

Environmental Report 2002

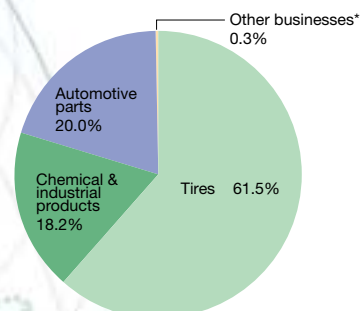
Eco-Conscious Management

Company Profile (As of March 31, 2002)

Company name	Toyo Tire & Rubber Co., Ltd.
Head office	17-18, Edobori 1-chome, Nishi-ku, Osaka 550-8661, Japan
Date of establishment	August 1, 1945
President	Yoshio Kataoka
Capital	23,974 million yen
Net sales	Nonconsolidated basis 193,474 million yen Consolidated basis 253,810 million yen
No. of employees	Nonconsolidated basis 3,096 Consolidated basis 5,601
Major products	Automotive tires and tubes, industrial rubber and plastic products, polyurethane foam, waterproof and shielding sheets, automotive parts, sporting goods, and other related products
Plants	Kuwana Plant (automotive tires, automotive parts, plastic products) Sendai Plant (automotive tires) Hyogo Manufacturing Complex (industrial rubber and plastic products, polyurethane foam, automotive parts) Fukushima Plant (industrial rubber products)
Major affiliated manufacturing companies	Fukushima Rubber Co., Ltd. (automotive tire tubes, waterproof and shielding sheets, polyurethane foam) T.G.K. Co., Ltd. (automotive parts) Toyo Soflan Co., Ltd. (polyurethane foam, automotive parts, plastic products) Chubu Soflan Co., Ltd. (automotive parts, plastic products) Ayabe Toyo Rubber Co., Ltd. (polyurethane products, plastic products)
R&D facilities	Technical Research Center Toyo Technical Center Soflan Technical Center Automotive Parts Technical Center High-Polymer Processing Technology Center Tire Test Course (Miyazaki) Winter Tire Test Course (Saroma, Hokkaido)

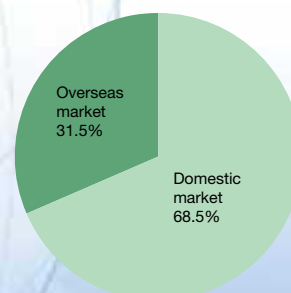
Business Performance

• Consolidated sales in FY 2002 by business segment

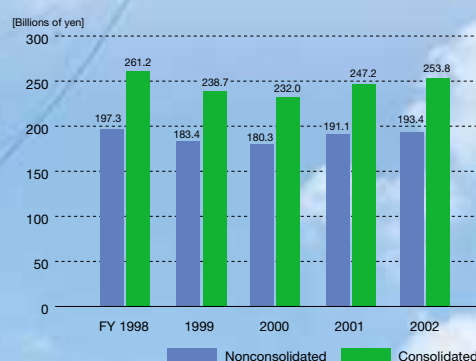


*Other businesses principally consist of financial services and information handling services.

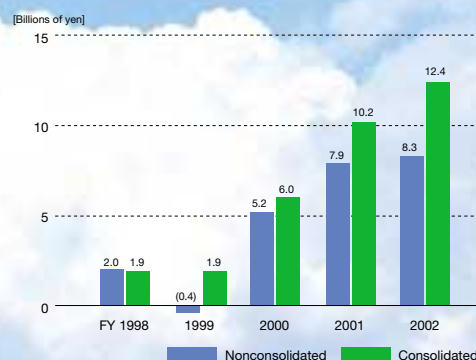
• Consolidated sales in FY 2002 by market



• Sales



• Recurring profit (loss)



CONTENTS

• Scope of the Environmental Report 2002

Period covered

This report mainly covers the Company's environmental performance and activities in fiscal year (FY) 2002, from April 1, 2001 to March 31, 2002. Years which are described in this report without fiscal year (FY) indications are calendar years.

Organizations covered

Toyo Tire & Rubber Co., Ltd., Kuwana Plant
Toyo Tire & Rubber Co., Ltd., Sendai Plant
Toyo Tire & Rubber Co., Ltd., Hyogo Manufacturing Complex
Fukushima Rubber Co., Ltd.
Toyo Soflan Co., Ltd.
Chubu Soflan Co., Ltd.
Ayabe Toyo Rubber Co., Ltd.

• Editorial Policy Concerning the Environmental Report 2002

We at the Toyo Tire & Rubber Group aim to contribute to society by focusing on tire, anti-vibration control and thermal insulation technologies to create a more comfortable environment. In the process, we are pursuing eco-conscious operations, seeking to help prevent global warming; reduce industrial waste; control the release of chemical substances; develop more environmentally friendly technologies, products and business models; and promote recycling. In short, the entire Toyo Tire & Rubber group is striving to reduce environmental impact. We are also committed to environmental awareness-raising activities, offering educational and support programs designed to promote environmental preservation.

One of these efforts is the Environmental Report, which we have published annually since fiscal 2000. We have simultaneously disclosed the same information contained in the report concerning our environmental activities and performance on our website.

In this, the third issue of the Environmental Report, we referred to the Environment Ministry's *Environmental Reporting Guidelines (Year 2000 Version)* and *Environmental Accounting Guidelines (2002 Version)*, and focused our attention on the Group's high-priority topics and activities for fiscal 2002. We hope that this Environmental Report provides useful information to our readers.

• Published

December 2002

• Publishing Section

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Environmental Management 2

Messages from the Management	2
Environmental Policies	4
Toyo Global Environmental Action Plan	5
Environmental Management System	6

Reducing Environmental Impact 7

Preventing Global Warming	7
Reducing Industrial Waste	9
Water Conservation	10
Control of Chemical Substances	10
Protecting the Ozone Layer	12
Green Procurement	14

Developing Environmentally Friendly Products 15

Environmental Management and Business Domain	15
Environmentally Friendly Products by Business Segment	17
Promoting Recycling	22

Symbiosis with Society 25

Contributing to Communities	25
-----------------------------------	----

Awareness-Raising and Publicity Activities 27

Environmental Education	27
Environmental Communication	27

Emergency Response 28

Occupational Health & Safety and Disaster Prevention Activities	28
---	----

Improving the Management System 29

Environmental Risk Management	29
ISO 14001 Certification	30
The Environmental Impact Toyo Tire & Rubber Group Operations	31
Environmental Accounting	32

Data 33

History of the Toyo Tire & Rubber Group's Environmental Activities	33
Data of Manufacturing Plants	34

Messages from the Management

In Pursuit of Sustainable Business Activities Toward the Creation of a Recycling-Oriented Society



Yoshio Kataoka
President

Today, we face the pressing need to attain sustainable development that allows for both environmental preservation and economic growth. With this recognition, Toyo Tire & Rubber Group considers environmental preservation one of its highest management priorities.

Taking action on the environmental front, Toyo established the “Toyo Global Environmental Charter” in 1992, spelling out our environmental management policy. Based on this policy, the Toyo Group has focused on the prevention of global warming, reduction of industrial waste, and control of chemical substances, and has implemented specific measures toward achieving these goals.

From the time the Company was founded in 1945, the Toyo Tire & Rubber Group has been supplying high-quality products and services centering on tires, and including industrial rubber, polyurethane and plastic products, with “environment and safety” as the core theme of its business operations.

In April 2002, the Toyo Group initiated its 21st Century Management Vision for attaining further growth. The Vision defines a future in which the Toyo Group, by focusing on tire, anti-vibration and thermal insulation technologies, creates a more comfortable environment for individuals and communities, and thus emerges as a value-creating company that individuals and communities can always count on. In order to realize this mission, the Toyo Group will take decisive action to resolve environmental issues in each business domain. By continuously pursuing a variety of environmental preservation activities, the Group will help build a sustainable, recycling-oriented social structure.

There are many hurdles still ahead as the Toyo Group addresses environmental issues, but many substantial achievements have already been realized. The details of Group's activities and achievements have been summarized in the Environmental Report, published annually since fiscal 2000. This issue is the fiscal 2002 Edition. We hope it provides a better understanding of our efforts in eco-conscious operations, and we sincerely welcome your frank opinions and suggestions.

Focusing on Further Reduction of Environmental Impact Groupwide

Based on the recognition that our business activities have an impact on the global environment, the Toyo Tire & Rubber Group has been promoting eco-conscious operations. We believe that we cannot achieve sustainable business growth over the long term without steadily reducing environmental impact.

The rubber and polyurethane industry in which the Toyo Group operates is closely linked with global warming, which is becoming increasingly serious on a global scale. In this regard, our automotive-related products, featuring proprietary tire and anti-vibration technologies, and our thermal insulation materials are especially effective in the prevention of global warming. As a leading company in the rubber and polyurethane industry, we believe it is our mission to proactively address environmental issues. Fulfilling the mission will help create a sustainable, recycling-oriented social structure. It is to this end that the Toyo Group is striving to promote environmental management.

We specifically defined our medium- and long-term voluntary action plans in the Toyo Global Environmental Action Plan, while spelling out the philosophy and action guidelines as well as the system for the Group's environmental management in the Toyo Global Environmental Charter. In particular, for the prevention of global warming, we have established numerical targets for the reduction of carbon dioxide (CO₂) emissions, chlorofluorocarbon (CFC) use, and industrial waste generation, together with reductions in other indexes, as priority issues. We have achieved substantial results by steadily implementing our action plans.

In fiscal 2001, we reviewed past activities and set stricter target periods and values. We implemented more rigid control of chemical substances based on the PRTR (Pollutant Release and Transfer Register) Law. In addition, we are making the environmental accounting system an important tool for promoting environmental management and improving the system, by referencing the *Environmental Accounting Guidelines 2002 Version*, issued by the Ministry of Environment.

Together with a review of the action plans, we are also strengthening their promotion. We seek to further reduce environmental impact, focusing on the priority issues outlined above.



Takuya Okazaki
*Chairman of the Environmental
Preservation and Occupational
Health & Safety Committee*
Senior Managing Director



Hiroshi Takino
*Chairman of the
Environmental Committee*
Director

Environmental Policies

The Toyo Tire & Rubber Group considers reducing environmental impact one of its highest management priorities, and has been promoting eco-conscious business operations. In order to define the Group's policy in this regard, Toyo established the Toyo Global Environment Charter in 1992, spelling out the environmental philosophy and establishing action guidelines, then revised it in 2002.

Global Environmental Charter

1. Philosophy

Our corporate activities are aimed at creating fun on wheels and greater comfort. In doing so, we strive to help build a more affluent, fulfilling society, friendly to the Earth.

2. Action Guidelines

1) Compliance with laws and regulations

We observe environmental laws and regulations as part of our effort to preserve and protect the environment.

2) Reducing environmental impact

We strive to reduce environmental impact by minimizing the waste generated in our business operations, the energy consumption and the production and release of harmful chemical substances. Furthermore, we work aggressively to conserve resources and promote their effective utilization through recycling and other measures.

3) Developing environmentally friendly products

In the product planning stage, we consider all phases of the product cycle, from production to disposal, and develop products and technologies that are friendly to the Earth. We consistently develop and offer products, technologies and services that save energy, minimize pollution, and help preserve the global environment.

4) Symbiosis with society

As a member of the global community as well as the local communities we serve, we provide assistance through the Toyo Environmental Protection Fund and communicate with people throughout society with the aim of improving the living environment.

5) Awareness-raising and publicity activities

We plan and conduct education and training programs for our employees, tailored to their specific positions and the tasks in which they are engaged, to help raise their awareness regarding environmental preservation. We also conduct publicity activities for customers, communities and local residents.

6) Implementing environmental activities overseas

At our overseas business sites, we observe the local environmental laws and regulations, establish environmental management systems, and strive to achieve harmony with local communities.

7) Emergency response

We implement thorough proactive measures against environmental disasters, and maintain and improve equipment and facilities to prevent accidents. In the event of an emergency, we will investigate and take action immediately, and also strive to prevent recurrences.

3. Improving the Management System

We dedicate ourselves to creating a better environment by establishing an office and a director for environmental preservation and occupational health and safety issues; by improving the environmental management system; and by disclosing the action plans drawn up by the departments responsible for implementing environmental measures. We also conduct annual audits to verify and evaluate the results of our environmental preservation activities, and take additional measures as necessary.

Toyo Global Environmental Action Plan

The Toyo Global Environmental Action Plan, which was established voluntarily, specifies concrete activities to be carried out over the medium and long term, in order to attain the objectives of the Philosophy, Action Guidelines and Improvement of the Management System prescribed in the Toyo Global Environmental Charter. Since the plan was established in October 1993, the Toyo Group has made concerted efforts to achieve each and every target. We have completed our third review, and set even higher medium- and long-term objectives.

2002 Revisions

Relation to the Toyo Global Environmental Charter	Medium- and long-term objectives	Related page
2.1) Compliance with laws and regulations	Strict observance of environmental laws, regulations and requirements (including industrial action standards, agreements made with public organizations, and indexes other than compulsory regulations), as well as agreements made with local residents, in order to promote environmental preservation	11-29 34-37
2.2) Reducing environmental impact	Preventing global warming	10% reduction in carbon dioxide (CO ₂) emissions from the 1990 level by the end of 2010 <small>Note 1)</small> 7
		Expanded utilization of heat produced from the incineration of used tires, mainly by using cogeneration systems 8
		Reduction of waste directly disposed in landfill sites to within 1% of the total volume of discharged waste by the end of FY 2006 <small>Note 2)</small> 9
	Waste reduction	Minimization of industrial waste generation 9
		Improvement of recycling ratio and in-house processing ratio 9
	Reduction of harmful chemical substances	Development of technology toward total elimination of dichloromethane <small>Note 3)</small> 10
Protecting the ozone layer	Complete elimination of chlorofluorocarbon substitute (HCFC) in 2003 12,13	
Green procurement	Preferential purchase of eco-conscious raw materials and development of green technologies <small>Note 4)</small> 14	
2.3) Developing environmentally friendly products	Environmentally friendly activities in the product development stage	Proactive measures in product development to minimize environmental impact at production sites and also in manufacturing processes, distribution, product use and disposal 15,16
		Life cycle assessment of main products for the development of eco-conscious products (in compliance with environmental labeling standards) 16,24
	Development and supply of products and technologies to reduce environmental impact	Development of lightweight, fuel-saving, low-noise tires 17,18
		Development and supply of energy-saving products, including industrial, energy-related, and housing-related thermal insulation materials 19,20
	Development and supply of environmentally friendly products, technologies and services	Development of river water purification technologies 19
		Supply of pollution prevention products, technologies and services, such as stack gas desulfurizers 20
2.4) Symbiosis with society	Development of recycled products and recycling technologies	Development of recycled products made from used tires 23
		Development of polyol recycling and related technologies, and their application in product development. 24
	Toyo Environmental Protection Fund (established in August 1992)	The fund is based on a "matching gift" system, in which Toyo donates the contributions made by employees of the Toyo Group companies and adds an equal amount as a company donation. Donations are provided as financial aid to NGOs (non-governmental organizations) working to solve environmental problems, as part of Toyo's contribution to society. 25
	Close communication with local communities	Participation and cooperation in local events (including cultural events and clean-up drives) 26
2.5) Awareness-raising and publicity activities		Open tours of factories and other facilities 26
		Support for employees' voluntary social activities —
		Raising employees' awareness regarding environmental preservation through the Environmental Report, in-house magazines and PR brochures, and promotion of other publicity activities aimed at customers and society 27
2.6) Implementing environmental activities overseas		Establishment and implementation of employee education and training geared to the specific positions and the tasks in which the employees are engaged 27
	Control systems	Thorough understanding and observation of local laws and regulations —
		Global information exchange, collaboration and response —
2.7) Emergency response	Harmony with local communities	Respecting and understanding local cultures and customs to enhance harmony with local communities —
	Thorough implementation of proactive measures against environmental disasters and accidents	Strict management of pollution control facilities, and measurement and control of pollutants 29
		Thorough education on hazardous and toxic chemical substances, and strict control of these substances 11-27
3) Improving the Management System	Review and improvement of emergency response manuals and related documents	Implementation of emergency response training 6-28
	Management system	Environmental Preservation and Occupational Health & Safety Committee (reorganized in June 1997) •Establishment of companywide policies and plans for environmental preservation, disaster prevention and occupational health and safety improvement 28
		Corporate Staff Center, Environmental Preservation and Occupational Health & Safety Group (reorganized in October 2000) •Companywide promotion of environmental preservation, occupational health and safety and disaster prevention programs 33
		Environmental management program at plants •Establishment and implementation of action plans at each plant, in line with the corporate plan •Operation in conformity with the ISO14001 system 30
	Environmental accounting	Implementation of environmental accounting in conformity with the Environment Ministry's Environmental Accounting Guidelines <small>Note 5)</small> 32
Environmental Management System Audits	Implementation of internal and external audits 6	

Note 1) Targets and achievements were indicated based on emission per sales unit until FY 2002, but in FY 2003 and subsequent years, the unit of measurement has been changed from emissions per sales unit to total emissions (tons-CO₂), in accordance with the Environment Ministry's Environmental Reporting Guidelines.

Note 2) The medium- and long-term targets for FY 2003 and subsequent years have been revised.

Note 3) Note 4) Added as medium- and long-term targets for FY 2003 and subsequent years.

Note 5) Newly added in FY 2003.

Environmental Management System

Background

The Toyo Group's commitment to environmental preservation dates back to at least 1972, when it organized the Corporate Environmental Improvement Committee for the purpose of establishing pollution-free plants. Since then, the Toyo Group has actively pursued environmental preservation activities, as well as tree-planting campaigns and work environment improvement drives. In April 1992, in response to heightened concern over environmental issues worldwide, the original committee was reorganized into the Corporate Environmental Affairs Committee (CEAC), which was given executive decision-making responsibility for Group environmen-

tal preservation activities. In 1997, the CEAC was dissolved, and the Environmental Preservation and Occupational Health & Safety Committee was established. The Committee has been promulgating the Toyo Global Environmental Charter, which outlines environmental action guidelines, and the Toyo Global Environmental Action Plan, which spells out medium- and long-term objectives of voluntary activities.

In January 1993, the Environmental Management Department (now the Environmental Preservation and Occupational Health & Safety Group, Corporate Staff Center) was established. It aggressively promoted environmental preservation activities at each produc-

tion site, primarily for energy conservation and industrial waste reduction, and also conducted voluntary internal audits in accordance with the Toyo Global Environmental Action Plan. In June 1997, the Environmental Management Office (the former Environmental Management Department) was renamed the Environmental Preservation and Occupational Health & Safety Promotion Office. Then, in October 2000, it was reorganized into the current Environmental Preservation and Occupational Health & Safety Group. The reformed unit works to enhance groupwide efforts and activities in the areas of environmental preservation, occupational health and safety, and disaster prevention.

Environmental Preservation Promotion System

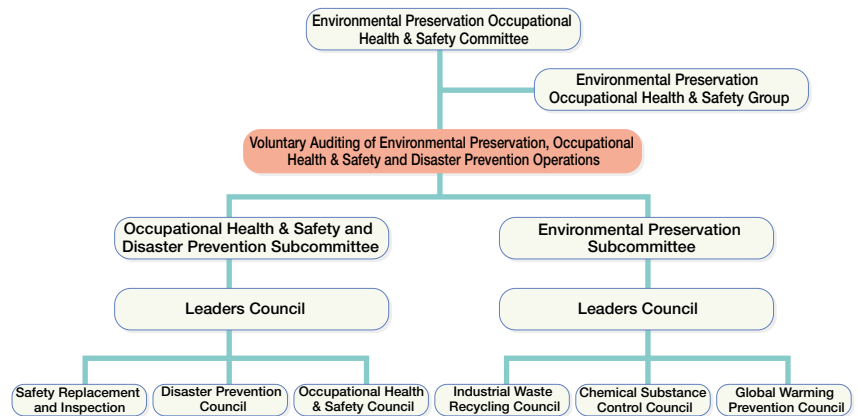
The Toyo Tire & Rubber Group organizations responsible for occupational health and safety and disaster prevention activities also carry out the Company's environmental preservation activities.

The Environmental Preservation and Occupational Health & Safety Committee deliberates groupwide environmental preservation activities, and determines policies, actions and targets. It is the Group's supreme body for environmental preservation issues. Its subordinate organizations include subcommittees that promote individual activities, special councils that are responsible for specific fields within the groupwide activities, and leaders councils, which coordinate the special councils. The Environmental Preservation and

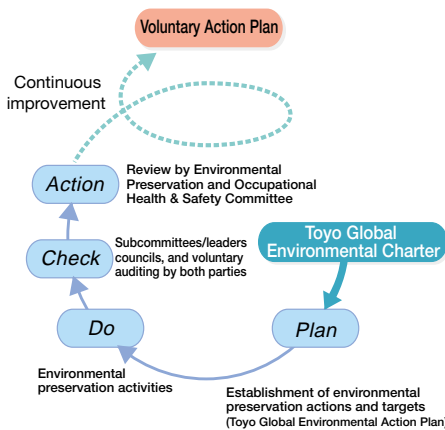
Occupational Health & Safety Group is dedicated to the management and support of environmental preservation activities. Delegates

from the various departments also periodically conduct voluntary audits of activities groupwide.

•Corporate Environmental Preservation, Occupational Health & Safety and Disaster Prevention System



•Toyo Tire & Rubber Group's Environmental Preservation Activities



Environmental Audits

The Toyo Tire & Rubber Group conducts environmental audits periodically at all its domestic manufacturing facilities, in order to ensure that environmental preservation activities are being consistently improved.

Internal auditing is also carried out, to examine the overall environmental activities promoted at production sites.

To make sure that the environmental management system is being operated as specified by ISO14001*, the Group commissions an external, ISO14001-certified and registered organization to annually audit site operations.

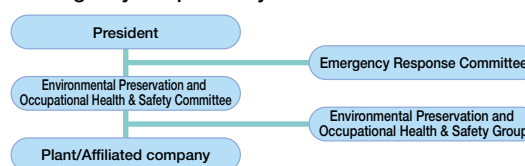


Toyo quickly addresses the issues pointed out in the audits, in order to ensure consistent improvement of environmental preservation activities.

Emergency Response

The Toyo Group has established an emergency response system to minimize environmental pollution resulting from possible accidents. It also conducts emergency response training regularly at its plants and affiliated companies.

•Emergency Response System



ISO14001: ISO14001 is the international standard for environmental management systems, promulgated in 1996 by the International Organization for Standardization (ISO). It calls for continuous improvement based on the management cycle of "Plan," "Do," "Check" and "Action."

Preventing Global Warming

Action Plan

1997 revised medium- and long-term target

10% reduction of basic carbon dioxide (CO₂) emission units (volume of CO₂ emissions per sales unit) from the FY 1991 level in Tire operations, Chemical & Industrial Products operations and Automotive Parts operations by the end of 2010 Note 1)

2002 revised medium- and long-term target

10% reduction of CO₂ emissions from the 1990 level by the end of 2010 Note 2)

FY 2002 target and result

< Basic CO₂ emission units >
Target: 0.671 tons-C/million yen
Result: 0.683 tons-C/million yen
Attainment ratio: 98.2%

FY 2003 target

CO₂ emissions:
283,691 tons-CO₂

Note 1) Revised in 2002

Note 2) Targets and achievements were indicated based on emission per sales unit until FY 2002, but in FY 2003 and subsequent years, the unit of measurement has been changed from emissions per sales unit to total emissions (tons-CO₂), in accordance with the Environment Ministry's Environmental Reporting Guidelines.

In line with the COP3* Protocol and subsequently established administrative and industrial policies, the Toyo Tire & Rubber Group continuously strives to prevent global warming through the reduction of CO₂ emissions — generated mainly at its production sites — by focusing on energy conservation, among other measures.

Tire plants consume particularly large amounts of electric power and heat energy in each manufacturing process: material refining, cutting, molding, vulcanization and inspection. Meanwhile in the polyurethane manufacturing processes, the consumption of electricity and heat energy is about 1/4 the amount used in the tire manufacturing processes. Burning heavy oil and coal to obtain this energy discharges CO₂. Therefore, conserving electricity and heat energy in the manufacturing processes leads to a reduction of CO₂ emissions.

Toyo Tire & Rubber Group takes various conservation measures designed to reduce CO₂ emission, such as modifying equipment used in each process to minimize energy loss, improving material mixing techniques, reducing vulcanizing time, and en-

hancing production system efficiency.

Toyo pursues a variety of energy-saving policies at each manufacturing site. All employees are instructed to save electricity, operate equipment efficiently, and avoid idling vehicle engines when stationary. By taking actions such as these, employees are enhancing their energy-saving awareness.

The Sendai Plant, for example, produces and distributes "Hints for Energy Conservation" pamphlets to employees, and conducts an annual "Energy-saving Summer Campaign" in conjunction with energy conservation awareness month. The plant also utilizes used tires to obtain energy for its operation, and recycles the ashes generated from tire incineration. Furthermore, waste thermal energy and warm wastewater are used in raising edible soft-shelled turtles.



Natural gas boiler



Vulcanizing process in tire production



Automotive polyurethane seat cushion manufacturing line using improved heat-retaining molding



Energy-saving boiler (also serves as direct heating deodorizing equipment)



Heat-retained manufacturing line for waterproof sheets

Energy Consumption in FY 2002

In FY 2002, the number of basic crude-oil-conversion energy consumption units (consumption volume of crude-oil-conversion energy per sales unit) for the Toyo Group's tire operations increased 0.3% from FY 2001, to 1.564 kL per million yen, while the number of basic CO₂ emission units decreased 0.8%, to 0.974 tons-C per million yen. In chemical and industrial products operations and automotive parts operations, on the other hand, the basic crude-oil-conversion energy consumption units rose 2.0% from FY2001, to 0.559 kL per million yen, and the basic CO₂ emission units climbed 1.5%, to 0.278 tons-C per million yen.

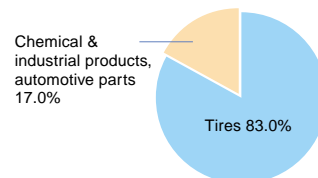
In the entire Toyo Tire & Rubber Group, basic crude-oil-conversion energy consump-

tion in FY 2002 increased 1.3% on a unit basis, to 1.114 kL per million yen, and the number of basic CO₂ emission units went up 0.4%, to 0.683 tons-C per million yen.

Comparing "total emissions" in accordance with the method adopted in FY 2002 in the Environment Ministry's Environmental Reporting Guidelines, the total CO₂ emissions in FY 2002 decreased 2.7% from FY 2001, to 279,765 tons-CO₂.

Until FY 2002, the Toyo Group had calculated the data based on basic CO₂ emission units (tons-C/million yen), using the sales amounts at its plants and affiliated companies, but because this proved to be an inappropriate index, we have switched to simple CO₂ emissions (tons-CO₂) volume for the calculation in FY 2003 and subsequent years.

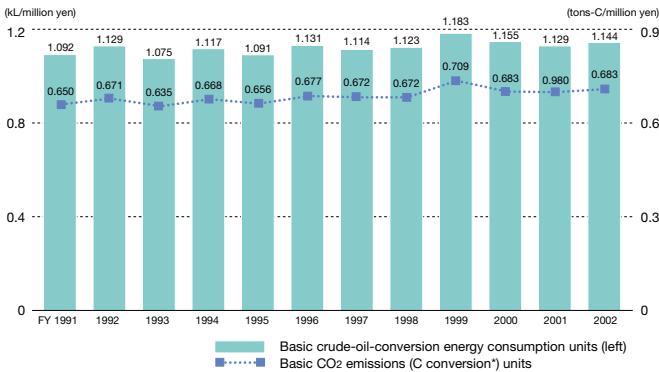
CO₂ Emissions in FY 2002 by Business



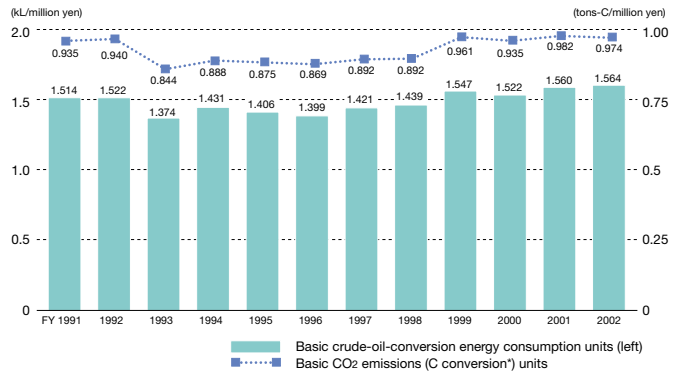
Although there was a slight increase from FY 2001 to FY 2002 in terms of basic CO₂ emission units, the total volume of CO₂ emissions actually decreased by 2.7%. The main reasons for this decrease are: (1) reduced electric power consumption due to lower production volumes, and (2) reduced consumption of heavy oil and coal due to the use of private power generators.

COP3: COP3 refers to the Third Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change held in Kyoto, Japan. In this conference, the Kyoto Protocol was adopted, mandating industrialized nations including Japan to achieve a 5% reduction in total greenhouse gas emissions (CO₂-conversion values) over the 2008-2012 period, compared with those in 1990.

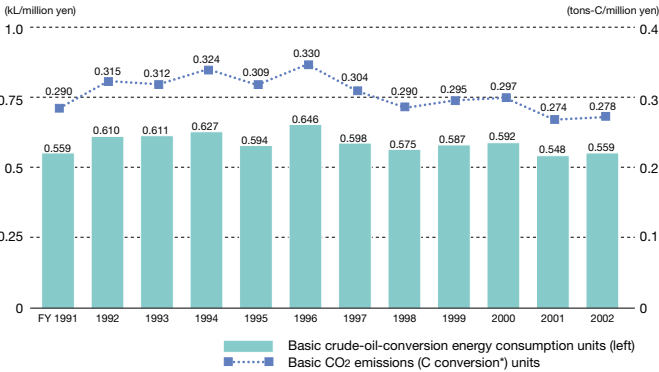
•The Group's crude-oil-conversion energy consumption and CO₂ emissions (C conversion*): basic units



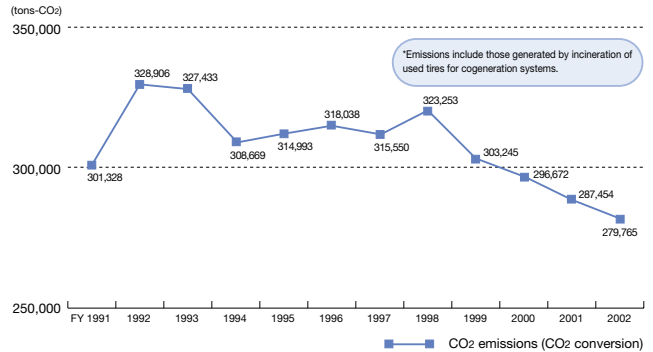
•Tire operations crude-oil-conversion energy consumption and CO₂ emissions (C conversion*): basic units



•Chemical/industrial products operations and automotive parts operations crude-oil-conversion energy consumption and CO₂ emissions (C conversion*): basic units



•The Group's CO₂ emissions (CO₂ conversion)



Toyo Tire & Rubber Group's Cogeneration Systems*

The tire industry has progressed together with the automobile industry. This progress has, however, given rise to a serious environmental issue—huge amounts of used tires left behind when cars are scrapped or their tires replaced.

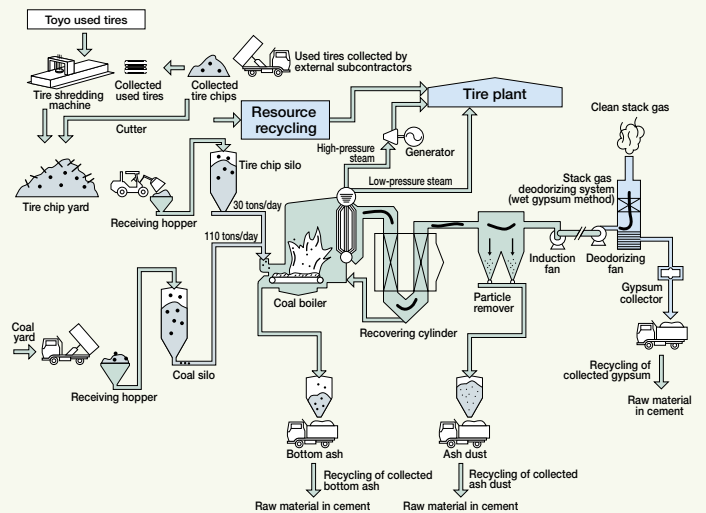
In addressing the used tire issue, we developed a cogeneration system that operates by using tire chips mixed with coal, and introduced it in the Sendai Plant in 1990. This cogeneration system was the first in Japan to be installed in a tire production facility.

The system uses a fuel consisting of 70% coal and 30% tire chips, which have a higher thermal generation value than coal. The boiler produces less NO_x than an ordinary coal boiler, and less SO_x than a boiler burning a mixture of heavy oil and tire chips. Thus, the Toyo cogeneration system has been attracting attention as a relatively low-pollution, low environmental impact method for power generation.

As of March 2002, 5,500 used tires were being incinerated every day (approx. 160,000 tires per month, 2,000,000 per year), to supply all the steam required in the vulcanizing process, and electric power amounting to more than 50% of overall demand in the plant.

At our Kuwana Plant (tire and industrial/chemical product production), we installed a heavy-oil, diesel-engine powered cogeneration system in 1995. Following the installation at Kuwana, our cogeneration efforts spread to our other plants.

•Cogeneration system installed at Sendai Plant



Shredding used tires for use as fuel in the cogeneration system



Cogeneration system operating at the Sendai Plant



Turbine for the cogeneration system at the Sendai Plant



Cogeneration system operating at the Kuwana Plant

C conversion: Total carbon dioxide (CO₂) emitted by the use of electricity, gas and fuel, converted into the amount of carbon (C).

Cogeneration system: A system that supplies heat energy and electric power at the same time. Since a cogeneration system uses exhaust heat produced in the process of generating electricity, it can provide higher heat utilization efficiency than a single-purpose system that either generates power or regulates temperature.

Reducing Industrial Waste

Action Plan Note)

1997 revised medium- and long-term target

80% reduction in the volume of industrial waste by the end of FY 2002 from the amount discharged in FY 1998

2002 revised medium- and long-term target

Zero emission of waste by the end of FY 2006

Note) Medium- and long-term target was changed in FY 2002.

FY 2002 target and result

< Direct disposal at landfill sites >
Target: 4,200 tons
Result: 5,033 tons

FY 2003 target

< Direct disposal at landfill sites >
3,940 tons

Industrial waste tends to grow in volume together with economic development. In Japan, the capacities of final disposal sites are decreasing rapidly, presenting a serious societal problem.

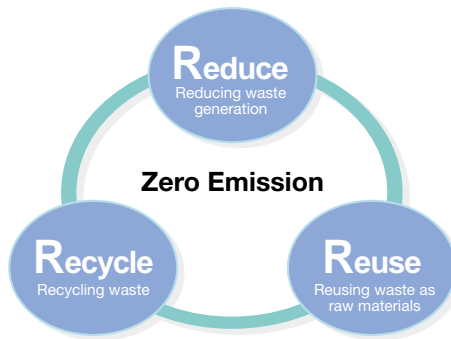
Against this backdrop, the Toyo Tire & Rubber Group has been promoting "zero emission" activities aimed at reducing the

volume of industrial waste directly disposed at landfill sites to within 1% of the total generated waste, based on the policy "Reduce, Reuse, and Recycle."

For example, unnecessary end pieces trimmed off during the process of waterproof sheet manufacturing are collected and reused as raw materials.



Industrial waste is strictly separated by type prior to collection

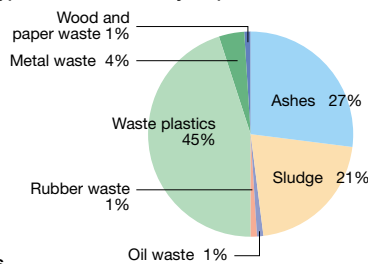


Reusing rubber pieces trimmed off during the waterproof sheet manufacturing process

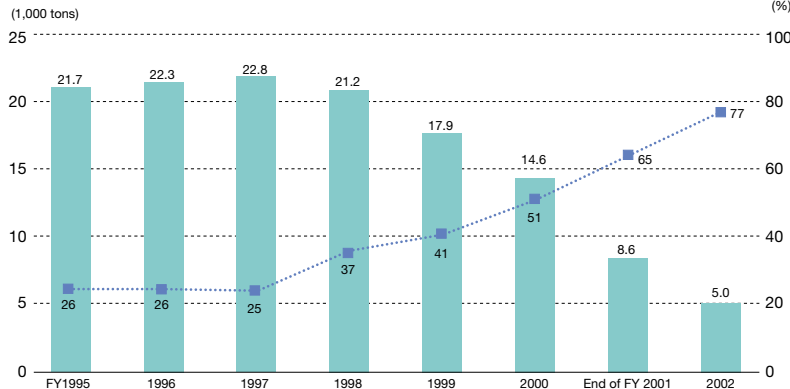
Industrial Waste Reduction in FY 2002

The amounts of industrial waste subcontracted for disposal in FY 2002 decreased 41.0% from FY 2001, to 5,033 tons, which represented a recycling ratio of 77%.

•Types of waste directly disposed at landfill sites



•Amounts of industrial waste disposed by subcontractors, and waste recycling rates



*Notes regarding "fiscal year" and "end of year" designations:
Until FY 2000, the data represented the amount of waste generated in the pertinent fiscal year (from April to March of the following year).
From FY 2001, the data is calculated by multiplying the amount of waste generated from January to March by four to obtain an annual amount.

■ Volume of industrial waste disposed by subcontractors (left)
■ Waste recycling rate

Water Conservation

Action Plan Note)

1997 revised medium- and long-term target

1% reduction from the previous year

2002 revised medium- and long-term target

Lower than the level in 2000

Note) Medium- and long-term target was changed in FY 2002.

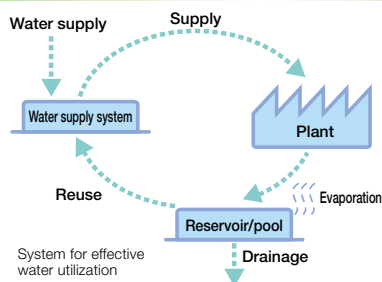
FY 2002 target and result

< Water consumption >
Target: 3,345,000 m³
Result: 3,463,000 m³

FY 2003 target

< Water consumption >
3,400,000 m³

The Toyo Tire & Rubber Group strives to conserve water. The Group's manufacturing sites save water by using it effectively, and by re-cooling and re-circulating used cooling water, among other water conservation and use maximization measures.



Cooling water re-circulation system

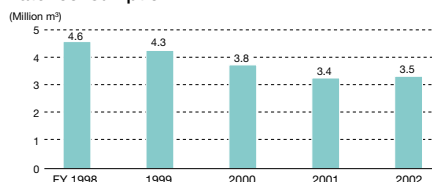


Tread cooling process in tire production

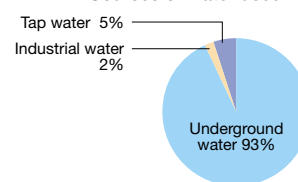
Water Conservation in FY 2002

The amount of water consumed in FY 2002 increased 3.5% from FY 2001, to 3,463,000m³, due to increased consumption in Tire operations.

•Water consumption



•Sources of water used in FY 2002



Control of Chemical Substances

Some 100,000 different chemical substances are said to be produced and distributed in the world today. These chemicals are used in a variety of products that are essential in our daily lives. Yet, however important they may be, we cannot deny the fact that chemical substances discharged into the atmosphere, water and soil in the process of product manufacture, distribution, use and disposal can

negatively impact people's health and the planet's ecosystems. In March 2000, the PRTR Law* was enacted, mandating companies using chemicals to implement stricter control over the substances.

The Toyo Tire & Rubber Group refers to Material Safety Data Sheets (MSDS*) in selecting which chemical substances to use. The Toyo Group ensures appropriate control of

chemicals contained in products and those used and discharged in manufacturing processes. At the same time, the Group is making efforts to switch to safer chemicals and to reduce chemical consumption, in order to create products that have less environmental impact and to prevent pollution before it occurs.

Reduction of Dichloromethane*

Action Plan Note)

Medium- and long-term target

Development of technology toward total elimination

Note) Added because the medium- and long-term target was changed in FY 2001.

FY 2002 target and result

< Consumption >
Target: 554 tons
Result: 489 tons

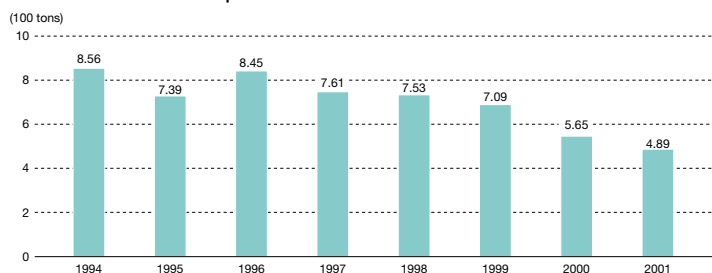
FY 2003 target

< Consumption >
458 tons

The Toyo Group uses dichloromethane as a foaming agent and a cleaning agent in its flexible polyurethane production. Since dichloromethane is a chlorinated solvent, it is high on the list of environmentally hazardous materials, and is controlled by various environmental laws and regulations. Therefore, the Group is making every effort to reduce dichloromethane consumption.

The amount of dichloromethane used in FY 2002 declined 13.4% from FY 2001, to 489 tons.

•Dichloromethane consumption



PRTR (Pollutant Release and Transfer Register) Law: The official title is the Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management. The law mandates the comprehensive monitoring and reporting to the administration of releases and transfers of chemicals suspected to be hazardous to people and/or ecosystems. The administration compiles the data and releases reports to the public.

Response to the PRTR Law

In compliance with the PRTR Law, the Toyo Tire & Rubber Group exercises strict control over toxic chemical substances, both in terms of their release into the atmosphere, water and soil, and their transfer as wastes. The Toyo Group is working to further tighten its control of toxic substances. The amounts of chemical substances which were released into the environment or transferred as waste, and which are regulated by the PRTR Law, and used by the Toyo Group in excess of one ton per year (0.5 tons or more for Specific Class I Designated Chemical Substances) in FY 2002 are listed below. For a detailed breakdown covering each Toyo Group manufacturing

plant, refer to the "Manufacturing Plant Data." The PRTR Law mandates reporting on chemical substances for which annual con-

sumption volume is five tons or more, with the information required in FY 2002 or 2003, depending on the substance.

•Top five chemical substances by volume handled in FY 2002

Ranking	Name of substance	Application
1	methyl-1,3-phenylene diisocyanate	Raw material for polyurethane
2	1,1-dichloro-1-fluoroethane	Polyurethane foaming agent
3	N-cyclohexyl-2-benzothiazolesulfenamide	Rubber vulcanization accelerator
4	toluene	Solvent
5	dichloromethane	Polyurethane foaming agent and cleaning agent

•The Group's PRTR in FY 2002

Designated substance No.	Substance name	CAS-No.	Amount released			Amount transferred	
			To atmosphere	To water	To soil	As industrial waste	To sewage
9	bis (2-ethylhexyl) adipate	103-23-1	7	0	0	50	0
25	antimony and its compounds	—	0	0	0	0	0
32	2-imidazolidinethione	96-45-7	0	0	0	125	0
40	ethylbenzene	100-41-4	6,237	0	0	241	0
43	ethylene glycol	107-21-1	0	0	0	3,616	0
44	ethylene glycol monoethyl ether	110-80-5	3,800	0	0	185	0
56	propylene oxide	75-56-9	70	0	0	0	0
59	p-octylphenol	1806-26-4	0	0	0	11	0
63	xylene	1330-20-7	199,632	0	0	23,050	0
100	cobalt and its compounds	—	0	0	0	487	0
101	2-ethoxyethyl acetate; ethylene glycol monoethyl ether acetate	111-15-9	21,675	0	0	369	0
115	N-cyclohexyl-2-benzothiazolesulfenamide	95-33-0	0	0	0	9,165	0
120	3,3'-dichloro-4,4'-diaminodiphenylmethane	101-14-4	0	0	0	0	0
132	1,1-dichloro-1-fluoroethane; HCFC-141b	1717-00-6	909,672	0	0	2,206	0
145	dichloromethane; methylene dichloride	75-09-2	267,046	0	0	22,833	0
159	diphenylamine	122-39-4	0	0	0	6	0
172	N,N-dimethylformamide	68-12-2	1,271	0	0	3,457	0
177	styrene	100-42-5	0	0	0	0	0
179	dioxins	—	280	0	0	620	0
198	hexamethylenetetramine	100-97-0	0	0	0	396	0
200	tetrachloroethylene	127-18-4	8,020	0	0	13	0
204	tetramethylthiuram disulfide; thiram	137-26-8	0	0	0	22	0
227	toluene	108-88-3	367,240	0	0	45,087	0
230	lead and its compounds	—	0	0	0	267	0
249	zinc bis (N,N'-dimethyldithiocarbamate); ziram	137-30-4	0	0	0	93	0
270	di-n-butyl phthalate	84-74-2	0	0	0	0	0
272	bis (2-ethylhexyl) phthalate	117-81-7	13	0	0	9,507	0
282	N-(tert-butyl)-2-benzothiazolesulfenamide	95-31-8	0	0	0	3,226	0
299	benzene	71-43-2	2,223	0	0	178	0
309	poly (oxyethylene) nonylphenyl ether	9016-45-9	0	0	0	1,036	0
338	methyl-1,3-phenylene diisocyanate; m-tolylene diisocyanate	26471-62-5	0	0	0	9,559	0
352	tris (2-chloroethyl) phosphate	115-96-8	1	0	0	10	0

Unit: kg/year (Rounded to the nearest whole number. Note that the amount of release and transfer of dioxins is indicated using another unit: mg-TEQ/year)

MSDS: Material Safety Data Sheets

Dichloromethane: Dichloromethane is a non-combustible solvent in practical use, with the highest dissolving power among chlorinated solvents. Since it also has a low boiling point, it is widely used for cleaning heat-sensitive parts.

Protecting the Ozone Layer

Action Plan

Medium- and long-term target

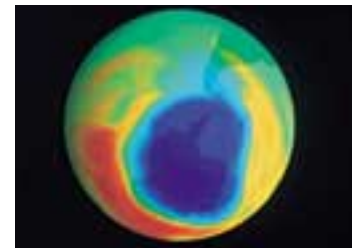
Complete elimination of the CFC substitute HCFC by the end of 2003

FY 2002 result

Development of foaming technologies using new CFCs and CFC-free substances with zero ozone depletion coefficient to replace the CFC substitute

The stratospheric ozone layer that protects people and other living things on Earth from harmful ultraviolet rays has been depleted by chemicals discharged into the air — such as chlorofluorocarbon (CFC), trichloroethane, and hydrochlorofluorocarbon (HCFC) — contained in refrigerants, cleaning agents and foaming agents. CFCs and HCFCs are also greenhouse gases that cause global warming.

As a leading polyurethane foam manufacturer in Japan, the Toyo Group is implementing policies aimed at phasing out ozone-depleting substances ahead of the schedule specified in the Revised Montreal Protocol.*



Ozone hole above the South Pole

Measures to Help Protect the Ozone Layer

The Toyo Group achieved complete elimination of the CFCs as foaming agents in its polyurethane products by the end of 1995, and switched completely to a CFC substitute* (HCFC141b). However, the Revised Montreal Protocol mandates terminating use of CFC substitutes by the end of 2019. Therefore, the Toyo Group has decided to advance its schedule and now plans to complete the switchover from the CFC substitute to new substances with zero ozone depletion coefficient by the end of 2003. While pursuing new CFC substitute technology, Toyo applied its proprietary expertise to successfully develop a 100% water-blown technology that offers a virtually zero global warming coefficient. This new technology achieves lower density, higher thermal insulation and greater moisture absor-



Water-blown polyurethane foam experiment (left); construction material made of water-blown polyurethane foam



bency, which were difficult to attain with the conventional water-blown technology. The Toyo Group is now working on the practical application of a CFC-free foaming technology that uses pentane.

The amount of the CFC substitute (HCFC141b) the Group consumed in FY 2002 increased 6.4% from FY 2001, to 1,992 tons, due to the increased production of foam liquid.

Foaming Methods and Environmental Impact

Foaming method		Ozone depletion coefficient*	Global warming coefficient*
CFC type	Category		
Chlorine-based CFC	CFC11	1.0	1.0
Weak-chlorine-based CFC	HCFC141b	0.1	0.145
	HFC134a	0	0.325
Dechlorinated CFC	HFC245fa	0	0.205
	Pentane-foaming	0	0.00075
CFC-free	Water-blown	0	0.00025

*Larger values indicate greater impact to the ozone layer or stronger global warming effect.



Measurement of polyurethane foam hardness



Measurement of heat conductivity ratio of rigid polyurethane foam

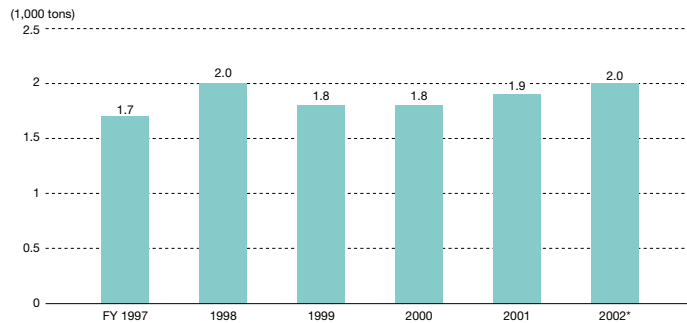
CFC substitute: CFC substitutes contain chlorine, but because of their hydrogen content, they are less harmful to the ozone layer. At the Fourth Meeting of the Parties to the Montreal Protocol, a resolution was passed, mandating complete elimination of CFC substitutes, including HCFC 141b and HCFC 123.

Revised Montreal Protocol: The Montreal Protocol specifies the schedule and regulations to be followed in reducing the use of ozone-depleting substances in accordance with the Vienna Convention for the Protection of the Ozone Layer. The Montreal Protocol was revised five times — in 1987, 1992, 1995, 1997 and 1999 — to strengthen the regulations.



Water-blown rigid polyurethane foam and galvalume steel sheet molded together in the production of Toyo Galdan

•Consumption of CFC substitute HCFC141b



* Note regarding "fiscal year"

Certain data was compiled from January to December in 2001, while other data was collected from April to March of the following year.

Progress toward Eliminating CFCs

- Apr. 1989** Established the CFC Task Force.
- Mar. 1991** Developed a new specific CFC*-free rigid polyurethane foaming system liquid.*
- June 1992** Developed Toyo Galdan, a thermal insulation board (primarily used for barn roofs and walls), made by integrating the molding of a durable galvalume steel sheet and rigid CFC-free polyurethane foam.
- Nov. 1992** Successfully developed a technology to eliminate the use of specific CFCs in the production of incombustible rigid polyurethane foam for spray, which had previously been considered technologically difficult.
- Jan. 1994** Completely eliminated the use of specific CFCs in flexible polyurethane foam production by using a substitute foaming agent and alternative materials.
- June 1994** Became the first in the industry to develop Grade-2 incombustible, specific CFC-free, rigid polyurethane foam for spray.
- Aug. 1995** Eliminated trichloroethane in the bumper cleaning process by modifying the cleaning agent and production facility.
- Dec. 1995** Completely eliminated specific CFCs in rigid polyurethane foam production by using an alternative foaming agent and a CFC substitute technology.
- Mar. 1998** Developed a technology to produce 100% water-blown, incombustible rigid polyurethane foam without employing a foaming agent of HCFC and HFC.
- 1999** Started switching over to the water-blown foaming method, and established a foaming technology that uses a new substance with zero ozone depletion coefficient and extremely low global warming coefficient. Also began research on the practical use of a CFC-free pentane foaming method.
- 2001** Began switching over to the new substances with zero ozone depletion coefficient and extremely low global warming coefficient. The switchover is scheduled for completion by the end of 2003.

Letter of Appreciation from UNEP

In October 1995, Toyo employee Takao Yamamoto won a commendation from UNEP (the United Nations Environmental Programme), in the form of a letter of appreciation. UNEP recognized Mr. Yamamoto for the key role he played in formulating policy proposals for the Seventh Meeting of the Parties to the Montreal Protocol, held in Vienna in December 1995. Mr. Yamamoto — then the Assistant General Manager of the Polyurethane Group, Chemical and Industrial Products Technical Department — also served at Japan Urethane Foam Association (JUFA), chairing the JUFA Technology and Environment Committee's Subcommittee on CFCs. The UNEP letter bestowed international recognition on Toyo and the entire Japanese polyurethane industry for its forward-looking attitude and vigorous efforts in the area of environmental preservation.



UNEP letter of appreciation: presentation ceremony and the letter

Specific CFCs: Specified CFCs contain chlorine, fluorine and carbon. When discharged into the atmosphere, they decompose in the stratosphere due to a reaction with ultraviolet rays, and produce chlorine that depletes the ozone layer. Complete elimination of CFCs (five types: CFC 11, CFC 12, CFC 113, CFC 114 and CFC 115) was mandated by the end of 1995.

System liquid: Foaming liquid prepared in consideration of production conditions, facilities and engineering to meet customers' quality requirements.

Green Procurement

Action Plan Note 1)

Medium- and long-term target

Preferential purchase of eco-conscious raw materials and development of green technologies

FY 2002 result

Promotion of green purchasing for materials not related to manufacturing, Note 2) and partial promotion of green purchasing for materials related to manufacturing, such as packaging materials and containers

Future target

Establishment and implementation of "Green Purchasing Guideline"

Note 1) Newly added in FY 2002.

Note 2) Materials for green purchasing not related to manufacturing in FY 2002: office supplies such as company envelopes, copy paper, computer output paper, paper files, toilet paper, ball-point pens, erasers, card cases and floppy discs; work supplies such as work clothes and cotton work gloves; and PR and advertising materials such as catalogs and pamphlets

In line with the Law on Promoting Green Purchasing* enacted on April 1, 2000, which promotes the preferential purchase of environmentally friendly products and services, the Toyo Group has been conducting activities that reduce environmental impact in the procurement stage.

When purchasing office automation equipment, office supplies, company cars and other products, the Group refers to the *GPN Data Book for Green Purchasing*, published by the Green Purchasing Network (GPN), so that the Toyo Group can select products that have less impact on the environment.

To reduce paper waste, the Group has introduced IT (information technology) paper-less information processing, while increasing the use of

recycled paper. The Toyo Group began by using recycled paper in copiers, computer printouts, toilet paper and paper towels in offices, then extended the use of recycled paper to PR and advertising tools such as the company brochure, catalogs and posters, and eventually the full range of office supplies, including envelopes and document forms.



PR materials, advertising tools and office supplies made of recycled paper

In purchasing raw materials and parts, the Toyo Group seeks the cooperation of suppliers from the standpoint of protecting our forests. The Toyo Group is switching packaging materials from wood and cardboard to returnable iron or resin containers that can be re-used repeatedly. As these examples demonstrate, environmental protection efforts extend to all areas of the Group and its operations.

The Toyo Group plans to establish "Green Purchasing Guideline" to further advance green procurement activities.

Natural Gas Vehicle Used for In-house Delivery

For the delivery of in-house mail and other articles, Toyo uses a natural gas vehicle known for clean emissions. Natural gas vehicles do not produce black smoke, and their emissions contain much lower amounts of nitrogen compounds (NOx) and carbon dioxide (CO2) than the exhaust gas of gasoline vehicles, while offering about the same driving performance.



Reusable part and product packaging materials

Environmental Measures for Logistics

In every phase of its supply chain (i.e., operations in all business processes from raw material procurement to delivery to customers), the Toyo Group strives to reduce the use of vehicles for transportation and to limit environmental impact.

Previously, in trucking parts and materials to manufacturing sites, each vehicle carried cargo from only one supplier. This meant

trucks were not always fully loaded during operation. In its drive to streamline distribution, the Toyo Group is now promoting a delivery system that allows two or more suppliers to share a truck. The Toyo Group is also striving to improve loading and transportation efficiency by shortening distribution routes and using cargo space more effectively. By rationalizing distribution operations, the Toyo Group is reducing the number of delivery

trucks on the road and the frequency of their operation.

For long-distance transportation, the Toyo Group is shifting from exclusive reliance on trucks to using a combination of trucks and ships. Effective use of cargo ship transport reduces the exhaust gas and noise that would otherwise be produced by trucks; it also serves to reduce energy consumption and CO2 emissions.



Shipment of tires from the Kuwana Plant

Law on Promoting Green Purchasing: Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (May 31, 2000, Law No. 100)

Environmental Management and Business Domain

The Toyo Tire & Rubber Group proactively promotes environmentally friendly technology and product development, in order to minimize the environmental impact of its business operations. To this end, the Toyo Group is accelerating its environmentally friendly operations in the various business domains in which it is active, and is also developing a system to accurately assess the environmental impact resulting from its products.

Tires

Technology	Product	Environmental issues addressed
Low rolling resistance tire (DSOC II* + materials technology) (Tmode** + materials technology)	Lightweight tires	Air pollution, global warming, industrial waste, exhaustion of natural resources
	Energy-efficient tires Tires for electric vehicles	Air pollution, global warming
Abrasion-resistance control technology (DSOC II* + materials technology) (Tmode** + materials technology)	Studless tires	Air pollution
Low noise technology	All tires	Noise
Advanced wear-resistance technology	All tires	Industrial waste
Resource conservation technology	Lightweight tires	Exhaustion of natural resources
Thermal recycling technology	Co-generation boiler fuel	
Material recycling technology	Retread tires for trucks and buses	Industrial waste, exhaustion of natural resources
	Retread tires for aircraft	

*DSOC II: Toyo Tire & Rubber's original, integrated tire design optimization technology using computer simulation

**Tmode: Toyo Tire & Rubber's new basic tire design technology, which simultaneously simulates and analyzes both the movement of the vehicle being driven and the behavior of the tire on the vehicle

Chemical/Industrial Products

Technology	Product	Environmental issues addressed
Pollution prevention system technology	Stack gas treatment systems	Air pollution, acid rain, offensive odors
	Stack gas desulfurization systems	Air pollution, acid rain
	NOx-suppressing additives	
	Microbiological deodorizing systems	Offensive odors
	Water treatment contact-filtering material	Water contamination
	Waterproof shielding sheets	Water contamination, soil contamination
New polyurethane foaming technology	Rubber/chemical linings	Air pollution, water contamination, acid rain
	Polyurethane foamed with HCFC Polyurethane foamed with HFC/pentane	Ozone layer depletion, global warming
	Water-blown polyurethane	
Energy-saving thermal insulation technology	Rigid polyurethane foam thermal insulation materials and manufacturing facilities Thermal insulators used in LNG*-related products cryogenic insulators	Global warming, exhaustion of natural resources
	Manufacture and installation of large refrigerated warehouses and cold-chain thermal-insulating panels	
Polyurethane material recycling technology	Chip foam	
Rubber material recycling technology	Water-permeable pavement material	Industrial waste, exhaustion of natural resources
Polyurethane chemical recycling technology	Recycled polyol	

LNG: Stands for Liquefied Natural Gas. Among fossil fuels, LNG produces relatively small amounts of air pollution and greenhouse gasses.

Automotive Parts

Technology	Product	Environmental issues addressed
Vibration-isolation/noise-prevention/vibration-control technology	Engine mounts	Air pollution, vibration
	Pneumatic springs	Vibration
	Stoppers	Noise, vibration
	Bushings	Noise
	Weather strips	
	Seat cushions	Vibration
New polyurethane foaming technology	Polyurethane foamed with HCFC	Ozone layer depletion, global warming
	Polyurethane foamed with HFC/pentane	
	Polyurethane foamed with carbon dioxide gas	
	Water-blown polyurethane	
Lightweight design technology	All automotive parts	Air pollution, global warming, industrial waste, exhaustion of natural resources
Rubber material recycle technology	TPE* foam sealing materials	Industrial waste, exhaustion of natural resources
	Resin boots	Air pollution, industrial waste, exhaustion of natural resources

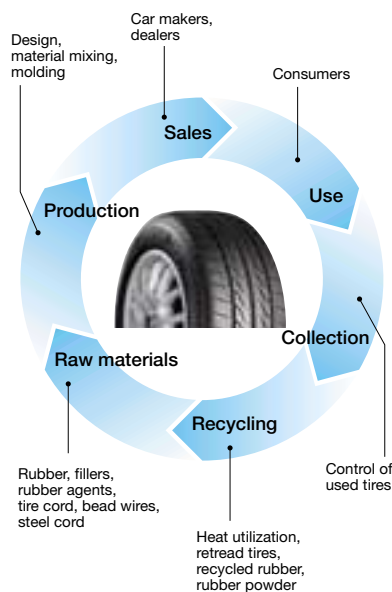
Life Cycle Assessment Activities

The Toyo Group is working aggressively to reduce environmental impact in every phase of the product life cycle, from raw material procurement and product design through production, transportation, sales, use, disposal

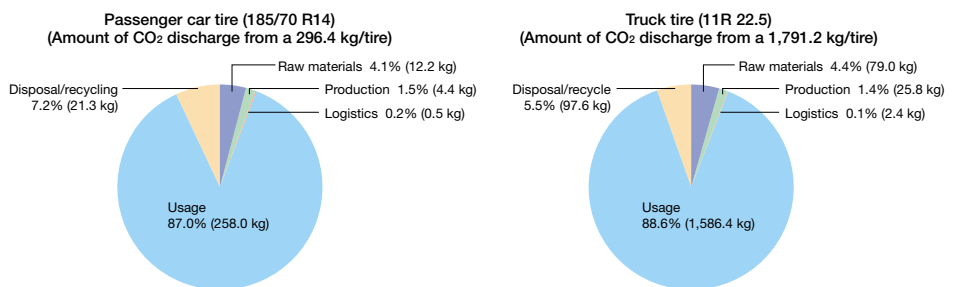
and recycling. To this end, we conduct a thorough life cycle assessment (LCA), in which we identify potential environmental impact factors, analyze them on a quantitative and qualitative basis, then develop and implement

countermeasures. We have been doing life cycle assessments for tire operations since 1997, and will soon introduce the assessment system in our chemical and industrial products operations and automotive parts operations.

Life cycle of tires



Amounts of CO2 discharged from a single passenger car/truck tire



< LCA calculation method >

In compliance with *Tire Inventory Analysis (1998)*, published by The Japan Rubber Manufacturers Association

- Raw material phase:**
Inventory data from raw material manufacturers
- Production phase:**
Calculation based on amounts of energy (fuel and electric power) consumed in production
- Distribution phase:**
 - Transportation by 10-ton truck for a distance of 500 km (fuel consumption: 3.5 km/L)
 - Carrying capacity
 - Passenger tires: 800 tires/truck
 - Truck/bus tires: 160 tires/truck

(4) Usage phase:

Item	Passenger tire	Truck tire
Tire weight	7.8 kg	53.7 kg
Service life	35,000 km	120,000 km
Fuel consumption of vehicle	10 km/L	4 km/L
Ratio of tires to fuel consumption	1/8	1/5

(5) Disposal/recycle phase:

- Incineration:**
Based on the assumption that all carbon (C) generated from incineration of used tires changes to CO₂
- Recycled rubber, rubber powder and retread tires:**
Calculation based on amounts of energy (fuel and electric power) consumed in production

TPE: Stands for Thermo-Plastic Elastomer. TPE is an elastic plastic that softens when heated and hardens when cooled, and can be modified this way repeatedly, thus enabling easy recycling.

Environmentally Friendly Products by Business Segment

Tires Designed to Minimize CO₂

Automobiles discharge CO₂ — a greenhouse gas — as they burn gasoline and gas oil. To reduce CO₂ emitted by vehicles, gasoline and gas oil consumption must be decreased, i.e. fuel efficiency must be improved. Tires have a role to play in this area. When the tires offer less resistance to rotation, this lowered rolling resistance enables a vehicle to use less fuel, and thereby discharge less CO₂. By incorporating new tire shape, structure and rubber compound design technologies, we achieved a reduction of approximately 20% in rolling resistance in FY 2000 from the level in FY 1991.

The average weight of Toyo tires produced in FY 2000 was about 10% lighter than in FY 1991, and the service life has also been extended about 20%, due to improved wear resistance. The result is resource conservation, and an indirect contribution to the reduction of CO₂.

Moreover, we are pursuing lighter, fuel-efficient tires in conjunction with the research and development of environmentally friendly gasoline- and electric-powered hybrid cars, all-electric battery-powered vehicles, and vehicles that run on solar power.



High-speed driving test

Low-Noise Tires

As societies have grown more motorized, traffic volume has increased. Vehicle noise has thus become a serious problem, especially to people living near heavily traveled main roads. Toyo is concentrating on developing tires that minimize the generation of road noise.



Tire noise test

Comfort Enhancing Tires

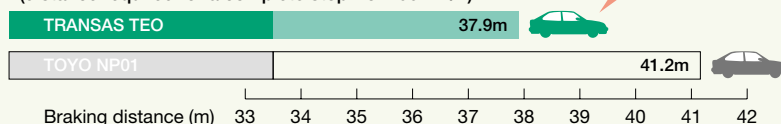
As motorization advances, diversifying the lifestyles of automobile users, the performance demanded of tires is also becoming more complex. Sedans, for instance, require tires that offer enhanced riding comfort and less impact on the environment. To respond to these trends, Toyo has introduced the TRANSAS TEO, a tire specifically designed and optimized for sedans.

The TRANSAS TEO offers a quiet, comfortable ride throughout its service life, provides the added safety of superb stopping performance — even in the rain — and incorporates eco-conscious design for improved fuel economy and greater durability.



TRANSAS TEO

•Braking test on a wet surface
(distance required for a complete stop from 90 km/h)



[Tire test conditions]

Place: Toyo Tire & Rubber Co., Ltd. Tire Test Course

Vehicle: Toyota Vista SV50 (equipped with ABS)

Test tires: TRANSAS TEO TOYO NP01

Tire size: 195/65R15 91H (S for NP01)

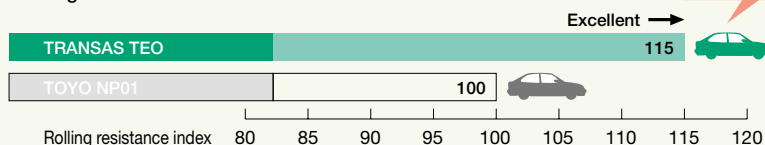
Rims: 15x6JJ Tire air pressure: 220 kPa/200 kPa < F/R >

Load: Equivalent to 2 occupants

Braking test method (in-house test):

Brakes applied in ABS-equipped vehicle to measure braking distance from 90 km/h to 0 km/h (straightway stopping) on a wet road, with the water present measuring 1 mm in depth

•Rolling resistance test



[Tire test conditions]

Test data obtained by drum-type rolling resistance tester

Tire size: 195/65R15 91H (S for NP01)

Rims: 15x6JJ Tire air pressure: 200 kPa

Load: 450 kgf

•In both tests, comparison was made between Toyo passenger car radial tires, the TRANSAS TEO and TOYO NP01.

•Detailed test data was submitted to the Tire Fair Trade Council

Enhancing Studless Tire Development

Toyo began marketing studless tires in response to the Law Concerning Prevention of Spiked Tire Dust, which was enacted in 1990 in an effort to help reduce road dust produced by spiked tires.

In 2001, we installed an ice drum tester to allow more reliable evaluations of studless tires year-round. The new equipment has enabled us to improve tire performance and develop new tires more quickly.



Ice drum tester



The Observe Garit KX studless tire

Run-Flat Tires Help Improve Fuel Economy

In 1981, Toyo moved to the head of the industry by commercializing run-flat tires for physically challenged drivers and police vehicles. The run-flat tires allow safe driving un-

der specified speed conditions for a certain distance, even when air pressure falls to zero after a puncture, or for other reasons.

Use of run-flat tires eliminates the need for a spare tire, thus reducing the vehicle weight and improving fuel economy. To further im-

prove fuel efficiency, Toyo is working hard to develop lightweight run-flat tires which offer less rolling resistance without sacrificing safety or comfort.

Tmode, the New Basic Tire Design Technology

To meet today's demands, vehicle tires must offer improved driving performance as well as advantages in other areas, such as lower rolling resistance, a quieter ride with less road noise, and a longer service life.

To achieve these sometimes conflicting objectives, a new tire design technology must be developed to enable production of specialized tires best suited to each consumer's vehicle and driving style. The technology must accurately capture forecast data, including the load on the tire, and optimize the tire structure and fabrication materials by simulating both driving conditions and tire behavior.

Based on this concept, we invented a proprietary basic tire design technology, Tmode, which simultaneously simulates the behavior of both vehicle and tire under a variety of running conditions, thus enabling extensive analysis.

Starting from the TRAMPIO Vimode sport tire introduced in January 2001, Toyo has been applying Tmode to the design of all its passenger car tires, seeking to enhance basic characteristics including rolling resistance, noiseless ride and wear resistance. Tmode also helps improve driving performance with its shorter braking distance, excellent aquaplaning and superb cornering grip.



Tmode simulates vehicle and tire behavior.

Eco-Conscious Automotive Parts

In developing various automotive parts, mainly made of rubber and polyurethane, the Toyo Tire & Rubber Group sets a weight reduction target for each part, and conducts R&D activities designed to achieve the goal. These efforts lead to improved vehicle fuel efficiency.

In addition, from the design stage, we seek to develop automotive parts in collaboration with car manufacturers, factoring parts collection and recycling from scrapped cars into the plan. Accordingly, parts are designed for easy disassembly and removal from vehicles, and for ready separation and sorting of materials. The various material types are labeled for quick identification, and easy, repeated recycling.



Designing lightweight automotive parts



Anti-vibration rubber automotive parts

Rigid Polyurethane Contributes to CO₂ Reduction

Building a house with superb thermal insulation materials reduces annual heating costs by about 70%, according to a study conducted recently in Japan. Meanwhile, a research from Europe indicates that effective thermal insulation can decrease CO₂ emissions by 8 to 10%. In short, thermal insulation performance is directly related to energy saving. Among the insulation materials available on

the market, rigid polyurethane foam is a clearly superior performer. Amid heightened concerns over global warming, the need for high-performance thermal insulation materials continues to grow. The Toyo Group boasts a high share of the rigid polyurethane market in Japan, and thus contributes to energy conservation and CO₂ reduction through the supply of high-performance thermal insulation products for various applications.

Major applications of rigid polyurethane:

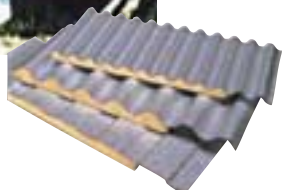
Rigid polyurethane applications include low-temperature warehouses, refrigerated warehouses, refrigerators, freezers, low-temperature showcases, containers, refrigerated ships (including fishing boats), LNG (liquefied natural gas) tanks, LNG tankers, vending machines, barns, silos, mushroom cultivation houses, multi-unit residential buildings, houses, commercial buildings, schools, and hospitals.

•Toyo Galdan

Toyo Galdan corrugated thermal insulation boards for barns are manufactured employing an integrated molding of a galvalume steel sheet and rigid polyurethane foam with superb thermal-insulating performance. Toyo Galdan is produced by the environmentally friendly water-blown method.

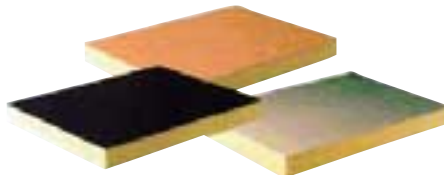


A barn built with Toyo Galdan, and thermal-insulating boards in various shapes



•Soflan Board

Soflan Board is made by sandwiching rigid polyurethane — featuring the highest thermal-insulating performance among all available thermal insulating materials — with a soft face material. Soflan Board is best suited to construction applications, where it offers high thermal and chemical resistance.



Soflan Board

•Soflan High-Board

Soflan High-Board is used for thermal insulation in large, cryogenic structures such as LNG (liquefied natural gas) tanks and LNG tankers. It minimizes energy loss during storage and transportation of LNG and other low-temperature materials.



Soflan High-Board used in an LNG tank (above) and an LNG tanker (below)

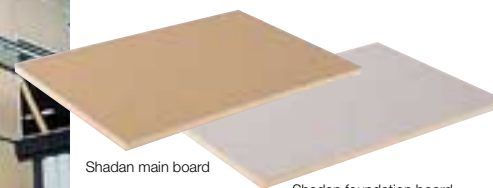


•“Shadan Q” Method

The Shadan Q external thermal insulating method uses rigid polyurethane boards, which combine outstanding airtight characteristics and durability with superior thermal insulation capabilities, thus enabling construction of energy-saving houses. Since it prevents dew condensation within the thermal insulating material, Shadan Q helps prolong the service lives of houses.



Shadan Q method



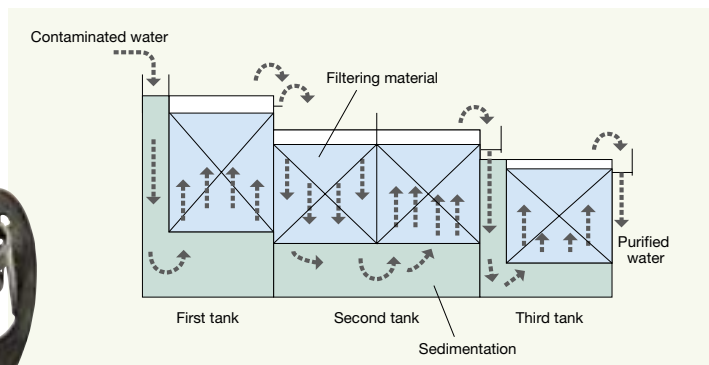
Shadan main board

Shadan foundation board

Toyo Bigore — River Water Purification System

Toyo Bigore draws on biochemical reactions to purify contaminated water. In this system, river water is conducted to a water channel containing Toyo Bio Heilex plastic contact-filtering material to eliminate BOD*, which arises from dissolved organic matter in water, and the microscopic organic matter known as SS*.

As river water passes through the special Toyo Bio Heilex porous filtering material, with its large surface area, the water recovers its self-cleaning capability. Since the system requires minimal machinery, it offers low operating costs and easy maintenance.



Toyo Bigore river water purification system using the Toyo Bio Heilex (left)

BOD: Stands for Biochemical Oxygen Demand. This is a measure of the quantity of oxygen consumed by microorganisms during the decomposition of organic matter in water over a given period of time. The higher the BOD, the dirtier the water.

SS: Stands for Suspended Solids. SS are fine undissolved particles of any solid within a liquid. The SS concentration is an index used to express the turbidity (cloudiness) of water.

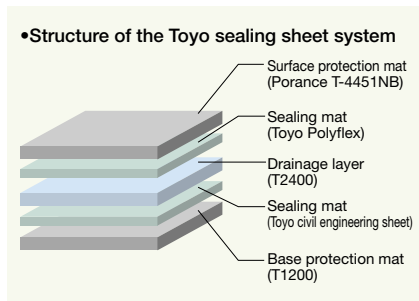
Seepage Control at Industrial Waste Disposal Sites

The Toyo shielding sheet system was designed in response to a December 1995 Ministry of Health and Welfare (currently the Ministry of Health, Labour and Welfare) request for reinforced seepage control at industrial waste disposal sites.

This highly durable shielding system is made by sandwiching a drainage layer between two sealing mat sheets, then covering the surfaces with a surface protection mat and a base protection mat. The Toyo Group also offers other methods that provide a seepage monitoring function and a self-repair function.

Toyo shielding sheet is used at various waste disposal and collection centers and re-

clamation sites to prevent harmful waste substances from seeping into and contaminating the soil and groundwater.



Shielding sheet-laying work

Stack Gas Treatment Systems

The Toyo Group has been focused on processing harmful gases for many years, and has installed various systems to treat specific corrosive and odor-causing stack gases.

The photo shows a stack gas treatment system installed on an industrial waste incinerator that handles medical waste, vinyl and styrene foam.

The Toyo system removes chloride compounds such as hydrogen chloride (HCl) generated from incineration, and sulfur oxides such as sulfur dioxide gas (SO₂) produced by heavy oil used as a supplementary fuel.



Stack gas treatment system installed on a mixed waste incinerator

Deodorizing Systems

The deodorizing system shown in the photo eliminates unpleasant smells generated in a poultry manure fermentation room. Because odors produced on a large poultry farm will not dissipate naturally, a deodorizing system must be installed.

Removing harmful gases eliminates offensive odors; therefore, odor treatment equipment is also a type of gas treatment system. The Toyo Group brings its extensive stack gas treatment expertise to bear in developing systems that remove offensive odors.



Deodorizing equipment eliminates odors in a poultry manure fermentation room

Rubber and Resin Linings

Linings are used to cover metal products and concrete, to prevent corrosion and abrasion. As corrosive elements in our environment become increasingly complex, higher performance is demanded of linings.

The Toyo Group draws on its long-standing technical expertise in the rubber and resin field to produce high-quality linings.



Chemiflake linings

Catechin-Compounded Polyurethane Foam

To meet the growing need for products that promote a clean, healthy environment, the Toyo Group produces and sells polyurethane foam containing catechin, extracted from green tea.

Catechin has antibacterial and deodorizing effects, and is a gentle natural alternative to conventional, chemically synthesized counterparts.



Catechin-compounded polyurethane pillow

Environmentally Conscious Redevelopment

Technical Center Built in Harmony with the Surrounding Environment

Toyo is promoting a project to redevelop its Tire Technical Center in Itami City, Hyogo Prefecture, into the core of the company's future research and development operations. Toyo started the reconstruction of the Center in the summer of 2000. The building was completed in November 2001, and the facility renamed "Toyo Technical Center."

Designed to stimulate the creativity of researchers and engineers, the Toyo Technical Center incorporates various innovative ideas, and provides the driving force behind Toyo's R&D activities in the 21st century.



Quiet, spacious office

The new building consists of two main zones. The tire experimentation



and evaluation zone occupies the first and second floors. The research and development zone — on the fourth and fifth floors — has no partitions or barriers, and features an atrium in the center.

Tests conducted in the tire experiment and evaluation zone produce noise and vibrations, yet the research and development zone requires quiet, so people can immerse themselves in their creative thoughts. In order to interconnect two areas with such conflicting characteristics and still allow each the isolation it requires, the third floor serves as a buffer zone. It features a special middle-floor seismic isolation system developed by Toyo, the first of its kind in the world.



Cornering performance test on a flat-belt tester

The third floor also functions as both a customer care center and product showcase, where visitors can see for themselves the seismic isolation equipment installed in the building.

The main building also incorporates cutting-edge audio-visual equipment and information technology infrastructure to facilitate technical and product development. Its air conditioning system uses water and a CFC substitute with a zero ozone depletion coefficient for the heat source and refrigerant. The building's superb heat insulation structure minimizes energy loss. Furthermore, solar energy, natural light, and natural wind are fully utilized to enhance the comfort of the indoor environment, while conserving energy. Coupled with road improvements in the area and greening projects such as tree-planting that create an attractive and distinctive landscape year-round, the facility blends harmoniously with the surrounding environment.

At the cutting-edge Toyo Technical Center, we have already embarked on the challenge of creating the comfortable environment that the 21st century will demand.



Solar cells used to power outdoor lights



Seismic isolation installed in the garden terrace section on the third floor (top), and exterior of the Center building (left)



- Location: 104 Amatsu-Fujinoki, Itami City, Hyogo Prefecture
- Structure: 5 stories above ground, one-story penthouse
- Total floor area: Approx. 9,750 m²

Redevelopment of the Former Itami Plant Site

The Itami Plant began operation in 1953, and produced Toyo's automotive tires for many years. However, because the vicinity was recently developed as a residential area, and owing to the damage the facility sustained during the Great Hanshin Earthquake, the Itami Plant closed down in December 1998, and its production function was transferred to the Kuwana Plant.

The site of the former Itami Plant, a prime location in front of the JR Itami Station, is being redeveloped into one of the largest commercial complexes in the Kinki region. Named "Diamond City Terrace" (total floor area: 153,500 m²), the facility is now under construction, with opening scheduled in the fall of 2002.

Our efforts toward environmental preservation in this redevelopment project involve addressing the following issues.

•Closing down the Itami Plant

The Itami Plant concluded an industrial pollution prevention agreement with Itami City and Hyogo Prefecture in 1970, intended to reduce the facility's impact on the surrounding environment. In closing down the plant, we investigated the soil and underground water for hazardous chemical substances, including thiram and PCB — controlled substances used in the facility — to ensure compliance with environmental standards. We submitted the results to Itami City and Hyogo Prefecture, and upon receiving the consent from the municipalities, we terminated the industrial pollution prevention agreement, its terms completed, in May 2002.

•Site redevelopment

The site of the former Itami Plant is being redeveloped as a large-scale commercial complex. Therefore, it is subject to the Law Concerning the Measures by Large-Scale Retail Stores for Preservation of the Living Environment, which is designed to protect the environment of the surrounding area. To ensure that the redevelopment causes minimal environmental impact, Toyo has conducted a thorough environmental impact study and taken strict measures in compliance with the *Itami City Guidelines for Environmental Impact Assessment*, in addition to collecting information and opinions from outside experts and local residents.

We took appropriate measures to minimize environmental impact in 14 areas: air pollution, water contamination, soil pollution, noise, vibration, low-frequency air vibration, odors, obstruction of sunshine, radio wave interference, waste, scenery, regional environment, cultural assets and traffic congestion. We are continuing to monitor the effectiveness of the measures taken during and after the construction of the complex.



Former Itami Plant Image sketch of "Diamond City Terrace"



Promoting Recycling

Action Plan

Medium- and long-term target

Development of recycled products and recycling technologies

- 1) Development of recycled products made from used tires
- 2) Development of polyol* recycling and related technologies, and their application in product development

Each and every Toyo Group employee, keenly aware of the importance of environmental preservation, works to promote recycling and waste reduction at every stage of our corporate operations. The Toyo Group takes various approaches to waste recycling, from the man-

ufacturer's perspective. These include "product recycling," in which waste is recycled for product and other applications; "material recycling," in which waste is processed into materials that are then reused as products; "thermal recycling," in which waste

is burned as fuel; and "chemical recycling," in which waste is returned to elemental substances for eventual re-incorporation into products. In this way, we strive to utilize limited resources effectively and minimize negative effects on the environment.

Recycling Used Tires (Industry-wide efforts)

The Japanese tire industry considers tire recycling a priority issue, which must be addressed with industry-wide efforts. Under the direction of the Japan Automobile Tyre Manufacturers

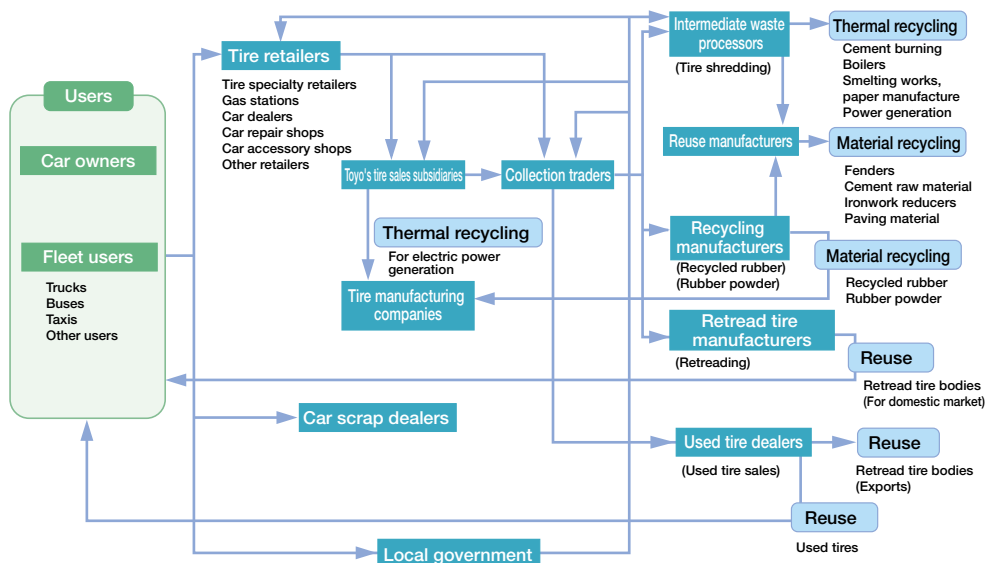
Association, Inc. (JATMA) and the Japan Tyre Recycling Association (JTRA), all the tire manufacturers in Japan are promoting efforts to re-use waste tires, reduce their number, and dispose of them in an appropriate manner.

In addition, a *Manifest System* has been in-

troduced in the tire-related business sector. The system is designed to prevent illegal disposal of used tires and to promote their appropriate disposal by means of slips called industrial waste control manifests.

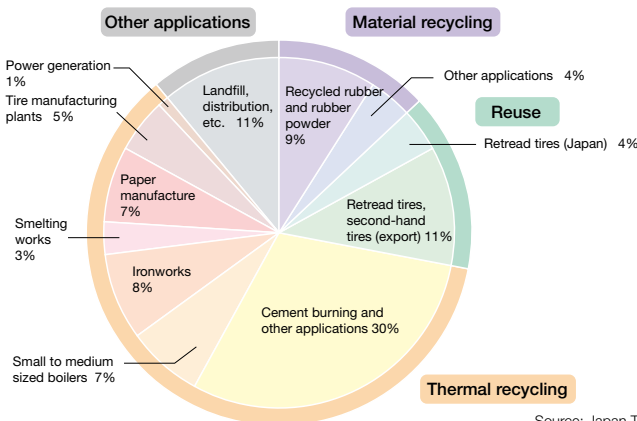
•Collection routes

The diagram below illustrates how used tires are collected and disposed of at Toyo. Used tires are collected from car users by tire retailers and other related businesses, and then sent to Toyo's tire sales subsidiaries, collection traders, intermediate waste processors, and recycling operators for thermal recycling, material recycling, or reuse.



•Types of recycling

Recycling is classified into four categories: material recycling, reuse, thermal recycling and other types of recycling. In 2001, the recycling ratio for used tires increased by 1 percentage point, to 89%. Broken down by type, reuse — including incorporation in retread tires produced after renewing the tread that was in contact with the road surface — represented 15% of total used tires. Material recycling, including processing used tires into forms of recycled rubber and rubber powder, amounted to 13% of the total. Thermal recycling, including cement burning and plant co-generation system applications, accounted for 61% of total used tires.



Source: Japan Tyre Recycling Association (JTRA)

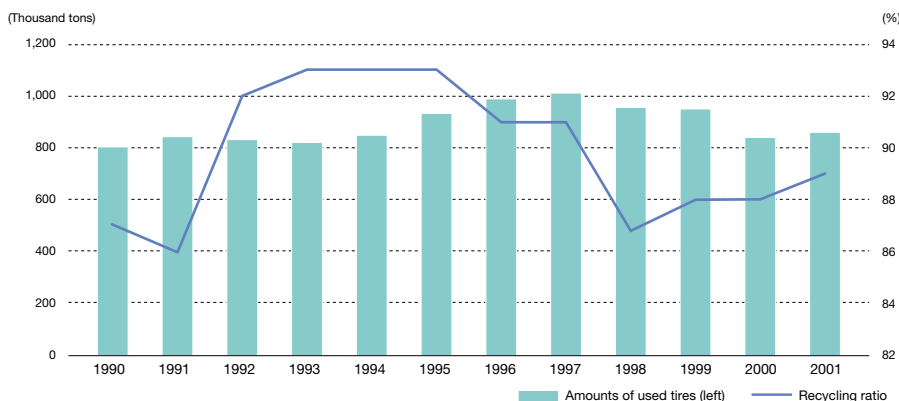
Polyol: Main raw material of polyurethane concentrated liquid, which is a mixture of polyol and isocyanate.

•Amounts of disposed tires

In 2001, the total number of tires produced in Japan increased by 4 million, or 3.9%, from 2000, to 107 million. Net weight rose by 30,000 tons, or 2.9%, to 1,059,000 tons.

Broken down by number and weight, used tires generated in tire replacement increased by 3 million, or 3.8%, to 83 million, and rose by 18,000 tons, or 2.1%, to 860,000 tons, respectively. The tonnage represents 82% of used tires on a net weight basis.

Meanwhile, the number and the weight of used tires generated in car scrapping increased by 1 million, or 4.3%, to 24 million, and rose by 12,000 tons, or 6.4%, to 199,000 tons, respectively. The tonnage equals 19% of the total net weight of used tires.



Used Tire Product Recycling (Corporate activities)

•Reuse of used tires

A tire can be recycled by retreading, which involves shaving the worn tread and capping it with new tread rubber, then vulcanizing the entire unit. We retread a variety of used tires in this way, including truck and bus, construction vehicle, and aircraft tires. Due to the partial amendment in February 2002 of the Basic Policy on the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities, which was prescribed in the Law on Promoting Green Purchasing, Japanese tire manufacturers have an additional obligation to retread used automotive tires.



Retread tires are also equipped on aircraft (above); and the retread process

•Material recycling of used tires

We process used tires into rubber chips and combine them with a polyurethane resin to produce a water-permeable, noise-insulating elastic pavement material that is easy to walk on without slipping.



Elastic pavement material reduces weight burden on the feet

Water-permeable elastic pavement material

•Recycling of ash dust

Incinerated ash from the Sendai Plant cogeneration system weighs nearly 30% as much as the coal and tire chips used as the original fuel. Of the incinerated ash, ash dust accounts for about 30%, while the remaining 70% consists of combustion bottom ash and desulfurized gypsum. Previously, this ash was disposed of at landfill sites.

Since 1997, all ash dust generated from incinerated ash has been reused as raw material in cement and concrete coloring agents.

Combustion bottom ash has been reused as raw material in cement and for adjustment purposes in raising the ground level, while desulfurized gypsum has been utilized as a ground filling material since 2001.

The Recycling Promotion Council presented its Minister of International Trade and Industry (now Economy, Trade and Industry)

Award to the Sendai Plant, in recognition of its advanced capabilities and outstanding efforts in recycling. Not only does the Sendai Plant utilize used tires as fuel in its cogeneration system, but it actually promotes the recycling of ash dust generated from incineration.



Ash dust



Loading ash dust into a jet pack

Recycling of Polyurethane Foam

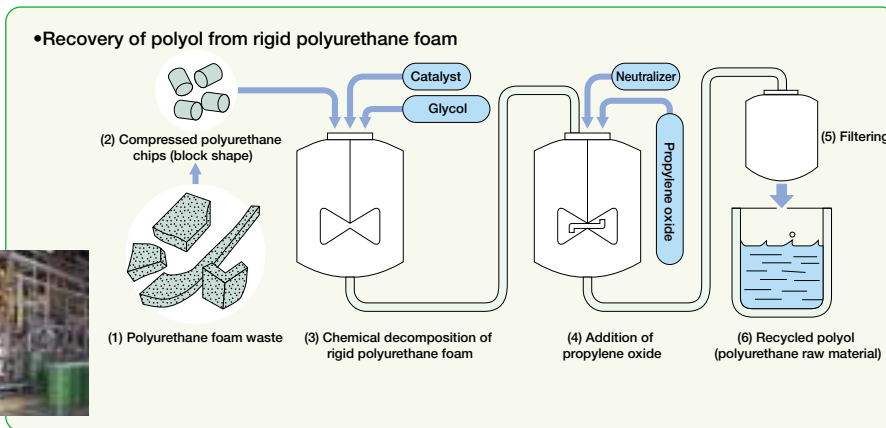
Polyurethane foam offers superior thermal insulation and shock absorbency, easy moldability, and numerous other outstanding features.

As a leading manufacturer of both flexible and rigid polyurethane in Japan, the Toyo Group is actively promoting the recycling of used polyurethane foam.

•Chemical recycling of rigid polyurethane foam
The Toyo Group successfully developed a technology to return rigid polyurethane foam to polyol for reuse as a raw material. Since 1975, we have been operating the world's only commercial plant dedicated to this polyurethane foam recycling application. Toyo Galdan, a CFC-free rigid polyurethane product, is partially made of the recycled polyol. It is an environmentally friendly product, both in terms of ozone layer protection and resource conservation.

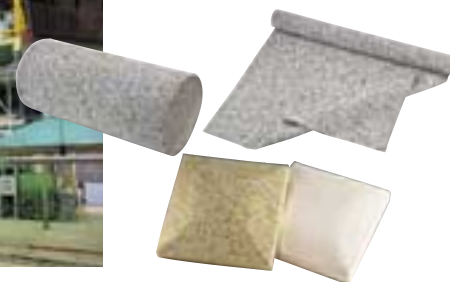


Manufacturing line for polyol recycled from rigid polyurethane foam



•Material recycling of flexible polyurethane foam
In 1992, we began a recycling business, using the polyurethane scraps produced in processing flexible polyurethane foam. In the recycling operation, we cut the flexible polyurethane scraps into chips and combine them for reuse as seat cushion inserts, among other insert applications.

Flexible polyurethane foam material recycling system at the Toyo Soflan Ebina Plant (left), and various flexible polyurethane products



Environmental Labels*

Environmental labels on products and services provide environmental information. Environmental labels are classified and standardized as follows by the International Organization for Standardization (ISO).

- Type I: Labels certified by third-party organizations.
- Type II: Labels declaring an item environmentally friendly, based on the manufacturer's own standards and criteria.
- Type III: Labels providing quantitative data on environmental impact.

In order to provide customers with environmentally conscious products, the Toyo Tire & Rubber Group has established strict in-house environmental standards and certifies only those products that meet the criteria as "eco-friendly." We provide environmental information on our products by affixing an environmental label on the products themselves, and also providing the label information in catalogs and brochures in which the products appear. As part of these efforts, we have adopted the Type II labeling system as a means to declare the environmental friendliness of qualifying products.

Toyo's Eco Block is a representative product that has been certified for a Type I label (Eco Mark certification no. 01118160). Eco Block is used to establish median strips on roads. It offers high durability, and allows easy installation and removal. Eco Block is made from recycled plastics.



Eco Block for a median strip



Winning the "Environmental Technology Award" and "Ozone Layer Protection Award"

As a leading polyurethane manufacturer, the Toyo Group is and has been actively committed to developing environmentally friendly technologies which reduce environmental impact, such as CFC-free foaming technology. In 2001, our highly evaluated chemical recycling technology — the world's first to enable the return of rigid polyurethane foam scraps to polyol for use as a raw material — was honored with the "Environmental Technology Award" from the Kinki Chemical Society, Japan, and the "Special Jurors' Award" at the "Ozone Layer Protection Awards" ceremony, sponsored by The Nikkan Kougyu Shimbun (Japan Industrial Journal).



Environmental Technology Award



Ozone Layer Protection Award ceremony

Environmental labels: Environmental labels help consumers make judgements at the time of purchase on the environmental preservation measures taken at each stage of a product's life cycle — design, materials procurement, manufacture, usage and disposal. The labels can serve a similar function in respect to services. Type I environmental labels are those which are certified by a third-party organization based on its own criteria. Type II labels contain a declaration of environmental friendliness, made by the manufacturer itself. Type III labels display quantitative data concerning the environmental impact of products, such as the volume of resources consumed.

Contributing to Communities

As a good corporate citizen, the Toyo Tire & Rubber Group supports the global environmental preservation activities of NPOs (nonprofit organizations) and NGOs (non-governmental organizations), while pursuing numerous other environmental activities in close cooperation with local communities. These efforts represent our commitment to developing and progressing together with regional communities and society at large.

Toyo Environmental Protection Fund

In 1992, the Toyo Group established the Toyo Environmental Protection Fund within the Osaka Community Foundation, and since then has been providing support for the global environmental protection activities of NPOs and NGOs through Group business sites throughout Japan. The Fund aims to build close cooperation with NPOs and NGOs in the fields of environmental preservation, environmental education and environmental research. The Fund is based on a “matching gift” system, in which Toyo donates the con-

tributions made by employees of the Group companies and adds an equal amount as a company donation.

In the past nine years, we have provided support to a total of 140 organizations. The total amount provided to the Osaka Community Foundation reached 193 million yen at the end of FY 2002. Of this amount, 108.2 million yen has already been donated to organizations.

In FY 2002, 10.34 million yen was donated to 16 organizations as financial aid from the Fund. In FY 2003, 9.17 million yen is scheduled to be donated to 18 organizations.



(1) Afforestation activities of the Land's Circle Network
(2) River Yura Network's outdoor workshop for the extraction of salmon spawn
(3) Environmental education by Keep Mt. Aoba Green

•Recipients of Toyo Environmental Protection Fund donations in fiscal 2001

Category	Recipient	Liaison business site	Description of activity
Environmental preservation	Fukushima Kenaf Society	Fukushima Rubber Co., Ltd.	Protection of the natural environment through kenaf cultivation
	River Yura Network (NPO)	Ayabe Toyo Rubber Co., Ltd.	Protection of the natural environment around the Yura River
	Japanese Society for Wild Geese Protection	Sendai Plant	Survey and protection of wild geese in Japan
	Keep Mt. Aoba Green	Sendai Plant	Protection of the natural environment of Mt. Aoba
	Clean River Hirose Society	Sendai Plant	Protection of the natural environment around the Hirose River
	Regional Exchange Center	Tokyo Head Office	Preservation of the local environment
	Land's Circle Network	Osaka Head Office	Preservation of the natural environment by afforestation
Environmental education	Toin Floricultural Club	Kuwana Plant	Cultivation of flowers for donation to public facilities
	Nagoya Municipal Shidami Nishi Elementary School	Chubu Soflan Co., Ltd.	Environmental education through firefly breeding
	Osaka Environmental Counselors Association (NPO)	Osaka Head Office	Social contribution through counseling activity
	Environmental Counselors Association Hyogo (NPO)	Hyogo Manufacturing Complex	Social activities, including environmental preservation seminars
Environmental research	Hagino Nature Watching Society	Toyo Soflan Co., Ltd.	Protection of the natural environment in the Hagino area
	Tokyo University, Graduate School	Osaka Head Office	Research on recycling of thermosetting resins
	Ryukoku University, Department of Science and Engineering	Osaka Head Office	Research on combustion composition method
	Kyoto University, Institute for Chemical Research	Corporate R&D Division	Research on high polymer materials
	Tokyo University of Agriculture and Technology	Corporate R&D Division	Research on clean energy batteries

•Scheduled recipients of the Toyo Environmental Protection Fund in FY 2003

Category	Recipient	Liaison business site	Description of activity
Environmental preservation	“Forest of Birds” Preservation Club	Fukushima Rubber Co., Ltd.	Activities for the protection of bird habitats
	River Yura Network (NPO)	Ayabe Toyo Rubber Co., Ltd.	Sponsorship of a Yura River symposium
	Japanese Society for Wild Geese Protection	Sendai Plant	Raising awareness of the importance of protecting wild geese in Japan
	Keep Mt. Aoba Green	Sendai Plant	Publication of the “Aoba Forest Guidebook”
	Clean River Hirose Society	Sendai Plant	Protection of the natural environment around the Hirose River
	The Society for the Protection of Pine, Bamboo and Plum Trees	Kuwana Plant	Removal of fallen pine trees; tree seeding
	Land's Circle Network	Osaka Head Office	Planting of broad-leaf trees
	Toin Floricultural Club	Kuwana Plant	Cultivation of flowers for donation to public facilities
	Beech Tree Planting Society	Osaka Head Office	Planting of beech trees
	The Society for the Protection of Cherry Trees	Hyogo Manufacturing Complex	Activities for the improvement of the tree-growing environment
Environmental education	Never-ending International workCamp Exchange (NICE)	Osaka Head Office	Activities for the preservation of the natural environment in Tondabayashi
	Nagoya Municipal Shidami Nishi Elementary School	Chubu Soflan Co., Ltd.	Environmental education through firefly breeding
	Osaka Environmental Counselors Association (NPO)	Osaka Head Office	Sponsoring environmental seminars
	Environmental Counselors Association Hyogo (NPO)	Hyogo Manufacturing Complex	Social activities, including environmental preservation seminars
	Hagino Nature Watching Society	Toyo Soflan Co., Ltd.	Nature observation sessions in the Hagino area
	Seki Town Green Boys Club	T.G.K. Co., Ltd.	Construction of a nature observation station
	Fukushima City Miyashiro Workshop	Fukushima Rubber Co., Ltd.	Environmental education for the mentally challenged
	The Society for Studying Wild Life	Hyogo Manufacturing Complex	Distribution of booklets to municipalities

Local Clean-up Activities

At each business site of the Toyo Tire & Rubber Group, employees, their families and local residents cooperate in regular clean-ups of public spaces such as roads, rivers, seashores and parks in the area.



Toyo employees at the Sendai Plant participate in a seashore clean-up sponsored by Iwanuma City in Miyagi Prefecture



Toyo Soflan employees participate in the Sagami River clean-up campaign.

Greening Activities

Working to create harmony with the surrounding environment, the Toyo Tire & Rubber Group plants trees and promotes other greening activities at its manufacturing facilities and test sites. Through photosynthesis, trees absorb carbon dioxide (CO₂) that would otherwise accelerate global warming; they also remove air pollution sources such as nitrogen dioxide (NO₂) and sulfur dioxide (SO₂), while providing oxygen (O₂) to the atmosphere. In FY 2002, we planted trees on and around the Sendai Plant premises, and created a garden on the roof of the office building.



Tree-planting on the manufacturing facility premises

Kuwana Festa

Toyo's Kuwana Plant holds the Kuwana Festa, a regional festival, and also participates in other area events, to promote closer communication with local residents.



Kuwana Festa held at the Kuwana Plant

Co-sponsoring the Saroma Grand Harvest Festival

To make full use of our winter tire test course in Saroma, Hokkaido during the warm seasons, Toyo co-sponsors the "Saroma Grand Harvest Festival" in Saroma Town, and opens the test course to local residents for this one-day event. With many attractions and vendors selling various local products, the festival has become an annual event that residents always look forward to. The test course is also used for regular driving safety lectures.



Saroma Grand Harvest Festival

Toyo Environmental Exhibition

Toyo has been aggressively promoting the reuse of used tires as a fuel for the cogeneration system at our Sendai Plant. The Plant was also the site of the Toyo Environmental Exhibition, held for local residents. The event helped people better understand the environmental preservation efforts of the Toyo Tire & Rubber Group.



Toyo Environmental Exhibition at the Sendai Plant

Plant Tours

Each business site of the Toyo Group offers area children and students a factory tour to further their social studies education. The tours show the actual work done on the production floors as well as activities designed to protect the environment.



Students visiting Toyo Soflan for a plant tour

Commendation by Local Governments

Toyo won a commendation ("Environmentally Friendly Business Operator Award") in February 2001 from Hyogo Prefecture, for the donation made by Toyo's Hyogo Manufacturing Complex in support of "Eco Kids" activities in the Higashi Harima area of the prefecture. Toyo also received the "Osaka Environment Award" in June 2001 from Osaka Prefecture for the activities of the Toyo Environmental Protection Fund over the past several years.



Osaka Environment Award



Environmentally Friendly Business Operator Award

Environmental Education

To ensure that the company remains environmentally conscious at all times, it is necessary to raise every employee's level of environmental awareness and improve his or her knowledge and ability through education.

The Toyo Tire & Rubber Group strives to raise the environmental consciousness of employees in general through in-house magazines and pamphlets. The Toyo Group also conducts various environmental management seminars and training sessions geared to employees in different positions and tasks; trains internal environmental auditors, and holds meetings to introduce environmental projects implemented independently at each business site.

Employees feed back the knowledge and skills acquired through these educational activities to their daily operations, and work to continuously improve groupwide environmental preservation activities.



Environmental pamphlets published at Toyo's business sites



Environmental management seminar

Environmental Communication

To achieve sustainable growth together with society, Toyo must form collaborative relationships with stakeholders — all the people associated with the company. The Toyo Tire & Rubber Group is promoting continuous interactive communications through various channels, in order to deepen the mutual understanding of environmental problems.

Environmental Report

The first pamphlet dedicated to reporting the Toyo Tire & Rubber Group's environmental activities was published in 1992. In 2000, the original publication was superseded by the annual Environmental Report. The fiscal 2000 Environmental Report was the first edition; the publication you are reading now is our third Environmental Report.



Information on the Web Site

To reach a wider range of people, the Toyo Tire & Rubber Group describes its environmental activities on its home page. The web site has been carrying the English version of the report since 2001.



Participation in Environmental Events

We participate in various exhibitions and lectures and provide information through magazines and newspapers, in order to raise environmental awareness, and also to make the Toyo Tire & Rubber Group's activities understood to more people.

Summary of Questionnaire Survey Results

A questionnaire was included at the end of the Environmental Report 2001 to learn the opinion of the readers. The following is a brief summary of the survey results.

- Topics of greatest interest:
Recycling activities, measures for the prevention of ozone depletion, efforts to ensure symbiosis with society
- Subject most thoroughly explained:
Mechanism of used tire recycling
- Suggestion:
Make information easier for ordinary people to understand

Thank you for your cooperation. We value your opinions, and will use them in the publication in the future.

Occupational Health & Safety and Disaster Prevention Activities

Occupational Health & Safety and Disaster Management Policy for FY 2003

“Concerted Efforts to Create a Safe and Comfortable Workplace; Individual Effort to Maintain a Healthy Mind and Body”

- Safety management**
Observe work standards, and strive to eliminate accidents caused by human error.
- Occupational health management**
Combine all employees' efforts to create a comfortable workplace, and encourage each employee's effort to manage his or her own personal health.
- Disaster management**
Strengthen disaster prevention activities at individual work sites.

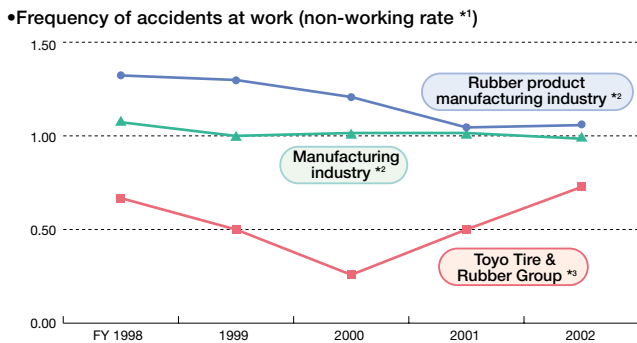
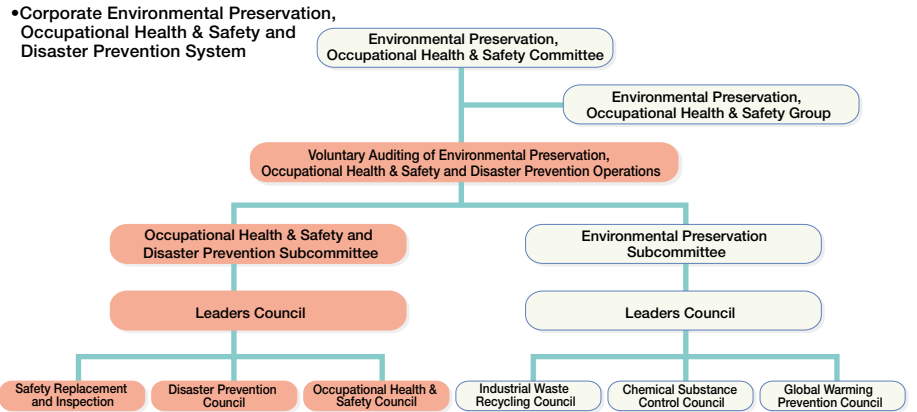
A Safe, Comfortable Workplace

Since there is nothing more important than the health and safety of employees, it is the social responsibility of companies to provide support to this end. With a corporate philosophy that stresses its “respect for people,” the Toyo Tire & Rubber Group strictly observes the Industrial Safety and Health Law and other pertinent laws and regulations. Based on the system shown below, the Group conducts voluntary activities to prevent accidents and fires at work.

To ensure the effectiveness of activities, we formulate a “Corporate Occupational Health & Safety and Disaster Management Policy” and a “Occupational Health & Safety and Disaster Management Policy for Individual Business Sites” every year, and follow the established guidelines.

At each business site, we conduct an annual voluntary auditing of occupational health and safety and disaster control operations to improve our occupational health and safety and disaster prevention activities. The audits

help us ascertain the state of our occupational health and safety and disaster prevention activities and provide a basis by which we can enhance these activities.



*1: Non-working rate = $\frac{\text{Number of accidents resulting in work suspension}}{\text{Total work hours}} \times 10^6$

*2: Source of data for manufacturing industry and rubber product manufacturing industry: Ministry of Health, Labour and Welfare (Survey on Trends in Labor Accidents, updated results)

*3: Data for the Toyo Tire & Rubber Group was compiled from data kept at 16 business sites, including affiliated companies.



Corporate environment preservation, occupational health and safety conference



First-aid class



Disaster response training



Firefighting training



Inspection to ensure 5S activities

Environmental Risk Management

To prevent air, water and soil pollution at its manufacturing sites, the Toyo Tire & Rubber Group controls and manages environmentally harmful, restricted chemical substances in compliance with relevant laws, ordinances

and regulations. We are also working hard to ensure optimal environmental risk management by eliminating or reducing the use of restricted chemical substances in design, pro-

duction and other upstream stages of the product life cycle, and by planning response measures for contingencies such as natural disasters, facility malfunctions and accidents.

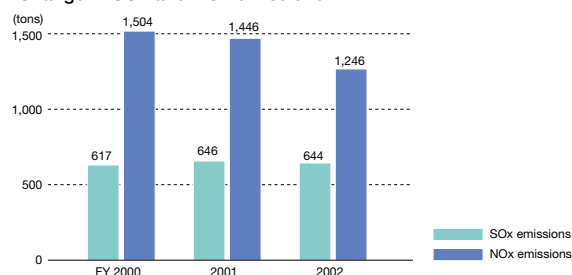
Air Pollution Prevention

Each Toyo Group production site is equipped with a stack gas desulfurization system to remove sulfur dioxides (SOx) from the exhaust gases discharged from boilers. We also employ cogeneration systems to reuse used tires as a fuel, thus reducing the amount of SOx and nitrogen oxides (NOx) released into the atmosphere. We are also striving to reduce trace dioxins generated in polyurethane and plastics incineration to levels lower than those required by regulation.



Cogeneration boiler equipped with a stack gas desulfurizer

•Change in SOx and NOx emissions



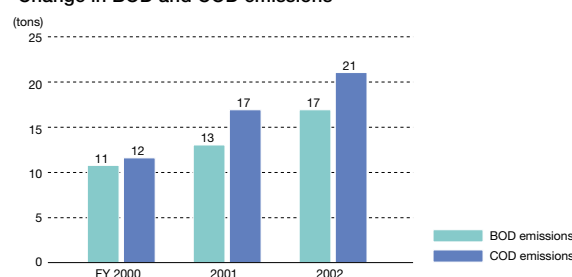
Prevention of Water Contamination

Wastewater from the plants is processed to remove oil and grease, then is repeatedly treated until it meets or exceeds the legal standards for water quality before being discharged into open bodies of water. Intensive wastewater treatment helps keep the rivers clean.



Wastewater treatment facility

•Change in BOD and COD emissions



Prevention of Soil and Ground-Water Contamination

To prevent chemical spills and consequent soil contamination, each tank is provided with a concrete protective wall. All empty chemical containers are stored and managed at designated facilities with leakage-receiving flooring, designed to prevent chemical spillage from contaminating the ground.



Dichloromethane tank with a protective wall (left), and properly stored empty cans (above)

Management of PCB-Containing Equipment

In July 2001, the Law for the Promotion of the Environmentally Sound Destruction of PCB* Waste was enacted, mandating companies to annually report to prefectural governors the use and storage status of PCB-containing equipment such as condensers and transformers.

The Toyo Tire & Rubber Group aims to achieve complete elimination of such equipment by the end of FY 2006. Until then, we will closely monitor our PCB processing facilities, and ensure proper processing of PCB to render it harmless.

•Use and storage of PCB-containing equipment (as of March 2002)

Equipment in storage/use	Approximate Quantity
Condensers (high voltage, low voltage)	Approx. 170
Transformers (single phase, low voltage)	
Fluorescent lighting stabilizers	Approx. 1,900

Problems Pointed Out from Outside the Group

In FY 2002, there was no operation of the Toyo Tire & Rubber Group that violated the law. Also, there were no accidents. However, four grievances were lodged from outside the Toyo Group. We respond to all grievances swiftly, conducting rigorous inspections to prevent recurrences.

Problems pointed out	Action in response
Adhesion of a black, tar-like substance on the white roofs of houses and hoods of white cars near the site	The substance was found to be rust from rain water gutters. We replaced the rain gutters and improved the drainage system.
Outdoor light flickering on and off at night, creating an eerie ambience	A lamp had reached the end of service life. We replaced the bulb.
Steam splashing from the roof of a factory building was getting the public road wet.	The problem was found to be caused by steam blowing from a vulcanizing vessel. We released the exhaust steam from the mist separator to prevent the steam from wetting the road.
Oil mixed in waste, pointed out by an intermediate processing company	Oil was found in a waste container, although none was detected elsewhere in the vicinity, and no oil had leaked into the soil or drainage. To determine the location from which the oil had been released, we installed a waste platform in each section of the site and monitored for oil leakage in the waste discharge.

PCB: Polychlorinated Biphenyl. PCB was once widely used as an insulating oil and a lubricating oil, among other applications. PCB production was banned in 1972.

ISO14001 Certification

The Toyo Tire & Rubber Group is moving aggressively to improve its environmental management system, in conformity with the ISO14001 international environmental standard. Toyo seeks to continuously reduce the environmental impact of its business operations.

The effort to acquire ISO14001 certification began in June 1998 with our Sendai Plant for tire manufacturing and the Hyogo Manufacturing Complex, where chemical products and automotive parts are produced. Both facilities earned the certification in that same month. By FY 2000, all eight Toyo

manufacturing sites in Japan were ISO 14001-certified.

In FY 2002, the Hyogo Manufacturing Complex and Sendai Plant were audited for certification renewal. Similar auditing at the other six manufacturing sites is scheduled to be completed in FY 2003.

•Acquisition of ISO14001 Certification at Toyo Tire & Rubber Group's Domestic Manufacturing Sites

No.	Production site	Address	Certification registration date	Renewal date	Range of registration
1	Toyo Tire & Rubber Co., Ltd. Hyogo Manufacturing Complex •Akashi Plant •Hyogo Plant	1183, Rokubuichi, Inamicho, Kako-gun, Hyogo Prefecture 1176, Rokubuichi, Inamicho, Kako-gun, Hyogo Prefecture	June 30, 1998	July 30, 2001 (First renewal)	Environmental management system for the development, design and manufacture of rubber, polyurethane and resin products for general and automotive industries; and for renewal services for rubber lining equipment. In each of these activities, the system is designed to promote: 1. Resource conservation 2. Energy saving (reduction of CO ₂ emissions) 3. Reduction and recycling of waste 4. Replacement of ozone-depleting and environmentally harmful substances with substitute chemicals 5. Prevention of water contamination 6. Contribution to local communities (via the Toyo Environmental Protection Fund and other programs)
2	Toyo Tire & Rubber Co., Ltd. Sendai Plant	3-5-1 Fukiage, Iwanuma City, Miyagi Prefecture	June 30, 1998	August 31, 2001 (first renewal)	Environmental management system for the manufacture and shipment of automotive and industrial vehicle tires; development of lightweight fuel-efficient tires for passenger cars; and the disposal of used tires. In each of these activities, the system is designed to promote: 1. Weight reduction in passenger car tires 2. Reduction of industrial waste emissions 3. Recycling of waste 4. Energy saving and resource conservation
3	Toyo Soflan Co., Ltd. (including Sekisui Soflan Industry, Co., Ltd.)	982, Kaneda, Atsugi City, Kanagawa Prefecture	March 24, 1999	July 12, 2002 (first renewal)	Environmental management system for the manufacture of concentrated liquid for polyurethane foam; development and manufacture of automotive seat pads; and the design, development and manufacture of general cushion pads, polyurethane blocks, and products made from recycled waste polyurethane foam. In each of these activities, the system is designed to promote: 1. Effective resource and energy utilization 2. Restriction on the use of environmentally harmful substances 3. Reduction of the environmental impact on wastewater 4. Reduction of the environmental impact on the atmosphere 5. Design of products with less environmental impact 6. Reduction and recycling of waste 7. Environmental Protection Fund activities
4	Ayabe Toyo Rubber Co., Ltd.	115, Kuricho Sawa, Ayabe City, Kyoto Prefecture	June 23, 1999	June 28, 2002 (first renewal)	Environmental management system for the development and manufacture of plastic products, and the manufacture of polyurethane-related products. In each of these activities, the system is designed to promote: 1. Resource conservation 2. Energy saving (reduction of CO ₂ emissions) 3. Reduction and recycling of industrial waste 4. Reduction of the amount of environmentally harmful substances generated (dichloromethane and other substances) 5. Social contribution in the region (via the Toyo Environmental Protection Fund and other programs)
5	Chubu Soflan Co., Ltd. (including the Automotive Parts Technology Center of Toyo Tire & Rubber Co., Ltd.)	3, Aza Shogayama, Oaza Uchikoshi, Miyoshicho, Nishikamo- gun, Aichi Prefecture	September 29, 1999	Scheduled in September 2002	Environmental management system for the manufacture of polyurethane foam products for automotive and general industrial applications; assembly and manufacture of automotive safety devices (air bags); molding and coating of resin bumpers for automotive applications; development of Eco Foam, and the collection and reuse of waste polyurethane foam. In each of these activities, the system is designed to promote: 1. Reduction of carbon dioxide emissions 2. Reduction of dichloromethane use 3. Reduction and reuse of industrial waste 4. Environmental Protection Fund activities
6	Toyo Tire & Rubber Co., Ltd. Kuwana Plant	2400, Oaza Nakagami, Toincho, Inabe-gun, Mie Prefecture	December 22, 1999	Scheduled in December 2002	Environmental management system for the manufacture of automotive tires, industrial vehicle tires, aircraft retread tires, and automotive parts, including anti-vibration rubber products; and the development of lightweight fuel-efficient tires. In each of these activities, the system is designed to promote: 1. Energy saving (electric power) 2. Resource conservation (materials for tire production) 3. Reduction and recycling of industrial waste 4. Reduction of organic solvent use 5. Support activities for regional environmental protection organizations
7	Fukushima Rubber Co., Ltd. (including the Toyo Tire & Rubber Co. Ltd. Fukushima Plant, F.C.C. Co., Ltd. and the Toyo Tire & Rubber Co. Ltd. High-Polymer Processing Technology Center)	28, Aza Domae, Miyashiro, Fukushima City, Fukushima Prefecture	February 23, 2000	Scheduled in February 2003	Environmental management system for the development and manufacture of rubber products for general industrial and automotive applications; development and manufacture of polyurethane and resin products for general industry; and the manufacture and servicing of automotive safety devices (air bags). In each of these activities, the system is designed to promote: 1. Contribution to regional and global environmental protection through the Toyo Environmental Protection Fund 2. Energy saving (electric power, heavy oil), and reduced use of harmful substances (dichloromethane, CFC substitutes and other chemical substances) 3. Reduction and recycling of industrial waste (including rubber and plastic wastes) 4. Development of products with less environmental impact
8	T.G.K. Co., Ltd.	52-1, Furukawa, Sekicho, Suzuka- gun, Mie Prefecture	February 23, 2000	Scheduled in February 2003	Environmental management system for the manufacture of automotive rubber products, and the development of weather strips. In each of these activities, the system is designed to promote: 1. Energy saving (reduction of electric power consumption) 2. Reduction of the amount of generated substances that impact the environment (industrial waste, organic solvents and other substances) 3. Development of products coated with water-based paint

* Examination and registration organization: Japanese Standards Association

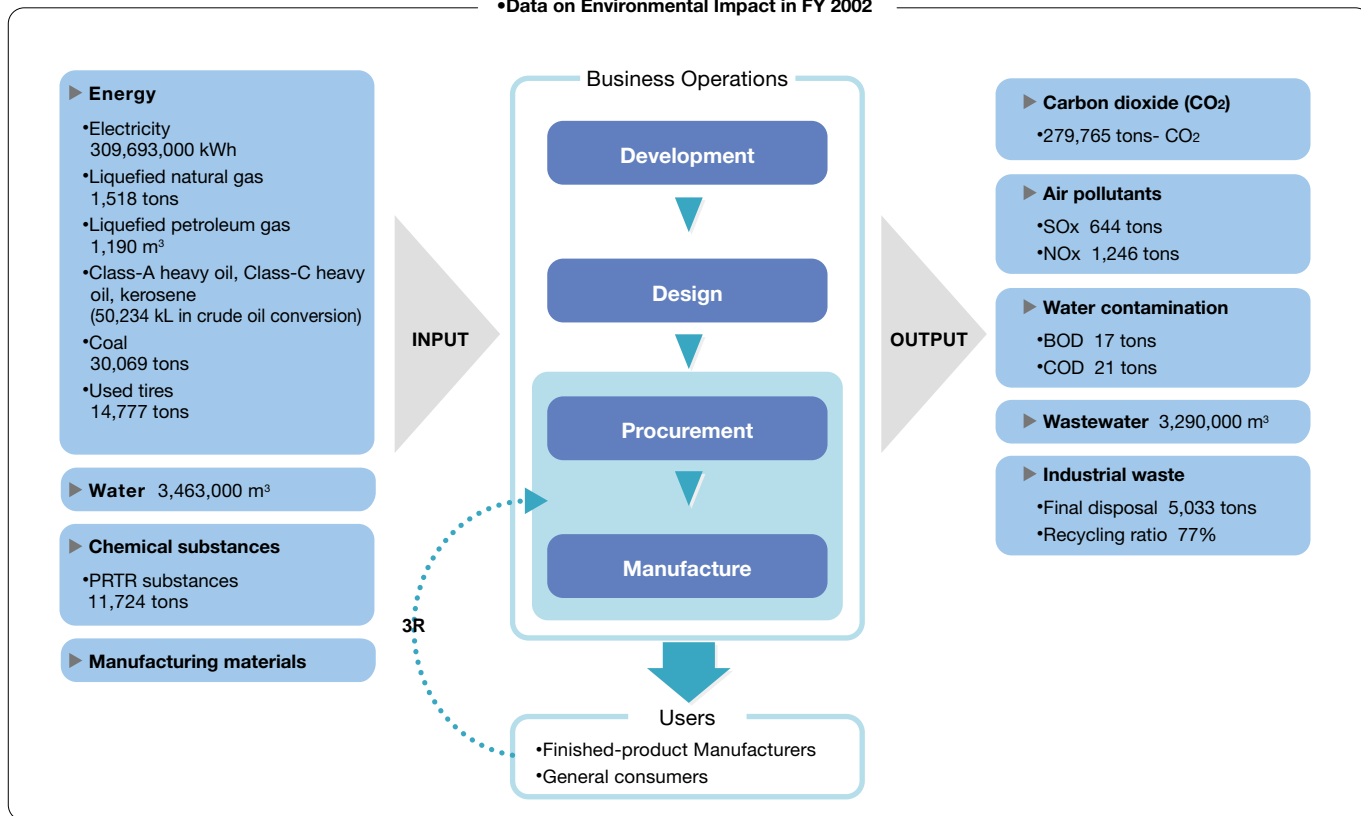
The Environmental Impact of Toyo Tire & Rubber Group Operations

In addition to tires, The Toyo Tire & Rubber Group deals with molded or processed products made of rubber, polyurethane and plastics. Although the extent of the environmental impact arising from our business operations varies depending on the product type, most of

our products are manufactured by using energy, water and chemical substances to process externally procured materials. In the manufacturing processes, carbon dioxide (CO₂), air pollutants, wastewater and industrial waste — all of which have an impact on the environ-

ment — are discharged. The Toyo Tire & Rubber Group considers it essential to understand all conditions and environmental factors related to our business operations, in order to effectively reduce their environmental impact.

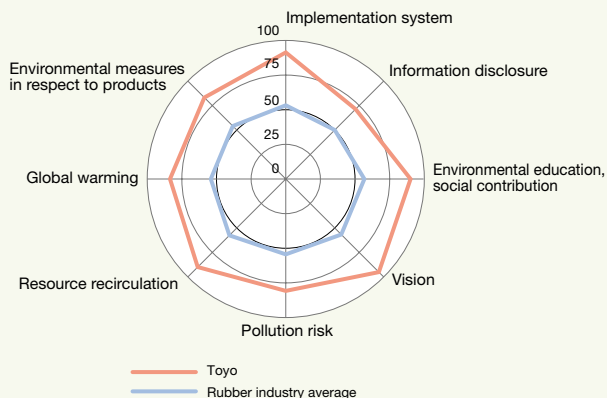
•Data on Environmental Impact in FY 2002



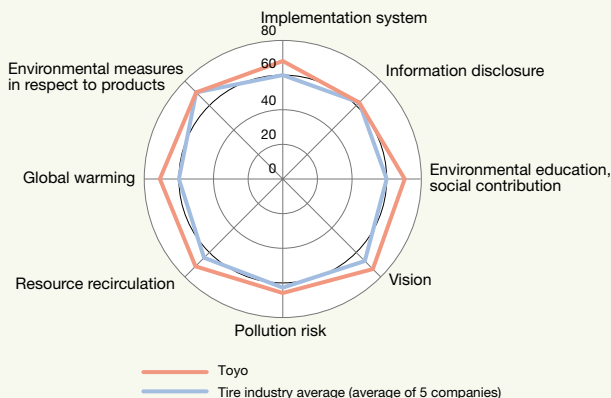
Toyo Highly Rated in Environmental Management Survey

Toyo ranked 32nd overall and best in Japan's tire industry in the Fifth Annual Environmental Management Survey, conducted by the *Nihon Keizai Shimbun, Inc.*, Japan's leading business and financial newspaper. The survey looked at the approaches to eight environmental issues taken by 2,040 major Japanese manufacturing companies. (Valid responses were returned by 820 companies. Results were published in the December 3, 2001 issue of *Nikkei Business Daily*, a major trade and industry publication.) In addition to its top ranking in the tire segment, Toyo placed second in Japan's rubber industry.

•Toyo vs. rubber industry average (based on values obtained by converting evaluation deviation values to scores on a 100-point scale)



•Toyo vs. tire industry average (average of five companies) (evaluation deviation values)



Radar charts made by Toyo Tire & Rubber Co., Ltd.

Environmental Accounting*

The Toyo Tire & Rubber Group believes that maintaining harmony among people, nature and technology is essential for achieving sustainable, long-term business growth. Therefore, we have analyzed the costs and effects of our environmental preservation activities, and provided the information to stakeholders through the Environmental Report. We hope they share our understanding regarding environmental preservation as we use the data to conduct our environmental management more effectively.

We are implementing environmental accounting in compliance with the Environment Ministry's *Environmental Accounting Guidelines (2002)*, in order to assess the environmental preservation activities at our plants and business sites, including those of our manufacturing subsidiaries.

In calculating the economic effects of our environmental preservation measures, we considered only those that are definitely accountable. A review of the applicable items in the environmental accounting reveals that in

monetary terms, the effects in FY 2002 increased by 439 million yen from FY 2001, to 987 million yen.

In terms of environmental preservation expenditures, the amount of investment in FY 2002 decreased by 160 million yen from FY 2001, to 120 million, while expenses fell by 22 million yen, to 1,748 million yen. Development costs for functional improvements, including reduction of tire noise and enhancement of fuel efficiency, were excluded from the R&D expenditures in the accounting.

1) Effects

•Environmental preservation effects

Item	Index classification	Results in FY 2002	Amount of decrease	
Environmental preservation effects related to resources charged to business operations	Water consumption	Water consumption (thousand m ³)	3,463	-84
	Environmental preservation effects related to environmental impact and waste generated by business operations	Emissions into the atmosphere	CO ₂ emissions (tons-CO ₂)	279,765
SOx emissions (tons)			644	2
NOx emissions (tons)			1,246	200
Emissions into open bodies of water		BOD (tons)	17	-4
	COD* (tons)	21	-4	
Environmental preservation effects related to goods and services produced by business operations	Waste emissions	Amount of waste disposed of at landfill sites (tons)	5,033	3,524
	Collection of products	Amount of collected used tires (tons)	12,733	1,298

* Minus (-) figures indicate increases from the previous year.

•Economic effects resulting from environmental preservation measures

(Million yen)

Classification of effect (substantial effect)		Monetary amount of effect
Income	Income from recycling of waste generated by main business operations and recycling of used products and other goods	17.3
Reduction of expenses	Reduction of energy costs through energy saving	898.8
	Reduction of waste disposal expenses through resource conservation and recycling	70.4
Total		986.5

2) Costs

•Environmental preservation expenditures

(Million yen)

Classification	Main efforts	Investment	Expenditure	
In-site costs	Pollution prevention expenditures	Costs of installing and maintaining chemical processing equipment, sound insulating walls and exhaust ducts	72.2	235.1
	Global environmental preservation expenditures	Costs of installing and maintaining automatic power-factor regulator, high-performance once-through boilers, and other equipment	26.2	319.6
	Resource circulation expenditures	Costs of treatment, disposal and recycling of industrial waste	11.0	542.2
Upstream/downstream expenditures	Costs for product recycling of used tires and polyurethane waste	0	126.6	
Management expenditures	Costs for operating the environmental management system, and conducting education and awareness-raising activities	0	188.1	
R&D expenditures	Costs for research and development of CFC-free foaming technologies and next-generation CFCs	10.7	257.9	
Social activity expenditures	Costs for environmental improvement and greening activities and for providing donations from the Toyo Environmental Protection Fund	0	38.2	
Environmental damage expenditures	Compensation for the impact of contamination	0	40.0	
Total		120.1	1,747.7	

Environmental accounting: A system for the quantitative measurement and expression of the cost and effect of corporate environmental preservation activities and measures. It is aimed at improving environmental preservation efforts, developing good relationships with society and attaining sustainable development for participating companies and organizations.

COD: Stands for Chemical Oxygen Demand. It is a measure of the quantity of oxygen required for chemically oxidizing and stabilizing contaminants in water. The higher the COD the dirtier the water.

History of the Toyo Tire & Rubber Group's Environmental Activities

1972•Established the Corporate Environment Improvement Committee.

1975•Started operations at a chemical recycling plant for rigid polyurethane foam.

1989•Established the CFC Task Force

1990•The Sendai Plant began operating Japan's first cogeneration system fueled partially by used tires.

1992•Reorganized the Corporate Environment Improvement Committee as the Corporate Environmental Affairs Committee.

- Established the TOYO Global Environmental Charter.
- Established the TOYO Environmental Protection Fund.
- Started the flexible polyurethane foam recycling business.

1993•Established the Toyo Global Environmental Action Plan.

- Established the Environmental Management Department (currently the Environmental Preservation and Occupational Health & Safety Group).

1995•Received a letter of appreciation from UNEP (the United Nations Environmental Programme) for helping formulate policy proposals for the Seventh Meeting of the Parties to the Montreal Protocol.

- Achieved complete elimination of CFCs used in the rigid polyurethane foaming process.
- Participated in the "Eco-Vehicle Project" initiated by the Environment Agency, and developed ultra-lightweight tires for electric vehicles.

1997•Changed the name of the Environmental Management Office (previously the Environmental Management Department) to the Environmental Preservation and Occupational Health & Safety Promotion Office.

- Dissolved the Corporate Environmental Affairs Committee, and established the Environmental Preservation and Occupational Health & Safety Committee.
- Developed a system to reuse all ash dust discharged at the Sendai Plant.

1998•The Sendai Plant was honored with the "Minister of International Trade and Industry (now Economy, Trade and Industry) Award" from the Recycling Promotion Council, in recognition of the environmental contribution made by the cogeneration system.

- Established 100% water-blown rigid polyurethane foaming technology.

1999•Introduced an environmental accounting system.

2000•Obtained ISO14001 certification at the Group's eight domestic manufacturing sites.

- Published the first Environmental Report.
- Achieved a 20% reduction in the rolling resistance of tires.
- Changed the name of the Environmental Preservation and Occupational Health & Safety Promotion Office to the Environmental Preservation and Occupational Health & Safety Group.

2001•Achieved a 10% reduction in tire weight and a 20% improvement in wear resistance (both in comparison with the levels in FY 1991).

- The Hyogo Manufacturing Complex was honored with the "Environmentally Friendly Business Operator Award" from Hyogo Prefecture.
- Received the "Osaka Environmental Award" from Osaka Prefecture, in recognition of the contribution made through the Environmental Protection Fund.
- Toyo's polyurethane water-blown foaming technology received the "Special Jurors' Award" at the "Ozone Layer Protection Awards" presentation, sponsored by The Nikkan Kogyo Shimbun Ltd. (one of Japan's leading industrial newspapers).
- Toyo's chemical recycling technology for rigid polyurethane foam received the "First Environmental Technology Award" from the Kinki Chemical Society, Japan.
- Received a letter of appreciation from the Osaka Community Foundation for the contribution made through the Environmental Protection Fund.

Data on Manufacturing Plants

Kuwana Plant

Location: 2400, Oaza Nakagami, Toicho, Inabe-gun, Mie Prefecture
Tel.: 0594-86-0100

Products: Automotive tires, automotive parts, plastic parts

Site area: 443,752 m²

Total floor area: 112,136 m²

No. of employees: 992 persons

•Air pollution measurements

	SOx		NOx		Ash dust		Dioxins	
	Standard	Measurement	Standard	Measurement	Standard	Measurement	Standard	Measurement
#1 Class-C heavy oil boiler	6	2.05	160	157	0.11	0.044		
#2 Class-C heavy oil boiler	6	1.26	140	137	0.11	0.026		
#1 Diesel engine	6	4.59	850	791	0.08	0.025		
#2 Diesel engine	6	5.25	850	823	0.08	0.021		
#1 Class-A heavy oil boiler	6	0.88	160	99	0.11	0.002		
#2 Class-A heavy oil boiler	6	0.54	160	83	0.11	0.042		
Incineration boiler	6	0.3	160	158	0.11	0.032		
Incinerator							80	0.37

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	6.0~8.0	8.0	6.6	7.3
BOD	8	3.0	1.0	2.0
COD	8	7.0	1.0	4.2
SS	10	9.0	2.0	4.7
n-Hex (minerals)	1	0.5	0.2	0.3
Nitrogen	120	2.5	0.7	1.4
Phosphor	16	1.2	0.6	0.8
Coliform bacteria	3,000	<10	<10	<10

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
40	ethylbenzene	1,256	0	0	0
43	ethylene glycol	0	0	0	0
44	ethylene glycol monoethyl ether	3,800	0	0	0
59	p-octylphenol	0	0	11	0
63	xylene	96,553	0	10,728	0
100	cobalt and its compounds	0	0	366	0
101	2-ethoxyethyl acetate	8,967	0	0	0
115	N-cyclohexyl-2-benzothiazolesulfenamide	0	0	1,656	0
159	diphenylamine	0	0	6	0
179	dioxins	1.3	0	620	0
198	hexamethylenetetramine	0	0	162	0
200	tetrachloroethylene	8,020	0	13	0
227	toluene	18,857	0	2,095	0
230	lead and its compounds	0	0	267	0
282	N- (tert-butyl)-2-benzothiazolesulfenamide	0	0	925	0
299	benzene	1,370	0	152	0
309	poly (oxyethylene) nonylphenyl ether	0	0	1,036	0

Sendai Plant

Location: 3-5-1 Fukiage, Iwanuma City, Miyagi Prefecture
Tel.: 0223-22-2191

Products: Automotive tires

Site area: 205,000 m²

Total floor area: 79,000 m²

No. of employees: 1,129 persons

•Air pollution measurements

	SOx		NOx		Ash dust	
	Standard	Measurement	Standard	Measurement	Standard	Measurement
Centralized smoke stack	11.5	1.27				
Desulfurizer (No. 1)	11.5	1.16				
Desulfurizer (No. 2)	11.5	1.88			—	0.110
Heavy oil boiler			150	145		
Coal boiler			320	244	0.20	0.135

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.8~8.6	8.2	7.2	7.8
BOD	120	14.0	1.9	6.2
COD	120	16.0	5.0	8.8
SS	150	16.0	3.0	8.2
Fluorine	8	0.37	<0.15	0.21
Boron	10	0.10	<0.10	0.10

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
63	xylene	9,334	0	289	0
100	cobalt and its compounds	0	0	121	0
115	N-cyclohexyl-2-benzothiazolesulfenamide	0	0	7,437	0
198	hexamethylenetetramine	0	0	234	0
227	toluene	12,691	0	393	0
282	N- (tert-butyl)-2-benzothiazolesulfenamide	0	0	2,301	0
299	benzene	853	0	26	0

Notes

•Air pollutant measurements

- Indicated measurements are the highest recorded values.
- Indicated standards are the most strictest of those put forth in the relevant laws, ordinances and agreements.
- The units of measurement for the standard values are as follows:
 - NOx: ppm
 - SOx: m³N/h for Fukushima Rubber Co., Ltd. and Toyo Soflan Co., Ltd.; and K value for others
 - Ash dust: g/h for Toyo Soflan Co., Ltd.; and g/m³N for others
 - Dioxins: ng-TEQ/m³N

•Water pollutant measurements

- Indicated standards are the most strictest of those put forth in the relevant laws, ordinances and agreements.
- The unit of measurement for the standard values is "mg/L," except for PH.
- Coliform bacteria: number/cm³
- PH: Hydrogen ion concentration
- BOD: Biochemical Oxygen Demand
- COD: Chemical Oxygen Demand
- SS: Suspended Solids

•PRTR substances

- (*1) Official numbers of designated chemical substances.
- The unit of measurement is "kg," and values are rounded to the nearest whole number.
- The unit of measurement for dioxins is "mg-TEQ/year," and the number of effective digits is two.

Hyogo Plant, Hyogo Manufacturing Complex

Location: Rokubuichi 1176, Inamicho, Kako-gun, Hyogo Prefecture
Tel.: 0794-92-2222

Products: Polyurethane foam, automotive parts, plastic products

Site area: 49,127 m²

Total floor area: 15,095 m²

No. of employees: 291 persons

•Air pollution measurements

	SOx		NOx		Ash dust	
	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 1	1.75	0.37	180	96	0.30	0.002
Boiler No. 2	1.75	0.31	180	81	0.30	0.006
Boiler No. 3	1.75	0.39	180	66	0.30	0.012

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.0~9.0	8.1	6.8	7.3
BOD	100	56.0	0.8	17.7
COD	100	61.0	2.5	21.2
SS	90	43.0	1.0	11.4
n-Hex (plants and animals)	20	8.5	<0.5	2.4
Nitrogen	120	74.0	0.9	15.2
Phosphor	16	6.2	0.03	1.4

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
25	antimony and its compounds	0	0	0	0
43	ethylene glycol	0	0	0	0
145	dichloromethane	113,105	0	18,680	0
172	N,N-dimethylformamide	19	0	1,862	0
272	bis (2-ethylhexyl) phthalate	0	0	0	0
338	m-tolylene diisocyanate	0	0	7,934	0
352	tris (2-chloroethyl) phosphate	0	0	0	0

Akashi Plant, Hyogo Manufacturing Complex

Location: Rokubuichi 1183, Inamicho, Kako-gun, Hyogo Prefecture
Tel.: 0794-95-1421

Products: Industrial rubber, polyurethane products, automotive parts

Site area: 77,658 m²

Total floor area: 15,459 m²

No. of employees: 505 persons

•Air pollution measurements

	SOx		NOx		Ash dust	
	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 1	3.5	0.37	250	156	0.3	0.004
Boiler No. 2	3.5	0.44	250	150	0.3	0.096
Boiler No. 3	1.75	<0.002	250	58	0.3	<0.001
Boiler No. 4	1.75	0.05	180	77	0.3	<0.001
Boiler No. 5	1.75	0.013	180	109	0.3	0.006

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.0~9.0	8.2	6.5	6.8
BOD	100	36	<0.5	3.1
COD	100	15	<0.5	2.8
SS	90	10	<0.5	1.5
n-Hex (plants and animals)	20	1.8	<0.5	0.6
Nitrogen	120	6.3	0.6	2.7
Phosphor	16	0.6	0.02	0.1
Coliform bacteria	3,000	1,300	18	30.7

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
43	ethylene glycol	0	0	0	0
56	1,2-epoxypropane	70	0	0	0
63	xylene	5,640	0	0	0
120	3,3'-dichloro-4,4'-diaminodiphenylmethane	0	0	0	0
132	1,1-dichloro-1-fluoroethane	39,179	0	0	0
145	dichloromethane	2,068	0	953	0
172	N,N-dimethylformamide	16	0	1,586	0
177	styrene	0	0	0	0
227	toluene	26,289	0	0	0
230	lead and its compounds	0	0	0	0
270	di-n-butyl phthalate	0	0	0	0
272	bis (2-ethylhexyl) phthalate	0	0	0	0
338	m-tolylene diisocyanate	0	0	0	0

Ayabe Toyo Rubber Co., Ltd.

Location: 115, Kuricho Sawa, Ayabe City, Kyoto Prefecture
Tel.: 0773-48-0001
Products: Polyurethane products, plastic products
Site area: 38,236 m²
Total floor area: 6,031 m²
No. of employees: 121 persons

•Air pollution measurements

	SOx		NOx		Ash dust		Dioxins	
	Standard	Measurement	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 1	11.5	0.22	—	130	0.30	0.005		
Boiler No. 2	11.5	0.32	—	86	0.30	0.003		
Boiler No. 3	11.5	0.26	—	81	0.30	0.002		
Incinerator							80	49

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.8~8.6	7.2	6.8	7.0
BOD	25	5	2	3.8
COD	120	8	5	6.3
SS	90	10	2	4.3
n-Hex (minerals)	1	<1	<1	<1
Dichloromethane	0.04	<0.01	<0.01	<0.01

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
120	3,3'-dichloro-4,4'-diaminodiphenylmethane	0	0	0	0
145	dichloromethane	2,715	0	400	0
179	dioxins	175	0	0.89	0
272	bis (2-ethylhexyl) phthalate	0	0	9,413	0

Fukushima Rubber Co., Ltd.

Location: 28, Aza Domae, Miyashiro, Fukushima City, Fukushima Prefecture
Tel.: 024-553-1356
Products: Industrial rubber products
Site area: 59,420 m²
Total floor area: 26,011 m²
No. of employees: 325 persons

•Air pollution measurements

	SOx		NOx		Ash dust	
	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 2	5.48	0.60	180	92	0.30	0.024
Boiler No. 3	9.09	1.41	250	130	0.30	0.018
Boiler No. 4	3.43	0.61	180	100	0.30	0.022
Boiler No. 5	3.83	0.61	180	120	0.30	0.019
Exhaust heat boiler	16.6	0.59	150	120	0.25	0.110

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.8~8.6	8.5	6.9	7.7
BOD	25	17.0	1.5	5.3
COD	40	11.0	2.2	4.5
SS	70	6.8	None detected	3.3
n-Hex (plants and animals)	10	2.1	None detected	0.8
Coliform bacteria	3,000	120	0	35.8
Dichloromethane	0.2	None detected		
Thiram	0.06	None detected		

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
9	bis (2-ethylhexyl) adipate	7	0	50	0
32	2-imidazolidinethione	0	0	7	0
63	xylene	1,020	0	7	0
132	1,1-dichloro-1-fluoroethane	5,700	0	2,206	0
172	N,N-dimethylformamide	1,236	0	9	0
204	tetramethylthiuram disulfide	0	0	22	0
227	toluene	223,679	0	24,534	0
249	zinc bis (N,N'-dimethyldithiocarbamate)	0	0	50	0
272	bis (2-ethylhexyl) phthalate	13	0	94	0
352	tris (2-chloroethyl) phosphate	1	0	10	0

Chubu Soflan Co., Ltd.

Location: 3, Aza Syogayama, Oaza Uchikoshi, Miyoshicho, Nishikamo-gun, Aichi Prefecture
Tel.: 0561-34-2711

Products: Automotive parts, plastic products

Site area: 31,080 m²

Total floor area: 11,282 m²

No. of employees: 215 persons

•Air pollution measurements

	NOx		Ash dust		Dioxins	
	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 1	150	70	0.10	<0.002		
Boiler No. 2	150	85	0.10	<0.002		
Boiler No. 3	150	63	0.10	<0.002		
Boiler No. 4	150	85	0.10	<0.002		
Boiler No. 5	150	85	0.10	<0.002		
Incinerator					80	5.7

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.8~8.6	8.6	6.2	6.5
BOD	160	110	1	21.8
COD	160	75	7	19.8
SS	200	130	3	20.9
n-Hex (minerals)	5	20	<1	3
Nitrogen	120	100	0.6	17.3
Phosphor	16	9	0.06	1.8
Coliform bacteria	3,000	105	<30	<30
Dichloromethane	0.2	0.04	<0.02	<0.02

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
63	xylene	29,146	0	0	0
101	2-ethoxyethyl acetate; ethylene glycol monoethyl	12,708	0	0	0
145	dichloromethane	20,620	0	0	0
179	dioxins	90	0	1.6	0
227	toluene	45,439	0	0	0
338	m-tolylene diisocyanate	0	0	1,625	0
352	tris (2-chloroethyl) phosphate	0	0	0	0

T.G.K. Co., Ltd.

Location: 52-1, Furukawa, Sekicho, Suzuka-gun, Mie Prefecture
Tel.: 05959-6-0791

Products: Automotive parts

Site area: 18,634 m²

Total floor area: 7,187 m²

No. of employees: 241 persons

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.8~8.6	8.6	7.4	7.9
BOD	25	3.0	0	2.1
COD	25	4.0	1.9	2.7
SS	90	13	2.0	7.0
n-Hex (minerals)	5	1.3	0	0.5
Total nitrogen	25	13.0	6.0	9.5
Total phosphor	2	0.14	0.07	0.11
Thiram	0.06	Less than 0.006		

Toyo Soflan Co., Ltd.

Location: 982, Kaneda, Atsugi City, Kanagawa Prefecture
Tel.: 046-222-4011

Products: Polyurethane foam, automotive parts, plastic products

Site area: 23,710 m²

Total floor area: 9,247 m²

No. of employees: 305 persons

•Air pollution measurements

	SOx		NOx		Ash dust		Dioxins	
	Standard	Measurement	Standard	Measurement	Standard	Measurement	Standard	Measurement
Boiler No. 1	0.33	0.033	—	66	265	24		
Boiler No. 2	0.22	0.039	—	98	176	22		
Incinerator							80	1.2

•Water contamination measurements

Item	Standard	Measurement		
		Maximum	Minimum	Average
PH	5.7~8.7	7.4	6.3	6.8
BOD	300	47	1	24
SS	300	14	<2.0	5.0
n-Hex (minerals)	5	<1.0	<1.0	<1.0
Iodine consumption	220	13	<1.0	3.3
Dichloromethane	0.2	0.03	<0.02	<0.02

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
25	antimony and its compounds	0	0	0	0
43	ethylene glycol	0	0	0	0
44	ethylene glycol monoethyl ether	0	0	0	0
63	xylene	941	0	0	0
132	1,1-dichloro-1-fluoroethane	864,793	0	0	0
145	dichloromethane	128,538	0	2,800	0
179	dioxins	14	0	0.0014	0
227	toluene	12,337	0	0	0
230	lead and its compounds	0	0	0	0
272	bis (2-ethylhexyl) phthalate	0	0	0	0
338	m-tolylene diisocyanate	0	0	0	0

•PRTR substances

(*1)	Substance	Released amount		Transferred amount	
		Atmosphere	Water	Waste	Sewage
32	2-imidazolidinethione	0	0	118	0
40	ethylbenzene	4,981	0	241	0
43	ethylene glycol	0	0	3,616	0
44	ethylene glycol monoethyl ether	0	0	185	0
63	xylene	56,998	0	12,026	0
101	2-ethoxyethyl acetate	0	0	369	0
115	N-cyclohexyl-2-benzothiazolesulfenamide	0	0	72	0
227	toluene	27,948	0	18,064	0
249	zinc bis (N,N'-dimethyl)dithiocarbamate)	0	0	43	0

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