Other Products for Agricultural Machinery and Industrial Vehicles from Trelleborg

In March 2022, we signed a share purchase agreement with Swedish company Trelleborg AB to acquire all of the shares it held in the Swedish company Trelleborg Wheel Systems Holding AB (TWS).

TWS operates a business manufacturing and selling tires and other products for agricultural machinery and industrial vehicles. At the time of the acquisition, TWS is estimated to have had a corporate value of 2.04 billion euros (approx. 265.2 billion yen at an exchange rate of 1 euro: 130 yen, using the performance-based earn-out method), with an EBITDA multiple of approximately 9x. The acquisition is expected to be completed in the second half of 2022.



Tire Production Strategy



Supporting Our Product and Regional Business Strategies and Efforts to Maximize the Ratio of High-Value-Added Products, We Will Build a Production and Logistics System that Is Resilient Against Environmental Changes and Fluctuations in Orders.

To supply good quality products at a low cost and in a timely fashion to customers in each region, we will exploit our strength in the multi-product lot production system while innovating production efficiency with the use of digital technologies such as IoT and AI and automation to supply highly competitive products worldwide.

Toru Nakamura Head of Tire Production Div., Member of the Board and Officer

Key Measures

1	Maximizing production of high-value-added products ADVAN, GEOLANDAR and WINTER tires	<ul style="list-style-type: none"> • Exploit our strength in the multi-product lot production system. • Minimize limitation on production integration constraints (capital investment).
2	Building a global production system in line with regional business strategies	<ul style="list-style-type: none"> • Fully utilize the capabilities of plants in each location around the world to develop local production for local consumption. • Maximize domestic production capabilities and shift to high-value-added products. • Ensure stable production at the Mississippi TBR plant.
3	Promoting the digitization (IoT / AI) of manufacturing	<ul style="list-style-type: none"> • Visualize operations and streamline improvements in the field, thoroughly eliminate waste and promote effective improvements and automation.
4	CSR management (plant operation)	<ul style="list-style-type: none"> • Promote global education and accept foreign technical interns. • Promote social contribution activities and carbon neutrality.

Results in Fiscal 2021 and Future Measures (Challenges)

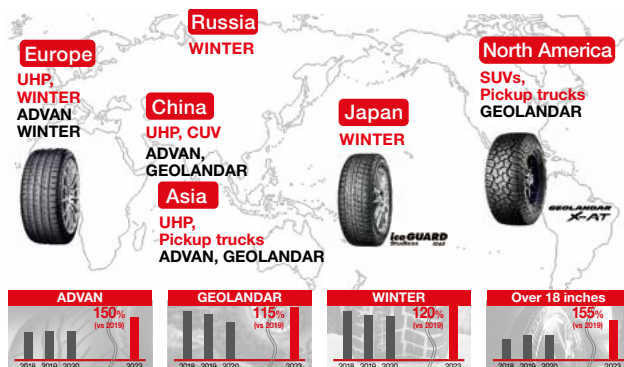
Results

- We maintained operations under the COVID-19 pandemic and logistics disruptions, achieving total target production volume.
- Amid restrictions on movement, we strengthened operations on-site at our domestic plants and made specific improvements (capital investment) to the size mix of high-value-added products.
- We responded to sharply rising raw material and energy costs, and achieved a record scrap ratio (down 23% year on year) by cutting down on material costs and reducing scrap produced from defects. Waste production and energy consumption was significantly reduced.

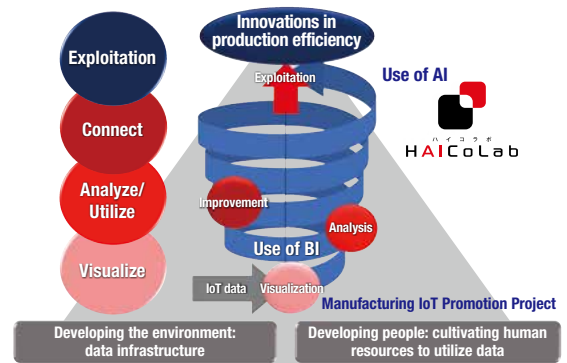
Future Measures (Challenges)

- We will maximize production capabilities at domestic plants and further promote the shift to high-value-added products.
- We will roll out the IoT/BI model established domestically to overseas plants in phases. Using this technology, we will reduce scrap produced from defects (industrial waste) even more thoroughly and promote reduced energy usage, analyze trouble and work to streamline and speed up development work and other operations to innovate operations.
- We will launch a plan aimed at achieving complete carbon neutrality at a model plant (Shinshiro-Minami Plant).

Product and Regional Business Strategies (Consumer Tires)



Developing Infrastructure for the Utilization of Manufacturing Data and Fostering a Data-Driven Culture



MB (Multiple Business) Business Strategy



Shift Portfolio to Products with Highly Stable Earnings and Strong Growth Potential.

Based on the strategy of shifting the portfolio to products with highly stable earnings and strong growth potential declared in the YX2023 Medium-Term Management Plan, we will drive the growth of the MB business and establish a structure that can ensure stable earnings by concentrating resources in the Hose and Couplings business and Industrial Products business.

Yasuo Nakayama Head of MB Div., Member of the Board and Officer

Key Measures

1	Hose and Couplings	<ul style="list-style-type: none"> Hydraulic hoses: Further expand market presence. Automotive hoses: Drive growth with new technologies in response to CASE. Strengthen efforts toward a hydrogen-based society (hydrogen dispenser hoses).
2	Industrial Products	<ul style="list-style-type: none"> Conveyor belts: Establish a dominant presence in core-strength markets. Marine products: Maintain high market share and strengthen production bases.
3	Aerospace Products	<ul style="list-style-type: none"> Decisively implement structural reforms that reflect the business environment.

Results in Fiscal 2021 and Future Measures (Challenges)

Results

Hose and Couplings

- To cater to brisk demand for hydraulic hoses in the Chinese market, we decided to invest in increased production at production sites in China.
- Sales of hydraulic hoses mainly for construction machinery were strong.
- We succeeded in significantly reducing the weight of automotive air conditioning hoses with the use of rubber and resin polymer alloys.

Industrial Products

- We released the Flame GUARD Super 100 flame retardant conveyor belt with high temperature heat resistance.
- Conveyor belt got increased sales due to the strengthening of domestic sales.

Aerospace Products

- The contract with Boeing to supply water tanks for drinking water was renewed.

Hamatite

- Transfer of the Hamatite business to the Sika Group was completed in November 2021.

Future Measures (Challenges)

Hose and Couplings

- We decided to invest in increased production at the Ibaraki Plant to swiftly respond to further increases in demand for hydraulic hoses.
- We have restructured the production system for the automotive hose business in the United States and Mexico.

Industrial Products

- To respond to the changing market environment, we decided to increase production capacity for conveyor belts at the Hiratsuka Factory.
- We began field demonstration tests of sensing systems to be installed in conveyor belts and marine hoses.

Aerospace Products

- With the aim of securing stable earnings, this has been integrated with the Industrial Products Div., which is highly compatible in terms of technology and skills, and we are striving to create synergies.

Major Products of the MB Business



Hydraulic hoses fitted to construction machinery



Conveyor belts that demonstrate exceptional heat resistance performance and durability



Marine hoses for oil transportation



Water tanks installed in commercial aircraft

PRGR (Pro Gear) Business Strategy



We Provide Excellent Products and Services Grounded in a Customer Perspective so that People Can Experience the Fun and Joy of Golf.

To provide excellent products and services, we will strengthen marketing, explore new technologies and pursue business activities based on transparent health and safety and compliance, aiming to sustainably enhance corporate value to create a prosperous society.

Hiroyoshi Hibino President of PRGR Co., Ltd.

Key Measures

1	Building a product lineup and enhancing product power	<ul style="list-style-type: none"> • Building a product lineup that matches respective user needs domestically and overseas • Exploring user needs and achieving the required performance in products
2	Marketing activities	<ul style="list-style-type: none"> • Strengthening promotion and services utilizing digital technologies • Expanding and enhancing unique services at directly operated stores and utilizing test hitting data in product planning and development
3	Improving profitability	<ul style="list-style-type: none"> • Ongoing business cost optimization • Optimization of the number of products rolled out and inventory turnover rate • Improvements to fixed production costs and SG&A expenses through activities to eliminate waste

Major New Products



RS JUST Series: Released in July 2022 for Athlete Golfers

Innovative design that pushes the limits and the 4-point concentrated face for higher initial velocity and optimum amount of spin achieves even further ball flight distance.

Lineup:
Drivers (three types),
Fairways (3W, 5W, 7W),
Utilities (#3, #4, #5)



PRGR IRONS Series: Phased Release from August 2020 to March 2022 for Athlete to Average Golfers

The PRGR IRONS series thoroughly pursues the ease of stance, hitting feel, distance performance, controllability and forgiveness required of irons for each targeted golfer.

Released Models:
00, 01, 02, 03, 05



LS Series: Released in June 2021 for Average Golfers

At the head speed generated by average golfers (average 40 m/s), balls travel further due to a higher initial velocity from the precise design, and optimized amount of ball spin and hitting angle.

Lineup:
Driver, Fairways (3W, 5W),
Utilities (#4, #5)



SWEEP Series: Released in May 2022 for Female Golfers

Due to a club design developed especially for women, at the head speed generated by female golfers (average of 30 m/s), the ball can be hit gently and achieve greater distance.

Lineup:
Driver, Fairways (4W, 7W),
Utilities (#5, #6), Iron Set, Putter

Digital Strategy



To Enhance Our Corporate Value, We Will Drive Enhanced Customer Value, Sustainable Process Innovation and Reforms to Corporate Culture Aimed at Further Growth with the Use of Digital Technologies.

Based on the HAICoLaB* data utilization framework, we will make use of digital technologies to reform processes and strengthen competitiveness as “Exploitation,” and expand services, promote work style reforms and drive a transformation aimed at sustainable growth as “Exploration.”

* A coined term based on “Humans and AI collaborate for digital innovation,” which also implies a joint research laboratory made up of people and AI (data/digital).

Masaki Nakamura Associate Officer, Head of IT & Management System Planning Div.

Key Measures

1	Exploitation: Process reforms to improve competitiveness	<ul style="list-style-type: none"> Digital technology transfer and greater sophistication in product development, and expansion of production improvement activities through the digitalization of manufacturing Streamlining and labor saving through the promotion of logistics DX and structural reforms to domestic sales
2	Exploration: Creating customer value (services)	<ul style="list-style-type: none"> Utilizing the expertise cultivated with TMS to streamline tire inspections and expand unique inspection services utilizing big data Providing the information gained through demonstration testing to drivers and various business operators, sustainably contributing to safe and secure driving
3	Promoting work style reforms	<ul style="list-style-type: none"> Taking advantage of the relocation of the head office to develop an environment that facilitates swift decision making and enables individuals and the organization to fully demonstrate their potential Improving productivity and achieving a shift to value creation through automation, streamlining and more in-depth communication

Results in Fiscal 2021 and Future Measures (Challenges)

Results

- We have independently developed a compound development and tire development system equipped with an AI engine and begun its practical application in tire design.
- We have started to collect and analyze data from production equipment using IoT as part of process improvement efforts.
- We have accumulated data from the demonstration testing of TMS and TPRS and are promoting utilization of the data for new solutions.
- We have boosted productivity through RPA, workflow development, paper reduction and other initiatives, and are promoting the shift to working styles that utilize digital technologies.

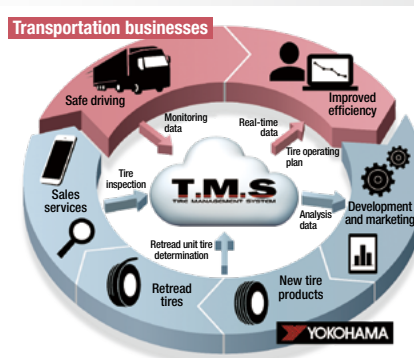
Future Measures (Challenges)

- By rollout out warehouse management systems across the organization, we will achieve traceability throughout the domestic supply chain by 2023.
- We will create new product value by making use of digital technologies such as AI and IoT, while working to increase the speed and reduce the costs of development.
- Based on the results obtained from demonstration testing, we will work to establish business models that contribute to safety and economy and strive to expand and enhance our services.
- To coincide with the relocation of the head office, we will promote swift decision making and accommodate satellite office and home office schemes.

TOPIC

TMS Tire Management System

Since the TMS service was launched in 2003, it has been utilized by 3,000 companies for a total of 30,000 vehicles as of June 2022. Due to environmental changes in the transportation industry (labor-saving action, etc.), the number of customers using the service has increased. Regular improvements are made to ensure swift and accurate inspections, and this has also enabled suggestions for tire utilization based on data accumulated by Yokohama over many years. The data can be utilized not only to facilitate safe driving and optimize costs but also for measures to address environmental issues.



Message from the Chief Financial Officer



Yokohama Achieved Record Highs in Both Sales and Profit.

The Yokohama Rubber Group has made steady progress towards achieving the targets laid out in the Yokohama Transformation 2023 (YX2023) Medium-Term Management Plan.

Gota Matsuo Member of the Board and Managing Officer

Chief Financial Officer, Head of Corporate Administration Div., in charge of Corporate Finance & Accounting Dept., Head of CSR Div., in charge of IT & Management System Planning Div., President of Yokohamagomu Finance Co., Ltd., in charge of PRGR

Record highs were achieved in every metric. Sales revenue for the Yokohama Group in fiscal 2021 on an ongoing business basis excluding the Hamatite business* was ¥670,809 million (an increase of 21.7% year on year). On the profit front, business profit stood at ¥62,162 million (up 73.3%), with operating profit of ¥83,636 million (up 132.4%) in part from recording a gain on the transfer of the head office building. Profit attributable to owners of parent amounted to ¥65,500 million (a 148.9% year-on-year increase). Our core tire business was impacted by various factors including sharply rising raw material prices and logistics expenses, disruptions to international logistics networks and the COVID-19 pandemic, but both sales and profit increased due to price hikes taking root mainly in North America, and the continuing weakening of the Japanese yen.

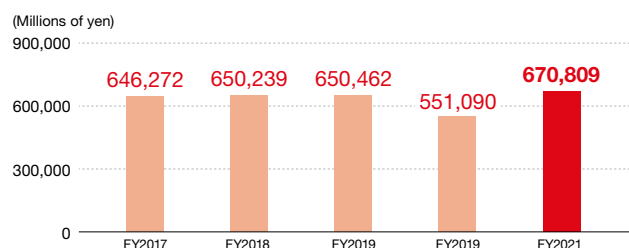
* Due to the signing of an agreement with the Swiss-based Sika AG on the transfer of the Hamatite business on April 28, 2021, the Hamatite business was classified as a discontinued operation, and the reclassification was also made retroactively for the same period of the previous year. The transfer of the Hamatite business was completed in accordance with the above agreement on November 1, 2021.

Financial & Non-Financial Highlights

Financial Highlights

Sales Revenue

¥ **670,809** million



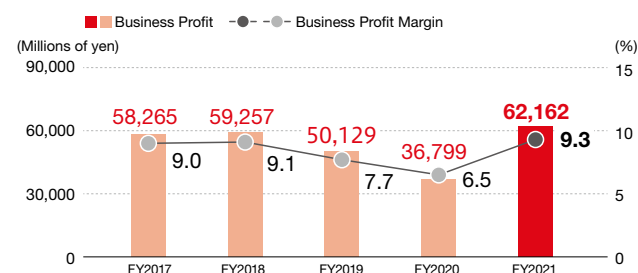
Sales revenue increased 21.7% year on year to ¥670,809 million, reflecting price hikes taking root in the tire business primarily in North America, and the ongoing depreciation of the yen.

Business Profit

¥ **62,162** million

Business Profit Margin

9.3 %



Business profit increased 68.9% year on year to ¥62,162 million, in part reflecting a gain on the transfer of the head office building, in addition to growth in overseas tire sales. The business profit margin rose 2.8 points year on year to 9.3%.