

Automotive Parts Technology

In order to respond to diversification of where cars are sold throughout the world, we are moving forward with efforts to develop automobile anti-vibration rubber parts that also possess cold resistance and high durability in addition to conventional products that focus on heat resistance.

For leading technology development, we are moving forward with development based on increasing performance while reducing weight and aiming to apply these to next-generation vehicles. As for analysis technology, we are working to create the most optimal designs in terms of low weight and reduced costs by increasing the sophistication of our analysis system, including seeking a correlation between actual car performance and equipment evaluations.



Our air suspension for commercial vehicles

Training Human Resources with Technical Expertise

With an eye toward a future in which the market environment is projected to be dramatically different due to the mobility revolution, the Toyo Tires Group is focusing its efforts on training professionals who can transform difficulties and crises into opportunities for sustainable growth. Human resource training supports technological innovation, the backbone of our Group, and we will engage in education and training that focuses on basic knowledge education, exchanges with parties outside the company, and passing on technology.

For example, Toyo Tire & Rubber Co., Ltd. aims to train human resources with “problem-solving skills and innovative capabilities” based on thinking oriented toward customer needs as well as “logical thinking and facilitation capabilities,” which are important abilities.

In fiscal 2017, the technology headquarters responsible for our tire development conducted about 115 hours of education and training for tire technicians who joined the company less than five years previous in order to advance the skills of young employees. As for the results of these education and training activities, a check is made using post-class tests to ensure that the target level is achieved.

TOPICS

Joint Development of Suspension Module for EVs Launched with GLM

The development of EVs has accelerated, with many different automobile manufacturers mapping out their own mass production plans in quick succession. In order to meet the demand of a future mobility society, the Toyo Tires Group has concluded an agreement with EV manufacturer GLM Co., Ltd. to jointly develop suspension modules for EVs.

The primary parts being promoted for development by the companies are “active air suspension^{*1} to ensure a smooth flat ride^{*2}.” We are aiming for commercialization before the end of 2020.

We aim to become a supplier that can propose greatly added value.

^{*1} Suspension that electronically dampens vibrations in vehicles
^{*2} Ensures a comfortable ride by damping juddering or vibrations with automatic control of the vehicle’s shock absorbers to best suit the road conditions

TOPICS

Holding of the 7th Company-wide Technology Development Presentation

We hold a company-wide technology development presentation as a venue to present the Company’s cutting-edge technology-related efforts and their results to management.

For fiscal 2017, there were six entries. Three awards, including the Outstanding Technological Development Award, were presented after evaluating the entries based on five perspectives (originality, logicity, future prospects, development speed, and presentation content).

The 2017 awards

■ **Outstanding Technological Development Award:** Leading Development of Automotive Parts for EVs

■ **Unique Award:** Development of New Tire Production Methods

■ **Surprise Award:** Development of Polymers That Adapt to Changes in the Mobility Environment



The 7th Company-wide Technology Development Presentation

Priority Theme 2

Contribution to the Global Environment

Ideal Status in 2020

Promoting environmental management on a Group-wide basis

Priorities

- Efforts to alleviate and adapt to climate change
- Efforts to reduce water risk
- Resource recycling efforts

Reasons for being Priority Issues

The Toyo Tires Group is actively engaged in efforts to reduce, prevent, and minimize its negative impact on society, which is growing as the scale of the Group’s business increases. In particular, environmental issues such as alleviating and adapting to climate change, reducing water risk, and resource recycling are considered likely to arise and have a major impact on society as our Group continues to conduct business into the future. So, these issues are positioned as priority issues to achieve our sustainability.

Policies

In the Toyo Global Environmental Charter, we clearly indicate our fundamental philosophy and action guidelines for promoting environmentally conscious behaviors and activities.

Furthermore, we support international norms such as the United Nations Rio Declaration on Environment and Development and Agenda 21 and have quickly established countermeasures for environmental issues based on a precautionary approach, including risk assessments, in order to fulfill our environmental responsibilities.

We respond to organization issues by operating ISO14001-based environmental management system, and disclose the environmental performance of our corporate activities in our CSR report.

Management Approach

Goals

For our activities within Japan, we have also formulated the Toyo Global Environmental Action Plan, the target year of which is 2020. We create annual activity plans, set objectives, and manage efforts to achieve this plan. Furthermore, we translate the activity plan and objectives into English each year and share it with each overseas business site.

As for global warming countermeasures, since the adoption of the Paris Agreement in 2015, countries throughout the world have set greenhouse gas reduction targets and compiled measures that each entity should undertake as global warming countermeasure plans. We are also moving forward with a review of our medium- and long-term targets taking into consideration laws, ordinances, regulatory standards, and plan targets for countries and regions in which the Group conducts business.

The FY2018 Policy (Excerpt) ^{*Domestic}

Response to Climate Change

● Energy Conservation

Targets Reduce energy consumption per unit of production by an average of at least 1% per year on a medium- to long-term basis.

● Preventing Global Warming

Targets Reduce CO₂ emissions intensity per unit of production by 15% compared to fiscal 2005 by the end of fiscal 2020.

Efforts to Reduce Water Risk

Targets Set voluntary targets at each site

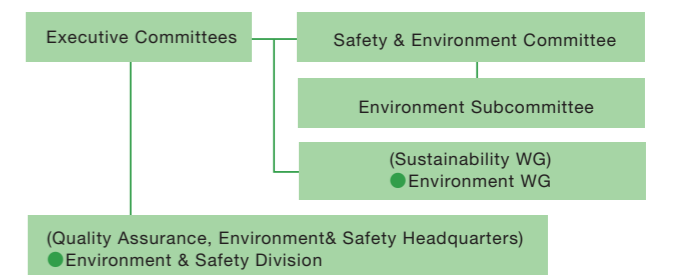
Resource Recycling Efforts

Targets Achieve a 100% recycling rate by the end of fiscal 2020 and maintain it thereafter.

Responsibilities

Corporate Officer of Quality Assurance, Environment & Safety Headquarters

Activity Promotion System ^{*Domestic}



^{*Overseas (at affiliated companies), the environmental manager of each company promotes activities based on the group policy examined and established by the Sustainability Promotion WG.}

Response to Climate Change

Risks and Opportunities posed by Climate Change

We recognize that risks and opportunities posed by climate change are important business issues.

As for our response to climate change, we have established a company-wide working group (WG) and discuss action plans, which include orientation, goals, and targets. The WG brings together the responsible parties in related business organizations, the discussed action plan is approved by the Executive Committee which the Board of Directors delegates authority to, and the plan is spread to all companies and organizations in the Group.

From the research results published by the Intergovernmental Panel on Climate Change (IPCC) and other research institutions, we consider the following to be the main medium- and long-term risks and opportunities that could arise due to climate change as the Group continues its business activities.

We will promote various activities, including examining business strategies that consider the 2 degrees C target and the setting of emissions reduction targets based on scientific evidence.

Main medium- and long-term risks and opportunities that could arise due to climate change

- Greater demand for products and services adapted to climate change
- More sophisticated technologies to reduce waste and recycle resources
- Reduce use of raw materials and more advanced replacement technology
- Diversification of raw materials
- Diversification of procurements sources
- Greater importance of environmental burden countermeasures
- Promotion of greater energy efficiency through IoT (increase energy efficiency)
- Introduction of EVs for logistics mobility and autonomous driving
- Response to environmental regulations in each country

In response to the above risks and opportunities, we are moving forward with, for example, efforts to reinforce our response to environmental regulations in each country, which include changing fuel sources, making active use of renewable energy, and improving energy efficiency of facilities.

Reduction of Energy Consumption

We are moving forward with efforts to reduce energy consumption through the effective use of energy required for business activities both in and outside the organization in order to contribute to the alleviation of climate change. Efforts are also being made to develop new products and technologies that contribute to climate change alleviation and adaption.

In fiscal 2017, Sendai plant of Toyo Tire & Rubber Co., Ltd. was changing the fuel from heavy oil to natural gas and updating equipment with the change in fuel. The equipment started operations in 2018.

Energy consumption within the organization

	2015	2016	2017
Energy consumption within the organization [1000GJ]	7,156	7,521	7,825
Domestic [1000GJ]	4,314	4,369	4,403
▶ From non-renewable sources [1000GJ]	4,082	4,146	4,187
▶ From renewable sources (Solar, Thermal Recycle by Used tire) [1000GJ]	232	222	216
Oversea [1000GJ]	2,842	3,152	3,422
▶ From non-renewable sources [1000GJ]	2,841	3,152	3,421
▶ From renewable sources (Solar) [1000GJ]	0.67	0.67	0.67

Energy consumption outside of the organization (in Logistics)

	2015	2016	2017
Domestic transportation energy consumption [GJ]	143,102	154,555	148,362

Energy intensity

	2015	2016	2017
Energy intensity (energy consumed/monetary unit of sales) [1000GJ/100 million yen]	1.75	1.97	1.93
Energy intensity by domestic main manufacturing base (Conversion to crude oil/production volume) [kl/1000t]	846.83	878.14	876.98
Reduction rate compared to the previous year that Energy intensity by domestic main manufacturing base	-0.46%	+3.70%	-0.13%

Production ratio of Fuel Efficient Tires

	2015	2016	2017
Tires for Passenger Vehicles (PCR) [%]	20.6	27.0	25.1
Tires for Trucks and Buses (TBR) [%]	5.9	8.0	7.1



Gas-turbine cogeneration system introduced at the Sendai plant

Reduction of Greenhouse Gas (GHG) Emissions

Greenhouse gas (GHG) emissions are said to be the main cause of climate change, and we are working to reduce GHG emissions by making effective use of energy through business activities both in and outside the organization and our products.

In fiscal 2017, we updated equipment at production facilities, made more efficient use of heat (fixing steam and air leaks), introduced inverter-type electrical equipment, and switched to LED lighting. As a result, we reduced our CO₂ emissions in Japan by 4,174 t-CO₂ annually.

GHG emissions

	2015	2016	2017
Direct (Scope 1) GHG emissions by domestic tire manufacturing base [1000t-CO ₂ e]	175.34	259.50	262.87
Energy indirect (Scope 2) GHG emissions by domestic tire manufacturing base [1000t-CO ₂ e]	91.30	97.65	97.63
Other indirect (Scope 3) GHG emissions by domestic tire manufacturing base [1000t-CO ₂ e]	9,152.35	7,649.96	7,891.07
Direct (Scope 1) GHG emissions by oversea tire manufacturing base [1000t-CO ₂ e]	72.63	84.11	89.76
Energy indirect (Scope 2) GHG emissions by oversea tire manufacturing base [1000t-CO ₂ e]	158.44	169.99	184.88
Other indirect (Scope 3) GHG emissions by oversea tire manufacturing base [1000t-CO ₂ e]	4,107.61	4,582.57	5,253.02
GHG emissions intensity by domestic tire manufacturing base (Scope1+2/production volume) [t-CO ₂ /t]	1.72	1.76	1.77
Compared to fiscal 2005 of GHG emissions intensity by domestic tire manufacturing base (Scope1+2/production volume)	107%	109%	110%

※Type of GHG: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃

Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions

	2015	2016	2017
NOx [t]	354.6	335.8	349.2
SOx [t]	19.2	23.4	19.3
Volatile organic compounds (VOC) [t]	792.2	794.1	812.6

Efforts to Reduce Water Risk

We recognize that access to fresh water is essential for human life and wellbeing and is recognized by the United Nations (UN) as a human right. So, we are aware that water risks in business activities are one of the business issues we face.

We have established a company-wide WG as for our response to water risks as well as climate change.

Upon evaluating water risks for the area where operations are conducted, WGs engage in efforts to reduce water intake and waste water by making effective use of the water appropriate for the risk level.

Using data (Aqueduct Water Risk Data) disclosed by Aqueduct, a global resource research institute, we ascertain whether the area around production facilities is a high risk area.

In addition, checks are made to ensure that no business sites use water taken from a wetland listed in the Ramsar Convention or any other nationally or internationally proclaimed conservation area, the water source has been identified as having high biodiversity value, such as species diversity and endemism, or total number of protected species, and a high value or importance to local communities and indigenous peoples.

Reducing Water Withdrawal and Water Discharges

Primarily at its production facilities, our Group mainly withdraw water from municipal water supplies or other public or private water utilities and ground water for its boiler equipment, parts processing facilities, product cooling, cooling towers, welfare facilities, and other facilities. Regarding water withdrawal and water discharges, each production facility is responsible establishing its own goals based on the size of the facility and products they produce. We are also revamping our equipment to reuse water as much as possible in each production process.

For example, Fukushima Rubber Co., Ltd. conducted renovation work to reduce the diameter of the groundwater pump, which resulted in an annual reduction in water intake of about 66,000 m³. We also reduced water intake at the Kuwana Plant by about 18,000 m³ annually by updating equipment.

There were no unplanned water discharges in fiscal 2017.

Total water withdrawal

	2015	2016	2017
Total water withdrawal [million t]	3.91	4.02	3.98
▶ Domestic [million t]	3.08	3.19	3.10
▶ Oversea [million t]	0.83	0.82	0.88

Total water discharge and quality by main manufacturing base

		2015	2016	2017
Sendai Plant	Total water discharge [1000t]	—	678.41	904.99
	Biological Oxygen Demand (BOD) [t/Month]	3.25	2.39	1.99
Kuwana Plant	Chemical Oxygen Demand (COD) [t/Month]	6.83	7.13	6.20
	Total water discharge [1000t]	—	334.23	309.91
Hyogo Manufacturing Complex	Biological Oxygen Demand (BOD) [t/Month]	0.73	0.67	0.86
	Chemical Oxygen Demand (COD) [t/Month]	1.51	1.31	2.24
Hyogo Manufacturing Complex	Total water discharge [1000t]	—	111.50	111.92
	Biological Oxygen Demand (BOD) [t/Month]	0.12	0.19	0.22
Hyogo Manufacturing Complex	Chemical Oxygen Demand (COD) [t/Month]	0.33	0.31	0.28

* See the website for details on scope of data collected, collection period, source of information, and calculation conditions and basis.

Resource Recycling Efforts

The Toyo Tires Group considers our mission to contribute to the shift from a society that consumes resources to one that recycles as the social responsibility of a manufacturer that conducts business globally.

As the scale of our production activities expands, the amount of raw materials we use also increases. Therefore, we strive to secure a stable and sustainable supply of raw materials indispensable for business growth, such as natural rubber, the main raw material in the procurement stage, in terms of both quality and volume. We are also moving forward with efforts to develop new materials and to improve product design and production processes to make more efficient use of materials.

We are working to reduce waste in our business activities with a target of achieving a waste recycling rate of “100% by the end of fiscal 2020.” As for when products are used, efforts are being made to extend the service lives of products, which includes manufacturing products with outstanding durability and producing reused tires (retreaded tires) from used tires.

There were no significant spills that we were liable for in fiscal 2017.

Examples of resource recycling efforts

- Moving away from incinerating waste and switching to thermal recycling
- Replaced wooden pallets with more durable plastic pallets
- Examining alternatives for regulated substances
- Efforts related to chemical substance risk assessments based on independent initiatives, wear dust, and used tires

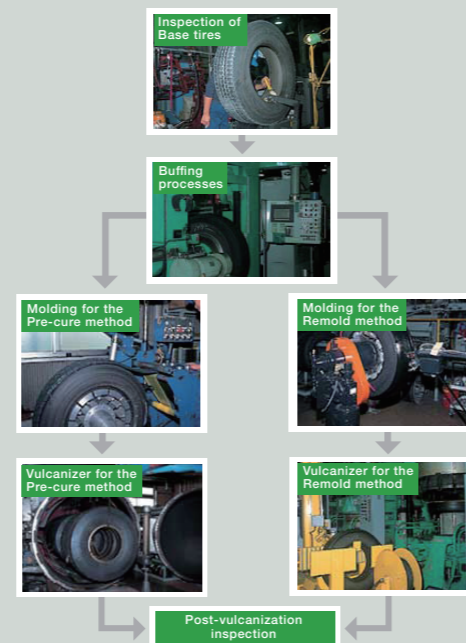
Main Materials used

	2015	2016	2017
Total weight of Main Materials used [1000t]	346.74	335.91	334.43
▶ Renewable materials used (Natural and Synthetic Rubber, Tire Cords, etc.) [1000t]	185.76	180.62	179.00
▶ Non-renewable materials used (Carbon Black, Cements, etc.) [1000t]	160.99	155.30	155.43
Reference: Raw material use efficiency during tire production	71.3%	73.8%	79.3%

Waste

	2015	2016	2017
Total weight of waste [1000t]	32.56	32.45	36.58
▶ Domestic [1000t]	18.88	17.81	19.25
▶ Oversea [1000t]	13.68	14.64	17.33
Domestic total weight of Recycling [1000t]	18.87	17.81	19.25
Domestic Recycling rate [1000t]	97.51%	99.38%	99.68%
Domestic total weight of Reuse [1000t]	1.18	1.08	0.90

Retreaded tire production flow



TOYO TIRES Brand, also known for High Quality Recycled (Retreaded) Tires

Collecting and recycling used tires is an important issue in the tire industry for recycling resources. As one solution, we are working to spread the use of retreaded tires. Retreaded tires involves replacing the tread (the part of a tire that comes into contact with the road surface) on worn tires to make them serviceable again. Since retreading reuses all the remaining part of the tire, it naturally saves resources and even emits less CO₂ than in manufacturing new tires*.

We produce and supply highly durable, high quality tires, and we have received high praise from users regarding retreaded products.

We contribute to the promotion of resource recycling in the transportation industry by spreading the use of high quality retreaded tires.

*Retreaded tires produce 59% less CO₂ in comparison to new tires during production. (Source: Japan Retreader's Association)

* See the website for details on scope of data collected, collection period, source of information, and calculation conditions and basis.

Priority Theme 3

Respect for Human Rights and Diversity

Ideal Status in 2020

Diverse employees actively working in an environment with a global sense of human rights

Priorities

- Fulfilling responsibility to respect human rights
- Review labor standards taking into consideration customary international law

Reasons for being Priority Issues

In order to respond to the greater diversity in stakeholders, the Toyo Tires Group supports and respects international norms, reduces the risk of business activities negatively impacting human rights, as well as positions opportunities to support and promote the benefits of human rights as issues that should be addressed with priority.

Policies

We respect international norms related to human rights and labor, such as the Universal Declaration of Human Rights and the ILO Declaration. In addition, we actively contribute to the promotion and spread of human rights to the extent that they impact the Group's business activities in order to fulfill our responsibility to respect human rights.

In particular, for the work environment, we provide safe and healthy work conditions, thoroughly prohibit not only discrimination in HR practices but also the direct and indirect use of forced and child labor. We also support and promote the enjoyment of human rights in collaboration with business partners so that the Group does not take part in human rights violations.

We have positioned the promotion of diversity as an important human resources policy, and we are moving forward with efforts to reinforce systems to train diverse human resources and for them to fully demonstrate their capabilities.

The Toyo Tires Group Charter of Corporate Behavior was compiled as corporate action principles applied uniformly across the Group in order to faithfully conduct business activities. The charter addresses the undertaking of business in a manner that respects human rights and the culture and customs of each region as well as valuing diversity among all people in the workplace.

Management Approach

Goals

We respect human rights in the workplace and work to eliminate all forms of discrimination and to promote diversity.

Responsibilities

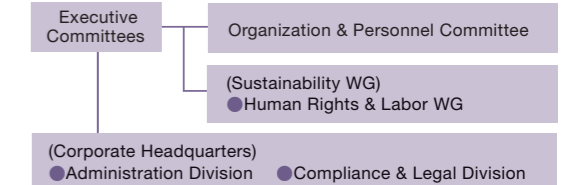
Corporate Officer of Corporate Headquarters

Activity Promotion System *Domestic

Human Rights



Employment



*Overseas (at affiliated companies), the HR and General Affairs manager of each company promotes activities based on the group policy examined and established by the Sustainability Promotion WG.

Respect for Human Rights

Fulfilling Responsibility to Respect human rights

At the Toyo Tires Group support the Universal Declaration of Human Rights and ILO Declaration on Fundamental Principles and Rights at Work. As for workplaces, business partners, and the communities in areas where we operate, we conduct business activities while addressing respect for the human rights of all people engaged in our work, whether directly or indirectly, as part of our code of conduct.

As a Group that conducts business throughout the world, we consider the respecting of human rights a business issue that should be addressed with priority. As such, we have established a company wide working group (WG) and discuss action plans, which include orientation, goals, and targets. The WG brings together the responsible parties in related business organizations, the discussed action plan is approved by the Executive Committee (chairperson: President), which the Board of Directors delegates authority to, and the plan is spread to all companies and organizations in the Group.

Furthermore, in fiscal 2017, we were unable to confirm any complaints regarding human rights-related concerns in the grievance mechanism disclosed by the Group, and we will continue to work to prevent or reduce any negative impact on human rights.