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Since we began implementation of our GD100 medium-term business plan in fiscal 2006, we have been working towards the achievement of clear, specific goals in the run-up to the 100th anniversary of the founding of Yokohama Rubber in 2017. I feel that we have been successful at coming up with ideas to further the realization of our objectives, and then getting everyone at Yokohama Rubber working together as one to put these ideas into practice. Both in our company and in society as a whole, it is important to “pass on the baton” to the next generation; over the past 12 years, we have been constantly thinking about how we can pass on the baton in the best possible way.

In our CSR activities, rather than merely seeking to fulfil our corporate responsibilities to society, we have adopted an approach that emphasizes building ourselves into a company that is trusted by society. Instead of focusing only on short-term profitability, we have concentrated on earning the trust of a wide range of different stakeholders. At the same time, I believe that maintaining a constant awareness of the importance of Environmental, Social and corporate Governance (ESG), which has become a major focus of attention in recent years, will help us to stay on the right path. Today, as we look ahead to our company's 100th anniversary, we need to start thinking in terms of what society will look like in 2050, or 100 years from now. Regardless of how society changes, I firmly believe that, if we continue to strive for steady, healthy growth, then we can be sure of keeping society's trust.

As I see it, Yokohama Rubber's biggest strength lies in our corporate culture, with its emphasis on freedom. By making maximum use of our corporate culture, which encourages employees to think freely for themselves and to make their views known, we can continue to respond effectively to the rapid pace of change in technology, and the rapidly changing social environment, which Industry 4.0 embodies. I believe that, as we continue to respond to change, we need to aim at becoming a truly “global enterprise” that is able to successfully develop localized business operations throughout the world.

To realize this vision, it is vitally important for all employees to demonstrate “thoughtfulness,” in terms of thinking not just about themselves, but about how they can be of use to, and make a positive contribution towards, other people and society as a whole. I sincerely hope that the new generation that will be carrying Yokohama Rubber into the future will approach their work with this kind of “thoughtfulness.”



Tadanobu Nagumo
Chairman and Representative Member of the Board

Yokohama Rubber's Value Creation Story

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Medium-range Management Plan Grand Design (GD100)

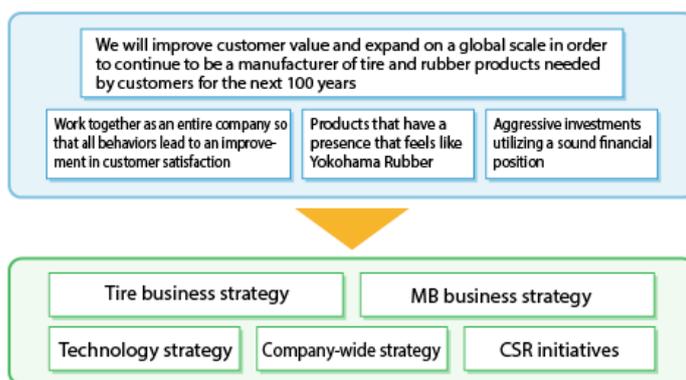
GD100 is the Yokohama Rubber Group's medium-range management plan that was started from 2006. With the vision of "we will evoke a distinctive global identity in building corporate value and in building a strong market presence" to mark the Yokohama Centennial in FY2017, net sales of 1 trillion yen, operating income of 100 billion yen, and an operating margin of 10% were set in FY2006 as the initial long-term financial targets for FY2017.

GD100 is separated into four phases of three years, and Phase III (nine years) was completed in FY2014. For Phase III from FY2012 to FY2014, while net sales of 1,800 billion yen, operating income of 150 billion yen, and an operating margin of 8.3% were set as the targets for three-year totals, the results were net sales of 1,786.6 billion yen, operating income of 165.4 billion yen, and an operating margin of 9.3%, meaning that while net sales fell short of the target, the target was exceeded for the other two benchmarks. Currently, we are working towards the targets for net sales of 770 billion yen, operating income of 80 billion yen, and an operating margin of 10.4% for Phase IV.



Phase IV: All for Growth

Phase IV (2015 to 2017) is the culmination of GD100 and is positioned as the phase for setting the stage for progress in our company's second century and resolving issues that have arisen up until now based on the theme of "All for Growth—Open the way for the next 100 years by bring together the potential of Yokohama Rubber". We hope to bring together all forms of growth in our business activities, including the growth achieved each phase, growth of the Group overall, and individual growth. Net sales of 770 billion yen, operating income of 80 billion yen, and an operating margin of 10.4% were set as the quantitative targets for 2017.



We promise to create the value as we implement the GD100 strategy and provide value to society.

Value provided to stakeholders (Yokohama Rubber's Important Issues)

■ Customers

We supply safe and secure products through manufacturing focused on our passion and

technology.

- Employees

We value and develop our people, and create opportunities for people.

- Shareholders and investors

We improve our company value by growing business opportunities.

- Local communities

We build a trusted identity as a contributing member of the global community by making contributions to the development and prosperity of local communities.

- The global environment

We challenge to build a sustainable society in harmony with the environment, to protect our blue planet and human beings.

- Business partners and suppliers

We promote CSR activities throughout the value chain.

100 Year History of Staying Ahead of Society

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Yokohama Rubber will celebrate its 100th anniversary since foundation in 1917. Over this period of 100 years, we have overcome various difficulties and worked as a company to develop products ahead of the world.

We will introduce the values Yokohama Rubber has continued to provide to society along with our environmental and CSR activities.

1917 to 2017 100 Year History

- [1917-1937 Foundation to prewar growth period](#)
- [1938-1950s From military demand, expansion, and defeat to reconstruction](#)
- [1960s-1970s High growth period](#)
- [1980s-1990s From the bubble economy to a period of low economic growth](#)
- [2000s Evolution of CSR management](#)
- [2010s Further progress of globalization and expansion of social activities](#)

1917 to 1937 Foundation to prewar growth period

Established with aspirations of producing some of the finest products in the world

Operating based on a founding spirit that values economic efficiency and social qualities.



Developments at Yokohama Rubber		Representative products
Yokohama Rubber Co., Ltd. was established on October 13 as a joint venture between the BF Goodrich Company and Yokohama Electric Cable Manufacturing Company. Has the ambition to produce the best rubber products in the world using the advanced technology of the US.	1917	
Started tire production	1920	
	1921	Independent development and utility model registration of a cut-edge flat belt Developed Japan's first corded tire, the "Hama Town Cord" Extended the life of tires by three times
Hiranuma Plant was completely destroyed by the Great Kanto Earthquake Worked to rebuild the plant while importing and selling tires from the BF Goodrich Company.	1923	

<p>Started operations of the Yokohama Plant completed in Tsurumi-ku, Yokohama</p> <p>The speech at that time by President Suekichi Nakagawa adopted as the founding spirit.</p> <div style="border: 1px solid red; padding: 5px;"> <p>Founding spirit (summary)</p> <ol style="list-style-type: none"> 1. Production business is a social service. 2. Commit to delivering quality products unrivaled by those of competitors. 3. Management should adhere to the principles of fairness and consideration. 4. Making the best use of the productivity of machines is the great secret for improving efficiency. 5. Make a great effort to succeed in business. </div>	1929	<p>Started domestic production of V-belt</p> <p>Revolutionized the V-belt industry with high-speed operation, long life, and excellent acoustics</p>
	1937	<p>Launched a Y-shaped tire that adopts a new tire cord</p> <p>Improved durability, etc.</p>

1938-1950s
From military demand, expansion, and defeat to reconstruction

Business driven by military demand/overseas production and reconstruction from postwar

Promptly developed environmentally friendly products while resuming business following hardships.



Developments at Yokohama Rubber		Representative products
Established production sites in Asian countries	1938 to 1944	
Opening of Mie Plant	1940	Started sales of recycled rubber
Yokohama Plant rendered inoperative by Allied air raids	1944	
Lost all the business sites in Japan and overseas	1945 (end of war)	
Got a fresh start based on a dauntless spirit	1946	
Started operations at Mishima Plant	1951	
Started operations at Hiratsuka Plant	1952	Launched Japan's first cord conveyor belts
	1954	Launched the "Y-29", Japan's first snow tire

	1958	<p>Launched HAMATITE® sealant made from a rubber and resin compound Aimed for the domestic production of construction sealant, which passed stringent durability testing and has been used in many high-rise buildings.</p> <p>Developed a pneumatic fender as the Company's first environmental contribution product Previously, whales had been used as cushioning material for whaling ships coming alongside the pier, which were substituted by this fender.</p>
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**1960s to 1970s
High growth period**

Taking on our social responsibility as quickly as possible

As pollution had become a social issue and in anticipation of the times, we indicated a stance of consideration for not only our own company, but also the supply chain and the local community.



Developments at Yokohama Rubber		Representative products
<p>Renamed to The Yokohama Rubber Co., Ltd.</p> <p>Pollution Prevention Committee established Became the Environmental Improvement Department the following year.</p> <p>Established Tokyo Retread Co., Ltd. and started a retreading business</p> <p>Formulated a new management philosophy Aim to put an emphasis on corporate social responsibility. Around this time, we indicated that we would not generate pollution even at the stages of subcontractors, raw materials suppliers, and customers.</p> <p>Started operations at Onomichi Plant Equipped with a full factory wastewater closed system.</p>	1963	
	1964	<p>Japan's first spiral high pressure hose released Supports the adoption of hydraulics for industry machinery.</p>
	1965	<p>Manufacturing and sales of the first jet aircraft tires in Japan</p>
	1967	<p>Launched sales of "G.T. Special" and "G.T. Special XX", radial tires for passenger cars Radial tires with doubled durability of bias tires up until now became mainstream.</p>
	1970	
	1971	<p>Launched sales of "G.T. Special Steel", Japan's first steel radial tubeless tire for passenger cars</p>
	1972	
	1973	
	1974	

Occurrence of some defects in car steel radial tires and subsequent announcement Started withdrawal and replacement measures. Made prompt response efforts including inspections. Planned and executed recurrence prevention measures.	1976	Started development of fuel-efficient tires for North America
	1977	
	1978	Launched sales of "ADVAN HF" for passenger cars

1980s-1990s
From the bubble economy to a period of low economic growth

Pioneering environmental support
 Launched sales of the "DNA" series as the first eco-tires in Japan, staying ahead of the global low fuel consumption trend



"DNA", the first eco-tires in Japan

Developments at Yokohama Rubber		Representative products
Entered the PRGR (ProGear) golf business	1980	Launched sales of "ASPEC AX-323", a Kevlar radial tire for passenger cars
	1983	Launched sales of golf balls
	1988	Launched sales of low-permeability air hose with one-tenth the alternative freon R134a permeability of traditional products
	1990	Launched sales of "SY101", a studless tire for trucks and buses
	1991	Launched sales of "Flex Line", a cylindrical conveyor belt that prevent scattering of the transported object
Formulated the corporate philosophy		
Mie Plant completes a tire incineration boiler using waste heat in consideration of the environment	1992	
Formulated environmental protection action plan	1993	
Established production and sales subsidiaries in the Philippines, Thailand, and Vietnam		
	1996 to 1997	

Acquired ISO 14001 for all plants in Japan	1998	<p>Launched sales of “ES-01” and “ES-02” as first offerings of new fuel-efficient “DNA” series of passenger car tires in Japan</p> <p>The rolling resistance used for indicating fuel economy at this time is regarded as a benchmark for tire fuel economy now.</p>
	1999	

2000s
Evolution of CSR management

Becoming a company having world-class strengths in technologies for protecting the environment.

We have implemented various initiatives as a company having world-class strengths in technologies for protecting the environment based on GD100 and the Environmental GD100.



Logo for GD100

Developments at Yokohama Rubber		Representative products
<p>Started a zero emissions campaign Aim to stop producing industrial wastes for landfills by end of fiscal 2005</p> <p>Established production and sales subsidiaries in China and Thailand</p>	2000	<p>Began sales of prepreg for aircraft structures</p> <p>Achieved a significant reduction in weight compared to conventional metal structure materials and contributed to improved fuel economy.</p>
	2001	<p>Launched sales of “ECU-193” wood-based flooring material elastic adhesive as a sick house countermeasure</p>
<p>Completed construction of Shinshiro-Minami Plant in Aichi Prefecture</p>	2001 to 2004	
	2002	<p>Launched sales of “iceGUARD iG10” studless tires for passenger vehicles</p>
<p>Established a tire sales company in Russia, Yokohama Russia L.L.C</p>	2003	<p>ISO certification acquired for Yokohama Rubber’s pneumatic fenders</p> <p>Launched sales of “Ecotex”, an energy efficient conveyor belt</p>
	2005	<p>ADVAN become a global flagship brand Launched worldwide sales of “ADVAN Sport V103”</p> <p>Launched sales of the “AIR Watch” tire pressure monitoring system for passenger cars</p>



<p>Announced new medium-range management plan, Grand Design 100 (GD 100) At the same time, set out on a policy of being a company having world-class strengths in technologies for protecting the environment</p>	2006	
<p>Established production and sales subsidiaries in China (Shandong, Suzhou)</p> <p>Started the YOKOHAMA Forever Forest tree-planting project We create forests in consideration of biodiversity at offices in various locations.</p> 	2007	<p>Launched sales of "ZEN 102ZE", a fuel-efficient, low maintenance tire for trucks and buses</p>
<p>Established a local subsidiary in India, Yokohama India Pvt. Ltd.</p> <p>Established a Corporate Social Responsibility Division</p> <p>Released the CSR Management Vision of "To build a trusted identity as a contributing member of the global community."</p>	2008	
<p>Formulated Guidelines on Biodiversity</p>	2009	<p>Launched sales of "Y-coat", a coating material used in household appliances and electronic devices Contributed to improved durability for information home electronic products such as mobile phones.</p>
	2010	<p>Launched sales of "BluEarth AE-01", a fuel-efficient tire for passenger cars, as the first offering in the "BluEarth" series</p> 

2010s
Further progress of globalization and expansion of social activities

In preparation for the next generation of society
Evolution of social activities aimed at the next 100 years



Developments at Yokohama Rubber		Representative products
<p>Established Yokohama Peer Support Co., Ltd., as a company promoting employment of disabled individuals</p> <p>Started environmental protection project in the Laojunshan Preservation Area in China</p> 	2011	
<p>Received integrated ISO 14001 certification (China)</p> <p>Signed the United Nations Global Compact</p>	2012	<p>Launched sales of "Duotex", a long-life conveyor belt composed of recycled materials</p> 
<p>Introduced a regional comprehensive work position system, and abolished general position system</p>	2014	
<p>Held social contribution activities awards for business partners</p> <p>Awards were based on the result of self-diagnosis and questionnaires previously conducted with business partners</p>	2015	<p>Launched sales of the "AC6B 11" air conditioning hose, the first in the world to support next-generation refrigerant</p> 
<p>Acquired Alliance Tire Group B.V.</p> <p>Certified for top-ranking A List in the CDP Climate Change Report 2016</p> 	2016	<p>Launched sales of the "ibar HG82" hose for high-pressure hydrogen gas</p> 

Acquired Aichi Tire Industry Co., Ltd.

Achieved the goal of planting 500,000 trees in the YOKOHAMA Forever Forest Project



2017

Expected to achieve goal of 100% environmentally-friendly products



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Tire business that evolves technologies in response to the expectations of customers and society

We continue to pursue technologies that achieve a top-level of environmental performance and lead to safety and peace of mind.

Tire products

We offer products that enrich the lives of customers while responding to the social needs.

〈 ADVAN Series "ADVAN Sport V105" "ADVAN FLEVA V701" 〉



High-performance sporty tires

We offer enjoyable handling and high driving performance on wet surfaces so that many people can enjoy comfort even at high speeds.

〈 BluEarth Series "BluEarth RV-02" 〉



Acquired the highest grade of "a" for wet grip performance

This tire for minivans and crossover SUVs you use to drive around your precious family members and cargo achieves both fuel efficiency and safe driving during rainy weather.

〈 iceGUARD Series "iceGUARD 6" 〉



The masterpiece of Yokohama's studless tires "iceGUARD 6" added good performance in wet conditions and superior noise reduction to the existing key strengths of the iceGUARD brand (first-class performance on icy roads, long-lasting high performance, and improved fuel economy) to achieve even further safety on winter roads.

〈 Retread tires 〉



Retread tires are tires that have been reused through re-adherence of tread rubber that has worn off to restore function as a tire. By reusing resources we contribute to the reduction of CO₂ emissions in tire production as well as a reduction in waste tires.

〈 Internet release of “Rainy Day Hill” 〉



We have made an appeal for the excellent wet performance of Yokohama’s tires through this original short movie in an effort to improve recognition.

Technology development

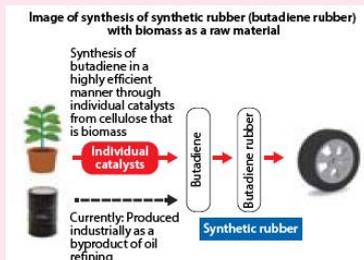
We utilize advanced technologies and materials technologies in response to the requirements of customers and society to develop a global R&D structure covering various use conditions.

〈 Development of and cooperation between technical bases 〉



We have developed regional development bases near markets including Japan, North America, Thailand, and Europe as a structure capable of supporting the requirements of each region.

〈 Biomass materials 〉



We are developing technologies for the generation of raw materials for synthetic rubber including butadiene and isoprene from biomass. We can reduce CO₂ emissions to one-fourth of previous levels through the development of these technologies.

〈 “AIRTEX” low air permeability material 〉



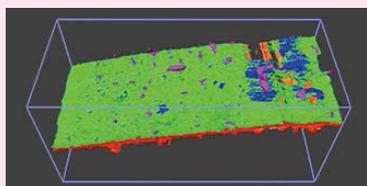
This low air permeability liner that is applied inside tires significantly reduces tire air leaks and contributes to improved fuel efficiency for tires and resource conservation.

〈 Tire simulation technologies 〉



Super computers, numerical simulations, and data science are used to clarify the impact that the variety of design factors of tires and rubber can have on various characteristics to facilitate the development of next-generation tires.

〈 World’s first 3D analysis technologies (Adhesion deterioration assessment) 〉



In partnership with Tohoku University and Hitachi High-Technologies Corporation, we have developed technologies for the three-dimensional analysis of rubber and steel cord adhesion deterioration. These technologies are expected to be applied to the development of tires with high durability.

Service and business development

We have a technology, service, and sales structure in place that allows us to quickly respond to various needs. Recently, we have also focused on the expansion of industrial application products and sales channels through M&As.

〈 Promoting motor sports activities 〉



We promote and support various motor sports as opportunities to experience the joy of driving. We will leverage the design, manufacturing, and assessment technology and know-how developed in these activities in the development of future projects.

〈 Expansion of production goods tire business 〉



We have expanded our business of tires for agricultural, forestry, and industrial applications through the acquisition of the Alliance Tire Group (ATG) and Aichi Tire Industry Co., Ltd. and partnerships.

〈 Sponsorship agreement with Chelsea FC and social contribution activities 〉



We have entered a sponsorship agreement with a Premier League football club to help improve recognition of our company and our brand image. We also conduct social contribution activities, including a football school and tire safety awareness activities.

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We provide backing support for the lives of people through MB business products

MB products

We offer a variety of products that support social infrastructure.

◁ "Versatran" high pressure hose ▷



High pressure hoses are essential for a wide variety of industrial equipment such as construction machinery and machine tools. The hoses have the characteristic of improving flexibility through the optimization of materials and keeping the bending radius to a minimum.

We plan to develop a lineup of spiral hose products that prioritize high pressure, high durability, quality, and performance, and to strengthen the overseas sales of high pressure hoses with a focus on the mid-range and above market overseas.

◁ "AC6B 11" next-generation refrigerant hose ▷



This is an air conditioning refrigerant hose that supports HFO-1234yf that has a low global warming coefficient. We succeeded in improving coolant resistance through patented plastic materials.

◁ Resin tailgate adhesives ▷

Resin tailgate adhesives were developed through revolutionary primer-less technologies, and have contributed to a reduction in car body weight. As fuel efficiency is improved, they contribute to both the global environment and fuel cost reductions.



〈 Marine hose and pneumatic fender 〉

Yokohama Rubber has a global top class market share for pneumatic fenders and marine hoses, widely used in marine transport operations for crude oil, etc. Since oil leaks can lead to major marine pollution, high reliability and durability have been essential for these products. In recent years, we have further improved the safety by introducing to the market our double carcass hoses with an oil leak detection feature.



Technology development

We conduct various forms of R&D in pioneering technologies and materials development to respond to the needs of customers, and technology development to support next-generation social infrastructure.

〈 High-pressure hydrogen gas hoses“ibar HG82” 〉



We have achieved lightness, flexibility, and also durability through a hybrid structure of patented fiber and steel wire. We are also actively engaged in the development of hoses to support the 87.5 MPa international standards.

〈 Silicon encapsulating materials for LED 〉



We have developed highly durable silicon encapsulating materials for high-brightness LED lighting, which have been applied in many areas close to daily life including offices and shopping malls.

In addition, UV-resistance silicon encapsulating materials, developed through proprietary technologies for UV-LED that demand has grown for recently, have been adopted and applied in various fields, including sensors and cosmetics.

〈 "Tuftex α" conveyor belt 〉



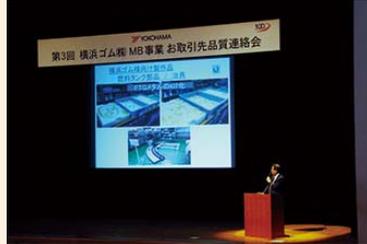
By carrying out a number of field trials, using a proprietary evaluation criteria, and making fine adjustments at the compound level, we were able to develop "Tuftex α" with an abrasion resistance of 64% better than our existing Ultra Wear Resistant (UWR) cover compound.

Service and business development

We have put in place global production, supply, and sales structure, and we also conduct activities aimed at improvements in terms of quality, technologies, and services.

〈 Business Partners Liaison Council 〉

We endeavor to stably provide high-quality products by creating strong trust relationships with business partners.



〈 Expansion of global production and sales structure 〉

During the GD100 period, we have established sales and production bases in China (Shandong/Hangzhou), Italy, and Indonesia; sales bases in China (Shanghai), Singapore, and Europe (Dusseldorf); and a production base in Mexico in order to strengthen our global production and sales structure.



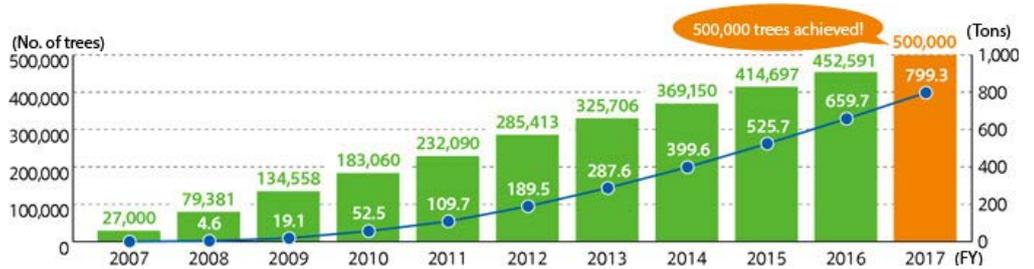
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Activities have spread over a period of eleven years since the start of the Project

YOKOHAMA Forever Forest Project that started from fiscal 2007 is a project for planting 500,000 seedlings at business locations in Japan and overseas by fiscal 2017 that mark Yokohama Rubber's 100th anniversary, based on our Environmental GD100 slogan of "we will become a company having world-class strengths in technologies for protecting the environment". Based on stance of potential natural vegetation, we plant the species native to that region. In addition, through tree planting we conduct green environmental regeneration activities that protect life in the regional environment and local communities through means such as raising the environmental awareness of participants, creating fire prevention programs and forests to preserve the environment, contributing to global warming prevention, maintaining biodiversity, and improving communication with the local community. The activities of this period of eleven years have spread significantly in aspects including ties between various people and contributions to the environment.

History of 500,000 trees and the fixed quantity of CO₂ absorption (Estimated based on measurements at the Hiratsuka Factory)



Ongoing support for disaster areas leveraging the know-how of the YOKOHAMA Forever Forest Project "Green Tide Embankment" in Otsuchi-cho, Iwate Prefecture

We support the "Green Tide Embankment" Project that is part of the reconstruction plan concept set forth by Otsuchi-cho that focuses on creating a beautiful town with unique paths with a view of the sea that make you want to walk, and as part of these efforts we supported the creation of a forest that will serve as a model case. The "Green Tide Embankment" is an idea conceived by the plant ecologist Dr. Akira Miyawaki, who has provided guidance for the YOKOHAMA Forever Forest Project. The Miyawaki method is a unique method for growing trees closely together in a state near to a natural forest by planting native species and raising many types of seedlings. On April 30, 2012, a mound (embankment) utilizing earthquake rubble was formed for a length of 50 m along the Kozuchi River that flows through Otsuchi-cho. Starting with the first tree planting event, a mound of approximately 250 meters long was forested by 2015. These activities have been carried on in a tree planting course in the "Furusato (Hometown) Course" of Otsuchi Gakuen that is operated by the town of Otsuchi. Debris from the Great East Japan Earthquake are buried inside of the mounds where these trees are planted. We believe these activities not only constitute the effective utilization of debris that are full of the memories of people who underwent a disaster, but that they will also help prevent disasters in the future.



China



Zhangyon Huan
Safety and Environmental Section Manager
Yokohama Industrial Products – Hangzhou Co., Ltd. (YIPHZ)

We have conducted tree planting activities every year since 2014. We also participate in regional tree planting activities when we have the opportunity and value our relationship with the local community. In March 2016, we also participated in tree planting activities held near the Qiantang River that flows through the city of Hangzhou, and donated seedlings that we had nurtured in our plant premises. These types of YOKOHAMA Forever Forest Project activities have been noticed by the local community and were introduced in an event as public welfare activities in November 2016. In March 2017, employees provided guidance on tree planting at a tree planting event held at an elementary school in the Xiasha District of the city of Hangzhou.

India



Pradeep Baswana
Joint Manager, EHS
Yokohama India Pvt. Ltd. (YIN)

At the first tree planting event conducted in February 2016, 24 species of 2,159 tree seedlings were planted in the plant premises, with the participation of personnel from Embassy of Japan, state government, representatives from other related companies and school children. The trees grew about 3 m tall after one year, as the tree planted area grew into green area many birds and insects started to come. In February 2017, 24 species of 1,740 tree seedlings were planted at the second tree planting event. Our employees take pride in their contributions as part of CSR activities and biodiversity conservation activities. We are planning tree planting in Kasar Village as our next CSR activity including village personnel.

Shinshiro



Masaru Naito
Meister, Shinshiro Plant

Currently, approximately 70,000 seedlings are growing at the Shinshiro Plant. Seedlings are contributed to nursery schools, kindergartens, elementary schools, social welfare corporations, and other organizations to assist with local reforestation. At the Shinshiro City Johoku Nursery School, as activities to protect the lives of trees when trees were felled at the local Tominaga Shrine accompanying the relocation of the school building, we supported the raising and planting of seedlings from acorns from the trees that were felled. In addition, we conducted tree planting activities together with the NPO Donguri Mongori, Parks and Green Spaces Division and Natural Environment Division in Aichi Prefecture, and local children.

Hiratsuka



Fumina Suzuki
Environmental Protection Promotion Department,
Hiratsuka Factory

We started bird watching from September 2008 in order to understand the effects of the YOKOHAMA Forever Forest Project on the ecosystem. We have held monthly bird watching events 106 times as of June 2017 while receiving guidance from the Komatan bird watching group, and we have observed 55 species of birds in the process. We have felt the connection between birds and the YOKOHAMA Forever Forest while keeping records that include the forest being used by migrating birds including the eastern crowned warbler and nests built of trees that were planted by birds such as the white-eye. We will continue bird watching in the future as well.

North America



Christian Yates
Senior Environmental Specialist,
Yokohama Tire Manufacturing Virginia, LLC (YTMV)

We planted 2,300 seedlings during the first tree planting event in 2009. We have plans to complete the planting of a total of 13,000 trees in 2017. A YOKOHAMA Forever Forest that contributes to the habitat of living creatures has been formed at the plant, and the breeding of mammals such as deer and red fox and the eastern bluebird that is an endangered species has been observed at this forest. In addition, we are confident that the positive effects of this YOKOHAMA Forever Forest that include contributions to biodiversity, the absorption of CO₂, and controlling surface water and soil erosion to assist penetration to groundwater will lead to trust from the community surrounding the plant.

Vietnam



Nguyen Thanh Duy Sinh (left) General Affairs Section Manager
Huynh Thi Thu Ai (right) Environment Section Manager,
Yokohama Tyre Vietnam Inc. (YTVI)

We have also planted a total of 2,235 trees in tree planting activities at eight elementary schools in the neighborhood outside of the plant. According to Principle Nguyen Anh Hong, "As the students are proud of the trees they have planted, and they bring along their friends and family to tell them which tree they planted, I think these activities are also good for raising their awareness of environmental protection." It also makes us happy to see children play under the shadows of trees they have grown, and we take pride in the fact that we have also contributed to an improvement in the awareness of people in the local community towards climate change and the environment.



Nittaya Suna Environment Supervisor, Safety and Environment Section, Yokohama Tire Manufacturing (Thailand) Co., Ltd. (YTMT)

We started tree planting activities in 2008 under the guidance of Dr. Shirin of the Thai Royal Household Bureau. We expect to achieve the planting of approximately 81,000 trees in 2017, which is 161% of the tree planting target of 50,000 trees. We have also conducted bird and insect monitoring surveys within the plant premises since 2013. Furthermore, from 2015 we started creating a biotope, and held information sharing events for stakeholders including local residents, local municipalities, and elementary schools.

Our Commitment to Social Challenges over the Next 100 Years

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Relationship between our business and SDGs

Yokohama Rubber has confirmed the current state of initiatives through its business in consideration of the objectives of sustainable development goals (SDGs), and analyzed which target areas initiatives should be strengthened in going forward. Based on this analysis, Yokohama Rubber will endeavor to review its priority issues going forward.

An assessment will be conducted on the efforts in response to social challenges by all Group companies based on documents and interviews from the four perspectives of planning, implementation status, monitoring, and communication of results.

Relationship between efforts through the value chain and SDGs



- 1 Systematic monitoring and protection of rubber trees, plantations, and the ecological system at the stage of raw materials use
- 2 Education on agroforestry farming, etc. for rubber farmers at the procurement stage
- 3 Income support through employment for processors and local companies in developing countries
- 4 Resource conservation and the development of new materials through LCA analysis on natural resources
- 5 Indirect contributions to agriculture through the sale of tires in the field of agriculture and forestry through ATG
- 6 Improvements in CSR procurement and the environmental technologies of suppliers in the MB business
- 7 Project for considering infrastructure for a hydrogen-based society that has adopted highly durable conveyor belt for a reconstruction project in Rikuzentakata City
- 8 Preservation of forests and protection of the ecological system by supporting planned agricultural management
- 9 Recycling of water during production, effective use of groundwater, etc.
- 10 Introduction of cogeneration systems and renewable energy, spread of environmentally friendly products
- 11 Reduction of greenhouse gases through (10) above
- 12 Use of heat from waste tires, achieving zero emissions at plants, promotion of retread tires, development of more highly durable products
- 13 Prevention of marine pollution through marine hose development and improvements



Mizuki Kurauchi
Environmental Assessment Section Manager,
Global Environmental Project Department,
Japan Quality Assurance Organization

We recently confirmed the business performance of the Yokohama Rubber Group and its business processes through the filter of SDGs. As a result of this assessment, we found that nearly all of the activities conducted in accordance with the vectors indicated in the CSR Management Vision, Yokohama Group Action Guidelines, and GD100 and Environmental GD100 mapped with the SDGs, and that actual management of the organization was closely linked with the resolution of social issues for sustainable development.

Looking at the results of mapping in the value chain, there were many extremely positive areas including multiple efforts in upstream processes that assist in achieving SDGs, and multiple efforts that strengthen positive effects and minimize negative effects that have been conducted since in the past with clear objectives related to sustainability. Going forward it would be preferable to review what challenges should be tackled as priorities in sustainable development goals through materiality analysis and dialogue with stakeholders.

We hope that Yokohama Rubber remains to be a global company for the next 100 years and continues to contribute to happiness and prosperity based on sustainable development.

*The CSR Report 2017 that contains this comment has been prepared based on materials including sustainability reports deemed to be generally acceptable, and this comment does not represent the conclusion that information contained within the CSR Report 2017 has been accurately measured and calculated and disclosed without omission.

Technology Development over the Next 100 Years

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Basic technologies to support the future development of products and services at Yokohama Rubber

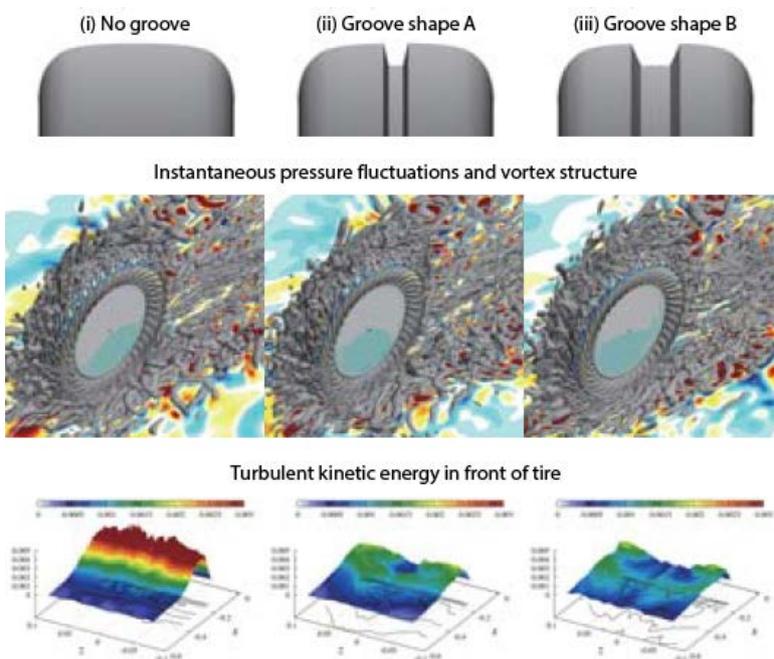
Computational Science Aeroacoustic simulation

The reduction of tire noise is an important environmental issue. As the disruption of the flow of air around tires and the road surface is one of the main causes of tire noise, we are engaged in research related to direct simulations of air vortex flow structure around tires and the resulting acoustic waves.

In 2014, Yokohama Rubber succeeded in becoming the first in the world to have a precise simulation of the vortex structure and acoustic waves around tires when running.

In 2015, the theme was selected as an HPCI (High Performance Computing Infrastructure) research topic, and the impact of the differences in the depth, width, etc. of grooves on the tire surface on acoustic waves (noise) was clarified.

This has been helpful in the design of tread patterns and facilitated the development of low noise tires.



Analysis 3D structural analysis of tire steel cord / rubber adhesion surfaces

Steel cords are embedded in tires to improve durability. The adhesion between these steel cords and the rubber that covers them is important for safety.

We have utilized electron microscope technology to become the first in the world to visualize the adhesion layer between steel cord and rubber surfaces in 3D (see diagram).

Some separated areas and/or spaces were discovered in the adhesion layer in the rubber and metal adhesive interface for the wire sample after humidity aging.

The adhesive force between steel cord and rubber is weak in these areas, and can be inferred that this is a source of declines in adhesiveness. Going forward we will further clarify the adhesion mechanism and apply this knowledge to the development of more durable tires.

