JTEKT CSR Report 2008

Environmental Report

Pursuing new possibilities to help protect the global environment.

JTEKT recognizes environmental preservation as among the most critical management issues.
This idea is stated in our Corporate Activities Standard,and we conduct related activities daily.

- To give the widest possible publicity to our unified environmental policy
- To take measures against environmental risk to secure the safety of the local community
- To reduce the environmental burden by improving productivity
- To preserve energy, conserve natural resources and develop recycled products

We not only pay attention to activities inside the company;
as an environment-conscious manufacturer,
we try to find ways to help preserve the global environment
through our business operations.
In the “Environmental Report” chapter we will introduce
our activities to secure the future of the Earth.

Environmental Report

Summary of Activities 2007

Environmental Management

P38

Started environmental activities in China

We started activities regarding the environment and safety. Fifteen China-based affiliate companies attended the general meeting in China.

P38

An India-based affiliated company, SONA, was awarded in the environmental area

SONA received a high evaluation of its environmental preservation activities and received the highest award in the "6th TERI Corporate Award for Environmental Excellence" in India.

P38

Rendered PCB-used equipment harmless

We disposed of PCB equipment kept in the Kariya Plant and Higashikariya Plant through detoxification.

P42

Efforts in the Development and Design Stages

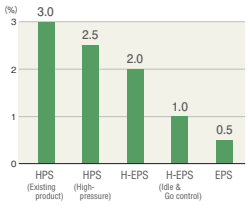
P45

Realized high power in electrical power steering

Realized high power in rack-assist type electrical power steering. This allowed it to be equipped to large SUVs or pick-up trucks for the first time in the world.

P46

Comparing energy consumption of power steering units



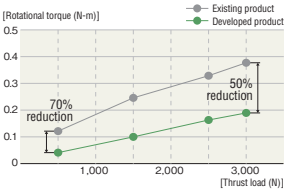
Dramatically reduced torque loss of needle roller bearings

We contributed to improved gas mileage by realizing low-torque thrust needle roller bearings, reducing torque loss by 50%

P48

Reduction efficiency of torque loss

Oil quantity: 200ml (Rotating speed: 200min^{-1})



Dramatically reduced energy consumption per workpiece

Productivity was improved dramatically by the development of a high-rigidity wheel spindle. Energy consumption per workpiece was reduced by a total of 45%.

P49

Efforts in the Production and Logistics Stages

P50

The Kokubu 2nd Plant was awarded for energy saving

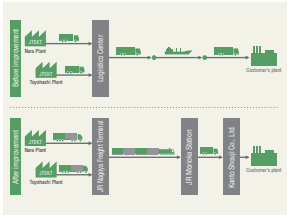
The Kokubu 2nd Plant was awarded in 2007 for its excellence in energy management by the Kinki Bureau of Economy, Trade and Industry.

P50

Improvement of physical distribution

Dramatically reduced CO_2 emissions by reviewing packaging and transportation between Nara / Toyohashi and Iwate. We will apply the same method to logistics in other regions.

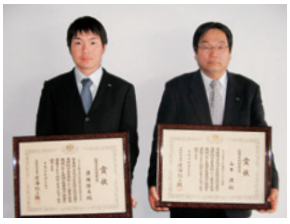
P51



Tokushima Plant awarded for ingenuity

The Tokushima Plant acquired a high reputation for its waste reduction activities and was awarded concerning "improvement in recycling shot dust into valuable resources" by the Ministry of Education, Culture, Sports, Science and Technology.

P53



*H-EPS is trademark of JTEKT CORPORATION.

Environmental Management

**To pass down the precious global environment to the future,
JTEKT promotes environmental preservation activities.
We try to reduce the environmental burden of all of our business activities
through our "Environmental Policy" and contribute to realizing a sustainable society.**

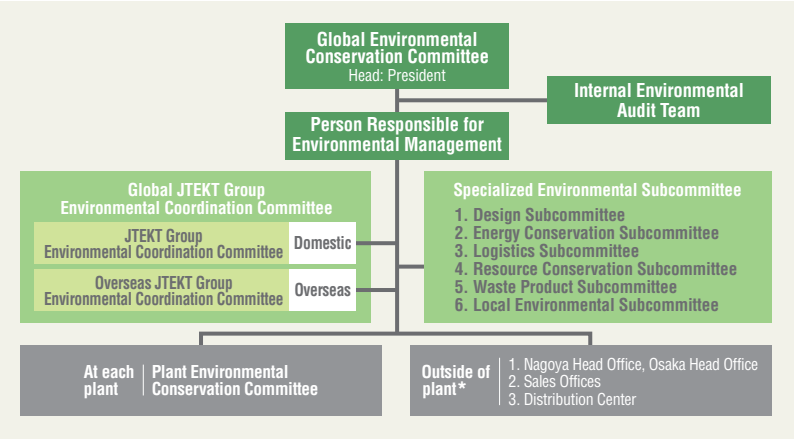
[Promotion Framework]

■ Formulate the "Environmental Policy"

JTEKT determines its company-wide environmental policy. We keep everyone informed about the environmental policy and also inform the policy public to all employees including external contractors. In addition, some plants determine their own environmental policy based on their originality and on regional characteristics.

■ Established centralized management framework

JTEKT established six specialized subcommittees under the Global Environmental Coordination Committee chaired by the President. These discuss and determine the company policies and purposes. Regarding efforts of the entire JTEKT Group including domestic and overseas subsidiaries, we established the Global JTEKT Group Environment Liaison Meetings and carry out environmental conservation activities. In 2007, we started such activities in China where environmental issues arising from rapid economic growth are a concern. We held a general meeting for our 15 local subsidiaries to strengthen environmental and safety measures.



*Outside the scope of third-party certification

Environmental Policy

1. Deeply understand the importance of global environmental conservation and voluntarily and aggressively carry out global environmental conservation activities both in Japan and abroad concerning our all business activities, products and services.

2. Continuously enhance the environmental management system to harmonize our business activities with the environment, and pursue cooperation with suppliers of raw materials.

3. Comply with environment-related laws, regulations and agreements pertaining to our business activities, and strive aggressively to prevent environmental pollution. In addition, contribute to global energy and resource conservation by accurately grasping technical needs related to global environmental conservation and developing and supplying products that meet such needs.

4. Raise the environmental awareness of all employees and pursue the following as important environmental management objectives in relation to all our business activities, products, and services:

(1) Reduction of CO_2 emission through efficient energy utilization
(2) Reduction of waste
(3) Thorough control of chemical substances and reduction of substances of environmental concern
(4) Reduction of raw and consumable materials
(5) Reduction of logistics-related CO_2 emissions
(6) Maintaining and improving community environments

5. Maintain an organized environmental conservation structure, clarify environmental conservation activity objectives and targets, conduct periodic reviews, and pursue environmental conservation activities with participation of all employees.

6. Maintain an awareness of the community surrounding each business site, maintain good communication with concerned government agencies and local residents, and publicly disclose information on our environmental management activities as necessary.

April 1, 2008

T O P I C S

An India-based affiliated company, SONA, was awarded in the environmental area

SONA KOYO STEERING SYSTEMS LTD. (SONA), the overseas affiliated company that manufactures steering systems in India, received the 6th TERI Corporate Award for Environmental Excellence hosted by the Energy and Resources Institute (TERI). This is to honor a company for its noteworthy achievements in environmental preservation. In this case, the activities of SONA, including elimination of toxins, conservation of water used in the plant and promotion of a greening campaign were highly evaluated. SONA was the first company to win this award in the automobile industry.

Dr. Surinder Kapur, Chairman & Managing Director (left) and Shiri P. Chidambaram, the Finance Minister of India (right)

[Objectives and Results]

■ Environmental Action Plan of JTEKT

To realize a sustainable society, JTEKT formulated the "Environmental Action Plan of JTEKT" that stipulates action policy and specific goals until 2010. Based on the plan, we are carrying out environmental conservation activities including at affiliated companies. In areas where goals have already been achieved, we have set more challenging targets and are working to achieve them.

PRTR Law :
PRTR is abbreviation for Pollutant Release and Transfer Register. This is a legal system in which administrative authorities show the volume of specific chemical substances released to the environment, as reported by the business entities.

【 1 】Environmental conservation activities for further reducing environmental impact

* Raising the targets

Item	Details	FY2007 Target	Results	Assessment	Page
Promotion of measures to prevent global warming	● Total CO_2 output: 5% reduction from 2003 level by the end of FY2010 ● Unit CO_2 output: 30% reduction from 2005 level by the end of FY2010*	268,000 (t-CO_2) 41.4 (t/100 million yen)	282,306 (t-CO_2) 41.3 (t/100 million yen)	× ○	50
Strengthening management and reduction of environmental burden	● Substances subjected to PRTR Law: 60% reduction from FY1998 level by the end of FY2010	96 (t)	88(t)	○	53
Reducing waste and promoting resource conservation	● Zero landfill waste: Reduce to zero by the end of FY2010 ● Incinerated waste: 96% reduction from the FY1990 level by the end of FY2010* ● Unite waste output: 30% reduction from the FY2003 level by the end of FY2010* ● Primary materials, by mass: 5% reduction from the FY2005 level by the end of FY2010 ● Primary materials, by value: 5% reduction from the FY2005 level by the end of FY2010 ● Secondary materials, by value: 5% reduction from the FY2005 level by the end of FY2010	28 (t) 1,254 (t) 10.7 (t/100 million yen) 1.536 (t/1 million yen) 9.69 (million yen/million yen) 4.37 (million yen/million yen)	26 (t) 1,177(t) 9.3 (t/100 million yen) 1.538 (t/million yen) 9.41 (million yen/million yen) 4.25 (million yen/million yen)	○ ○ ○ × ○ ○	52～53
Promoting the rationalization of logistics	● CO_2 output at the transportation stage: At or below the FY1990 level by the end of FY2010 ● Basic unit of CO_2 output: 40% reduction from the FY1990 level by the end of FY2010	17,406 (t-CO_2) 2.68 (t/100 million yen)	17,621 (t-CO_2) 2.58 (t/100 million yen)	× ○	51

【 2 】Eco-friendly development and design

Item	Details	Results	Assessment	Page
Efforts in the development and design stage	● Reduction or enviromnmental burden	・Development of (RP-CPS), which has high power and the world's highest standard of quality ・Low friction thrust needle roller bearings ・Weight reduction of hub units for small vehicles ・Reduction of size and weight in damper pulleys ・Low power consumption GL32J cylindrical grinders, etc.	○	45～49
Strengthening cooperation with suppliers	● Further promotion of green purchasing ● Creation of eco-friendly "Green Purchasing Guidelines" for distribution to suppliers	Revision of "Green Purchasing Guidelines" (April 2008)	○	25

【 3 】Expansion of environmental management in response to consolidated management

Item	Details	Results	Assessment	Page
Developing structure and improving actions	● Share basic policy and action guidelines	Continued activities with domestic and overseas group companies	○	38,42

【 4 】Proactive participation in social and conservation activities as a corporate citizen

Item	Details	Results	Assessment	Page
Promoting social contribution activities	● Participating in environmental conservation activities	Implementing clean-up activities around the plant	○	33
Developing communication with local communities	● Coordinating with and providing support for local governments	Continuing to hold local meetings regarding the environment	○	32
Promoting PR and information disclosure	● Improving the supply of environmental information via the Internet ● Improving and continuing to issue our environmental reports ● Promoting regional community volunteer activities	Issued Social &Environmental Report 2007	○	

* RC-EPS is a trademark of JTEKT CORPORATION.

[Environmental Burden of our Business Activities]

Reducing the environmental burden of our business activity is the key point in environmental preservation activities. To reduce the environmental burden in each business activity, JTEKT quantitatively grasps the overall amount of resource and energy input and the overall amount of output of environmental burden.

■ Resource / energy input and environmental burden output

The chart bellow shows the amount of resource / energy input and environmental burden output. JTEKT makes every effort to use energy effectively and to minimize our contribution to global warming. Specifically, we try to reduce energy usage in forging, casting, heat treatment and machine processing, while promoting the conversion of energy source to electricity or to municipal gas, which are more energy-efficient.
Electricity and municipal gas make up about 95% of energy input (on a calorie basis). For effective utilization of resources, we recycle 98% of emissions discharged from each process and sent outside the company.

CO_2 conversion factor used for CO_2 emission calculation

Electricity	0.3817 kg-CO_2/kWh
Fuel oil A	2.7000 kg-CO_2/L
Kerosene	2.5308 kg-CO_2/L
Propane gas	3.0094 kg-CO_2/kg
Municipal gas	2.2559 kg-CO_2/m³

*The source of CO_2 conversion factor:
Japan Automobile Manufacturers Association, Inc.

To assess our self-improvement, we fixed an electricity conversion factor. CO_2 reduction effect by cogeneration is converted by the average of conversion factors for thermal power generation and reflected in the emission calculation.

GJ: Gigajoule (unit of heat) $G=10^9$

COD: Chemical Oxygen Demand
(an index that indicates water pollution)

INPUT

Resource / energy inputs

Raw materials
(metals, non-ferrous metals)
Total: 290,000 t

Energy
Total: 6,961,175 GJ

Electricity	591,091 MWh
Municipal Gas	17,543,000 Nm³
LPG	3,135 t
Kerosene	875 kl
Fuel oil A	3,901 kl

Water
Total: 2,860,000 m³

Service water	498,000 m³
Industrial water	508,000 m³
Groundwater	1,854,000 m³

Chemical substances
(transaction volume of substances set out by the PRTR Law)
Total: 132 t

Logistics
Packaging and packing material: 5,174 t

Manufacturing

- Casting / Forging
- Heat treatment
- Machining
- Painting
- Assembling

Products
Automotive parts
Bearings
Machine tools
Mechatronic products

OUTPUT

Emissions of environmentally detrimental substances

Emission into the atmosphere

CO_2	282,306 t-CO_2
Output of substances listed in the PRTR Law	70 t

Emissions into rivers, lakes and oceans

Amount of wastewater	1,034,000 m³
COD	6.9 t
Nitrogen	8.3 t
Phosphorus	0.1 t
PRTR Law Subject Substance	0.1 t

Emissions sent outside the company

Waste	1,203 t
Recycling	13,918 t
For-fee recycling	48,391 t
PRTR Law Subject Substance	17.4 t

Logistics

CO_2 generated from product transportation	17,621 t-CO_2

[To Reduce Environmental Risk]

JTEKT has incorporated preventive measures into its environmental management system and strives to reduce environmental risks with the aim of eradicating regulatory infractions, abnormalities and complaints regarding harm to the environment.
We grasp the situation and take measures regarding the cases that didn't become abnormalities or complaints, in addition, we share such information for prevention. Furthermore, we listen to the opinions of local communities through the Local Environment Subcommittee and respond to such opinions, and we carry out emergency training every year as a precaution.

■ Environmentally Conscious Noise Control

As a measure for reducing global environmental risk, we built sound barriers for reducing noise when the old building was taken away from the site of the Nara Plant. In addition, we placed sound absorption sheets on the building to avoid the impact of the echo to the area outside the plant.

Sound barriers (Nara Plant)

■ Response to environmental accidents and complaints

In August 2008, an accident, in which detection value of COD (chemical oxygen demand) and SS (suspended solid) exceeded the standard value fixed by law, happened at Toyohashi Plant. The reason was the overflow of untreated waste water caused by clogging of a sand separator.
In January 2008, the accident, in which oil drained into a public waterway through a foul water sewer and storm sewer happened at the Kokubu Plant. The reason was delay in discovering an inflow of oil into the storm sewer because there was no monitoring function set at the rainwater outlet.
So, in addition to improving and expanding facilities as a preventive measure, we thoroughly reviewed the management system and applied corrective measures to the other plants.
We are continuously promoting prevention activities through continued efforts.

■ Compliance Status for Environmental Laws and Regulations

We have set voluntary standards for plant wastewater and atmospheric emissions that are even more stringent than those set by law. In FY2007, we had no penalties or fines except for the above two environmental accidents. There were no legal actions brought against us.

■ Efforts related to soil and groundwater (continuous reporting)

➡ Figure | 01

To prevent groundwater contamination by trichloroethylene contained in the cleaning agent that was used before, Kariya and Okazaki Plant use a pump-and-treat method (*1) to purify water and prevent the outflow of pollutants. In addition, the Okazaki Plant introduced bioremediation (*2) through injection of nutrients in 2004 as a measure to promote water purification. The effect of bioremediation is demonstrated, as the detection value of trichloroethylene falls below the value fixed by law at the places where the bioremediation method is applied.
In addition, we report groundwater measurement results to the authorities as well as to local residents through Community Discussion Meetings.
(➡ Related article, See P.32)

➡ Figure | 01

FY2007 Trichloroethylene measurements

Plant	Maximum measured value in groundwater
Kariya	0.710 mg/L
Okazaki	0.137 mg/L

*Environmental standard value 0.03 mg/l

***1 Pump-and-treat method:**
Groundwater is turned to spray and air is blown from below to vaporize and separate organic solvents inside, and activated carbon absorbs the pollutants.

***2. Bioremediation:**
This is a method for cleaning polluted environments using microorganisms. Substances such as nutrients are injected into the affected area to elevate the cleaning power of resident microorganisms.

■ PCB-used Equipment

➡ Figure | 01

We properly store PCB-using equipment, including condensers for which PCB (polychlorinated biphenyl) is used in insulation oil, and periodically report the volume and storage situation to the municipal authorities. In May 2008, we disposed of a total of 31 condensers stored at the Kariya and Higashikariya Plants after detoxification. We delegated this operation to Japan Environmental Safety Corporation. We promote disposal by delegation in a planned manner.

➡ Figure | 01

PCB-using equipment in storage

Plant	Condenser	Stabilizer
Kokubu	15	3,761
Kariya	1	850
Tokushima	66	126
Okazaki	83	99
Tokyo	23	269
Nara	11	112
Higashikariya	0	1
Total	199units	5,218units

There is no PCB-using equipment other than at the plants listed above.

[Environmental Audit]

To evaluate whether or not the environmental management system is continuously maintained and enhanced, JTEKT carries out both an internal and an external environmental audit every year.

■ Internal Audit

JTEKT conducts the internal environmental audit of each department and of the Specialized Environmental Subcommittees based on an audit plan every year. We follow up on all of the suggestions of the auditors and strive to continuously improve our environmental preservation level and reduce underlying environmental risks.

■ External Audit

An external auditing institution carries out a surveillance audit (once a year) and renewal inspection (once every three years) to check JTEKT's continuous compliance with its environmental management system. In the surveillance audit carried out in 2007, we received suggestions regarding compliance with environmental law and regulations, and regarding the system to properly reduce environmental risks, so we followed the suggestions. We received an overall assessment that we operate our environmental management system properly. Especially, activities for improving the environment that is directly-connected with the business operations and its results, proactive improvement activities for reducing environmental burden and activities for communicating with local residents, including regarding beautification activities, are highly evaluated.

A scene from the external environmental audit

■ Efforts by group companies

➡ Figure | 02

Five group companies, inclusing both domestic and overseas affiliates, obtained ISO14001 certification FY2007.

➡ Figure | 02

Group companies that obtained ISO14001 certification in FY2007 (domestic and overseas)

Domestic Group companies	Date certification obtained
KOYO HEAT TREAMENT CO., LTD.	December 2007
KOYO SALES, LTD.	March 2008
YUTAKA HIGH-TECH CO., LTD.	April 2008

Overseas Group companies	Date certification obtained
KAW (China)	December 2007
JAFS (China)	February 2008

TOPICS

KOYO HEAT TREATMENT CO., LTD. obtained ISO 14001 certification

As an environment-related activity, JTEKT promotes having our domestic affiliated companies obtain ISO certification. In FY2007, KOYO HEAT TREATMENT CO., LTD. obtained ISO14001 certification. This attempt enhanced employees' awareness of energy saving and waste reduction and brought results. In addition, they could conduct a compliance assessment properly through an internal audit. In FY2008, they are further promoting environmental conservation activities as well as increasing the number and level of the internal auditors.

The main manufacturing site, Yao Plant (Osaka)

[Environmental Accounting]

JTEKT carries out continuous improvement effectively and efficiently through quantitatively grasping the cost and effect of environmental preservation. For all stakeholders to have better understanding of our environmental preservation activities, we utilize the figures as the data for information disclosure.

■ Cost for Environmental Preservation

(Unit: million yen)

Category	Description	Investment	Cost
❶ Business area cost			
① Pollution control	● Maintenance and management costs for wastewater treatment equipment ● Maintenance and management costs for dust collection equipment	175	298
② Global environmental protection	● Cost for energy conservation measures	371	57
③ Resource recycling	● Investment and maintenance costs for waste reduction ● Cost of waste disposal, recycling, etc.	32	707
❷ Upstream and downstream cost	● Green purchasing costs ● Expense for industry groups, etc.	—	661
❸ Management activity cost	● Cost of education and awareness-development activities ● Cost of maintaining and managing ISO14001 certification ● Cost of environmental monitoring and measurement	—	215
❹ Research and development cost	● Development cost of eco-friendly products	870	1,875
❺ Social activity cost	● Cost for environmental information disclosure ● Cost of greening, etc.	—	82
❻ Environmental damage cost	● Pollution load levy (Tokyo and Tokushima) ● Cost of groundwater and soil purification	—	25
Subtotal		1,448	3,920
Total		5,368	

■ Economic Effect of Environmental Preservation Measures

(Unit: million yen)

	Details of effect	Economic effect
Profit	Business profit from the recycling of waste products generated by our primary business activities and used products, etc.	1,547
Cost reduction	Reduction of energy cost	332
	Reduction by energy preservation measures from resources conservation and recycling	24
Total		1,903

■Environmental accounting results for FY2007

➡ Figure | 01

The total environmental preservation cost for FY2007 was 5,370 million yen, which is comprised of 1,450 million yen of investment and 3,920 million yen of expense, and increased 250 million yen (5%) when compared to the previous year. Investment in energy saving as a countermeasure against global warming accounts for 64% of the business area cost.

The economic benefit from environmental preservation measures was 1,900 million yen, increased 240 million yen (14.6%) from previous year. Profit on sales of recyclable materials increased because of escalating metal price.

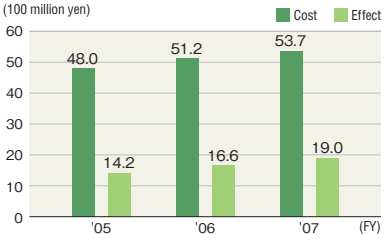
Note for chart "Economic Effect of Environmental Preservation Measures"

Figures only include calculable items including energy-saving effect. Therefore, the effects such as contribution to added value of products, environmental risk aversion and improving the company image are not included in the economic effect.
Cost depreciation is not included. Costs with combined expenditure purposes are shown.

Calculate range:
JTEKT CORPORATION only (Head offices and branches, Logistics Centers, R&D Dept. and all plants)
Accounting period:
FY2007 (April 2007 to March 2008)

➡ Figure | 01

Costs and Effects of Environmental Preservation



[Environmental Education and Training]

■ Environmental Education

JTEKT conducts various kinds of environmental education to enhance all employees' environment-consciousness. In addition to training internal environmental auditors, we educate about the environment in all education curriculums for entry-level employees, those newly-appointed to key position and engineers.

01 | Environmental self-awareness sessions

We hold environmental self-awareness sessions for employees at each plant every June, our environmental month. In 2007, to enhance environmental-awareness, we held the session on the theme of finding an environmental activity you can do by yourself.

02 | Educating internal environmental auditors

We conduct training for internal environmental auditors once a year for employees and employees of affiliated companies. In 2007, a total of 30 participants attended the course and newly registered as internal environmental auditors.

Number of people with major environment-related qualifications (FY2007)

Pollution prevention manager	Atmosphere	25	Specially controlled industrial waste manager	32
	Water	30	Dangerous object handler (class A)	3
	Noise	25	Dangerous object handler (class B)	250
	Vibration	17	Dangerous object handler (class C)	39
Energy management manager		24	Licensed electrician (first-class)	1
Energy management officer		9	Licensed electrician (second-class)	12
Internal environmental auditor		274	Licensed electrician (third-class)	22

■ Emergency training

It is necessary to conduct emergency training sufficiently and routinely to minimize environmental risks. JTEKT periodically carries out emergency training across the organization and inspects environmental preservation equipment. During inspection or training, we specify the critical incidents among fire, explosion, earthquake, typhoon and leakage of harmful substances that have a high potential for creating an emergency. Training and inspections are conducted based on the role of each department organized for emergency response.

Internal environmental auditor training

Environmental self-awareness session (Kariya Plant)

VOICE

Office manager,
Environment Control Office
Soichi Nouchi

For sharing environmental awareness with all employees

Environmental issues frequently come up in news or daily conversation these days. I talk about the company's environmental preservation activities during environmental education.
I hope that environmental education becomes the stage for employees to think about the activity they can do, and leads to as many results as possible.

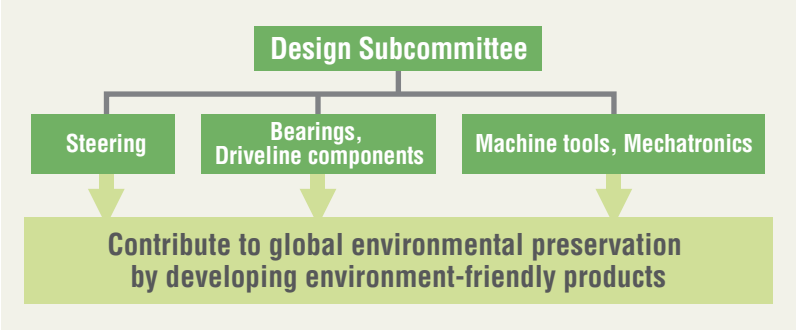
Emergency training (Tokyo Plant)

Efforts in the Development and Design Stages

JTEKT focused on efforts at the development and design stage as the most important point of all environmental activities. This is because epoch-making technological innovation has a possibility to achieve high goals that cannot be achieved with the other methods.

[Promotional Framework]

Under the Global Environment Conservation Committee, it is promoted and managed by the Design Subcommittee.
It is important to always improve the function of the product as well as improving environmental functions. In addition to providing comfort and safety, and fulfilling such requirements as quality, cost and deadline, we intend to develop technology that finally contributes to society.



[Goals and Evaluation]

For numerical evaluation of environmental burden reducing effect, JTEKT determines the basic equation of environmental efficiency as an original index. Specific goals are determined numerically and assessed every year.

Basic equation of environmental efficiency

$$\frac{\text{Product performance}}{\text{Product environmental burden}} = 1 \Big/ \sqrt{W^2 + T^2 + E^2}$$

W: mass term, T: loss term, E: energy term

Calculation method of reduced environmental burden

Environmental efficiency is calculated from degree of to which products can be made lighter, more compact, more energy efficient, etc. Environmental burden is the figure calculated as a reciprocal number.
Reduced environmental burden is calculated from the following formula, for example, when the figure of environmental efficiency is 1.25 that means that environmental burden was reduced by 20%.

$$\left(1 - \frac{1}{1.25}\right) \times 100 = 20\%$$

[Activities and Results by Business Areas]

We will introduce our main activities and results of our three business areas, “Steering Systems”, “Bearings and Driveline”, “Machine Tools and Mechatronics” in 2007.

■ Steering Systems

01 | As the responsibility of the company that knows everything about bearings

Steering is an instrument that bears an automobile’s turning function, and function and reliability are valued. JTEKT is one of the few companies in the world that covers all of the various kinds of steering systems, and promotes product development that has both high-quality and eco-friendliness.

02 | Reduction of Product Mileage by Localization (*1)

We promote local production and local procurement overseas for CO_2 reduction during transportation of steering products.

03 |Types and Application of Steering Products

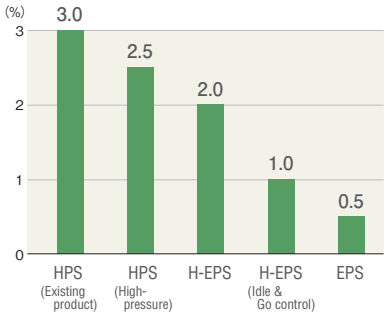
Electric power steering

Electric power steering is better than hydraulic power steering and hydraulic-electric power steering in gas mileage and compactness, but increasing power was the issue to be resolved. Therefore, we tried to realize high power along with environment design.

There are three types of electric power steering systems, according to the automobiles to which it will be applied, and we develop the most suitable technology on the basis of features of the systems. Among them, we succeeded in realizing significantly higher power in the rack-assist type.

***1 Product mileage by localization:**
This is a concept of CO_2 reduction by saving resources and energy in logistics. The figure is gained from multiplying logistics volume by travel distance.

Comparing energy consumption of power steering units



An energy ratio used for power steering among energy cosumption of a whole automobile.

T O P I C S

The World’s First Electric Power Steering Applied to a Large SUV (*2)

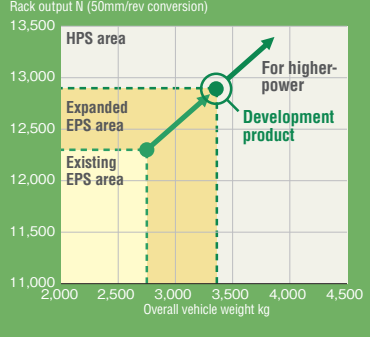
Compared to hydraulic power steering (HPS) which is powered by the engine, electric power steering (EPS) which is powered by a motor can increase fuel economy because it exhibits smaller energy loss of engine. However, realizing high power is the issue to be resolved in order to load EPS on large SUVs whose overall vehicle weight exceeds 3 t.

JTEKT tried to make EPS more powerful in various ways including developing a new system, and as one of the achievements, we succeeded in developing rack coaxial type EPS (RC-EPS) that possesses the world’s highest quality. In 2007, RC-EPS enabled loading EPS in large SUVs and pick up trucks for the first time in the world. To contribute to global environmental preservation, we promote diffusion of EPS through further technical innovation.

Newly developed rack coaxial type EPS

***2 SUV**
One form of vehicle.
Abbreviation for Sport Utility Vehicle.

Relation of EPS power output and overall vehicle weight



Hydraulic-electric power steering

We focused on improving the efficiency of pumps, reducing size and reducing torque loss.

Hydraulic power steering

We focused on reducing size, lightening and torque loss.

Types of steering and the automobiles to which applied

	Application					Location installed
	Passenger car				Large vehicles	
	Kei	Small	Medium	Large		
Electric power steering (EPS)						
● Column-assist Type (C-EPS)	●	●	●			Cabin
● Pinion-assist Type (P-EPS)		●	●			Engine compartment
● Rack-assist Type (R-EPS)			●	●		Engine compartment
Hydraulic-electric power steering (H-EPS)		●	●	●		Engine compartment
Hydraulic power steering (HPS)	●	●	●	●	●	Engine compartment

System		Point of Development	Effect		Value of environmental effect
Electric power steering	Column-assist Type 	● Housing optimization (lightening) ● Reduction of product mileage by localization in Japan, North America, Europe, China and Thailand	Mass	28% reduction	1.60
			Torque loss reduction	21% reduction	
			Consumption energy	83% reduction	
	Pinion-assist Type 	● Adopting hall IC torque sensor (reduction in size and weight)	Mass	22% reduction	1.58
			Torque loss reduction	25% reduction	
			Consumption energy	83% reduction	
	Rack-assist Type 	● Improvement of motor efficiency (reduced size and high power) ● High efficiency realized by adoption of double-reduction gear of ball screw and bevel gear	Mass	23% reduction	1.71
			Torque loss reduction	36% reduction	
			Consumption energy	83% reduction	
Hydraulic-electric power steering		● Efficiency improvement of pumps (low loss)	Mass	20% reduction	1.40
			Torque loss reduction	11% reduction	
			Consumption energy	67% reduction	
Hydraulic power steering		● Housing optimization (lightening)	Mass	11% reduction	1.14
			Torque loss reduction	10% reduction	
			Consumption energy	17% reduction	

*RC-EPS, C-EPS, P-EPS, R-EPS and H-EPS are trademarks of JTEKT CORPORATION.

■ Bearings and Driveline

Bearings that widely assist the industry and machinery, and driveline components that assume the running function of automobiles. Both components must meet the requirement of high performance as well as eco-friendliness.
Under such circumstances, we chose efficiency and weight reduction for bearings, and size reduction, weight reduction and energy-saving for driveline components as the main subjects of development.

01 | Lightweight hub unit for compact vehicles / Saving weight by 30%

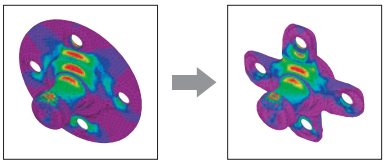
➡ Figure | 01

Applied new design approach derived from CAE analysis including unit periphery. Succeeded in reducing weight by 30% while maintaining rigidity and strength.

Value of environmental efficiency
1.10

➡ Figure | 01

Optimizing the form of hub unit

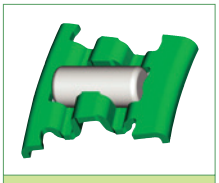


We designed the best suited form to save weight while maintaining strength.

02 | Low friction thrust needle roller bearing / Reducing torque loss by 50%

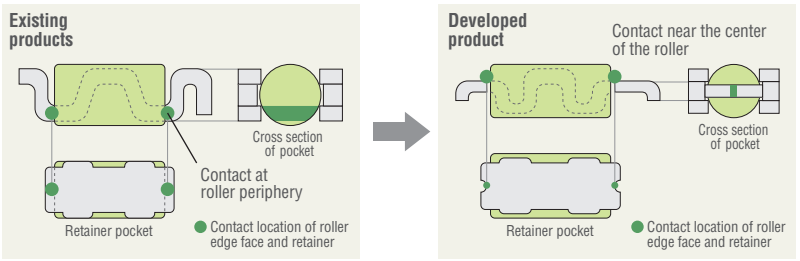
➡ Figure | 02

We made an optimal design of the retainer of thrust needle roller bearings, the bearings for transmission. We succeeded in reducing torque loss by 50% by reducing the skid resistance of the roller and thus contributed to improving gas mileage.



Value of environmental efficiency
1.15

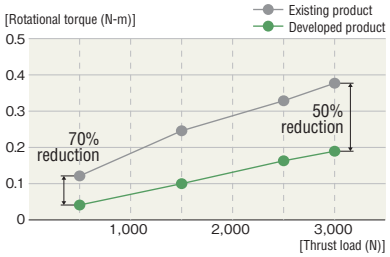
Structure and features



➡ Figure | 02

Reduction efficiency of torque loss

Oil quantity: 200ml (Rotating speed: 200min^{-1})



03 | Damper pulley for small gasoline engine / Reduction in size and weight, adoption of water-based paint

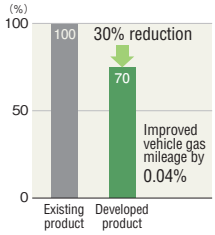
➡ Figure | 03

We changed the accessory drive system to the serpentine method (the method that drives an accessory with one belt) with the improvement of strength and durability of damper rubber, and so we realized reduced size and lightening.
In addition, we reduced VOC (*1) emission by applying water-based paint.

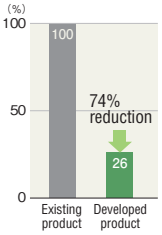
Value of environmental efficiency
1.10

➡ Figure | 03

Weight reduction



VOC emission



***1 VOC:** volatile organic compound

■ Machine Tools and Mechatronics

When developing and designing machine tools, we think this is the way we provide products with less environmental burden. We assessed the impact on the environment from the standpoint of the overall life cycle of the product including manufacturing, usage and disposal by conducting product assessment.

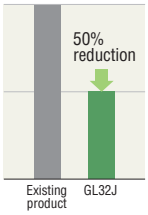
01 | GL32J Cylindrical Grinders / Reduced consumption energy per workpiece by 45%

We reduced slide resistance, amount of coolant and cooling energy of wheel bearing oil regarding the equipment, except grinding parts, and after all, we succeeded in reducing overall energy consumption of machinery.
In addition, regarding grinding parts, we realized processing by a broad wheel of 60 mm with the development of a highly rigid wheel spindle. That provided greater productivity. We reduced energy consumption per workpiece by 45%. We can reduce CO_2 by 10.5 t's in case of manufacturing 200,000 workpieces per year.

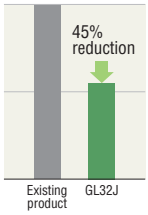
➡ Figure | 04

➡ Figure | 04

Coolant flow



Energy consumption per workpiece

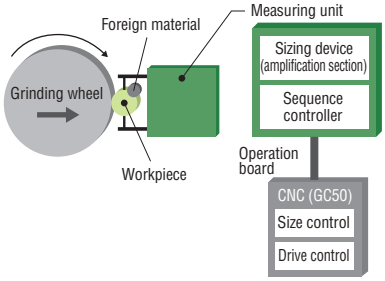


02 | CNC (GC50) Development of defective dimension preventing function / Reduced energy loss by 90% through reduction of defective units

Defective units produced in the manufacturing process cause waste and lead to environmental burden. In 2007, we developed the defective dimension preventing function to reduce defective units in the grinding process. It detects foreign material that gets mixed in with a workpiece when grinding with an in-process sizing device. Until then, when sizing with the foreign material in the device, the device malfunctioned and produced defects. However, the newly developed function reduces foreign material and has reduced defects by 90%. When loss energy is reduced in the 20 processing stages, we can reduce CO_2 by more than 5 t's.

➡ Figure | 05

Reduction of energy loss by reduction of defects



TOPICS

Technology of JTEKT Contributes to the Diffusion of Clean Energy

Wind power generation is clean energy that is rapidly spreading, mainly in Europe, because of the steep rise of crude oil prices and for prevention of global warming. As maintenance of wind power generators, which are installed at high places, is not easy, long life and reliability is required.
Large-size non-conductive ceramic bearings, which JTEKT developed and for which we established a mass production system, succeeded in preventing electric corrosion* and heat control and realized longer life.
As a result, we contributed to the improvement of wind power generators and reduction of maintenance costs.

*electric corrosion: A phenomenon in which electric flow passes through the inside bearings and the surface of rolling contact melts locally.

Structure of windmill power generators

Efforts in the Production and Logistics Stages

JTEKT is promoting effective use of materials as well as reducing CO_2 emission, the cause of global warming. In addition, we promote production and logistics activities that harmonize with the environment through waste reduction and management of chemical substances.

[CO_2 Reduction]

■ CO_2 Reduction in Production

➡ Figure | 01

Global warming is the key environmental issue for JTEKT. So, we promote energy saving and CO_2 reduction through such activities as enhancing the efficiency of existing facilities and upgrading aging facilities into high-efficiency ones. In FY2007, we couldn't achieve our target to reduce 268,000 tons of CO_2 by approximately 5% because the production volume increased. However, we reached the goal for reduction of CO_2 unit output. We pursue reduction of CO_2 unit output while we focus on achieving our reduction target for CO_2 emissions, including uncovering hidden items and conducting in-house activities in horizontal cooperation.

01 | Primary Initiatives

(1) Improvement of heat-treatment process
(2) Improvement of production / peripheral equipments
(3) Activities for expanding energy conservation through integration of low-load lines
(4) Efficient operation of in-house power operation
(5) CO_2 Reduction by energy conversion
(6) Activation of energy-saving activities at workplaces
(7) Environmental consideration at newly built plants

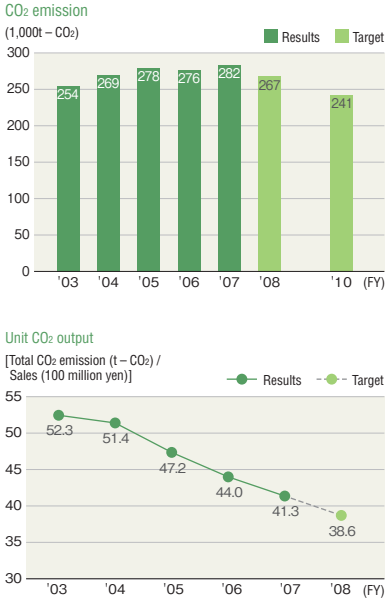
02 | Primary Actions Implemented

Kokubu Plant realized energy-saving by upgrading coolant temperature-control devices

A coolant temperature-control device is operated in the Kokubu Plant to restrict elevation of heat. The device was renewed to an inverter type, which has excellent energy-saving capability. The new device realized efficient use of energy; specifically, it realized reduction of electric power charge of 1.4 million yen per year and CO_2 reduction of 47 t – CO_2. We are going to expand application of such types of coolant device based on the coolant temperature control method guidelines as an energy conservation activity.

➡ Figure | 01

Changes in CO_2 Emission and Unit CO_2 Output in Production



TOPICS

Kokubu 2nd Plant was awarded by the Kinki Bureau of Economy, Trade and Industry

On February 21, 2008, at the energy-saving month award ceremony, Kokubu 2nd Plant received the director's award from the Kinki Bureau of Economy, Trade and Industry for its excellence in energy management. This is in appreciation of Kokubu 2nd Plant's long-standing efforts for energy efficiency. Kokubu 2nd Plant keeps on proactively promoting energy efficiency and seeks to receive the Minister's Award, Ministry of Economy, Trade and Industry.

■ CO_2 Reduction in Logistics

➡ Figure | 02

We aim to realize CO_2 reduction to the 1990 level by 2010.

01 | Primary Initiatives

(1) Improvement of Distance Distribution

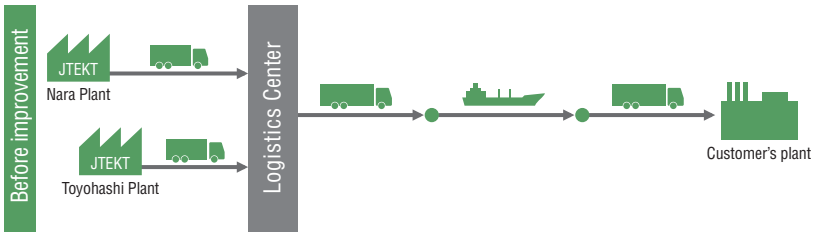
(2) Usage of trailers for core routes

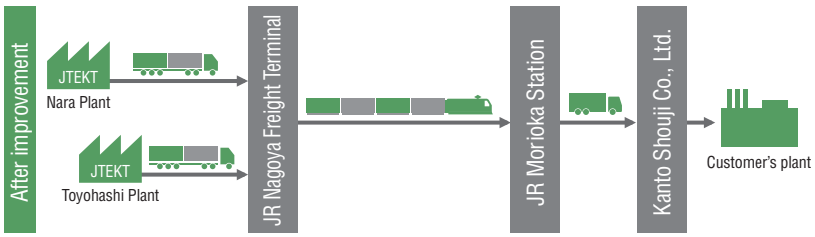
02 | Primary Activities Implemented

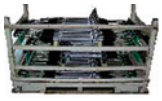
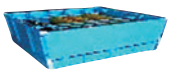
Nara Plant / Toyohashi Plant, Review of Packaging and Method of Distance Distribution

We used to pack the finished products on pallets before, when the products were transported from the Nara Plant and Toyohashi Plant to the customer in Iwate Pref. But we changed the transportation method. We transport parts packed on pallets, then the parts are gathered near the customer and assembled to the final products. That improved the package efficiency in distance distribution by 250%. Furthermore, we changed the means of transportation from marine transport to rail transport. That reduced CO_2 emission by 121 t (a 49% decrease from the previous year).

We are reducing CO_2 emissions further by applying this method to distribution in other areas.





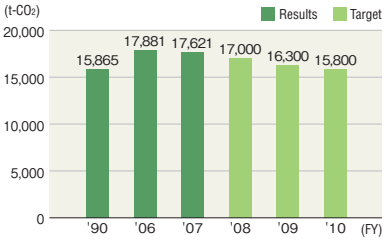
Before improvement		After improvement
	Package efficiency → 250% UP	
Finished products	Transporting material	Short gear and parts
1580x810x760H	Steel pallet size	1200x1120x720H
20 units	Capability	50 pieces
	Volume	30 pallets per day

Results
Volume of CO_2 reduction
Reduced 121 t for a year
-49%

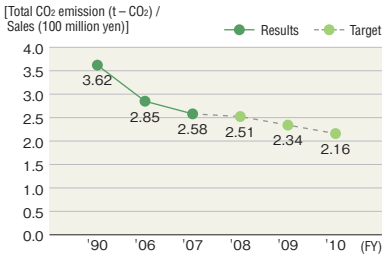
➡ Figure | 02

Change in CO_2 Emission and Unit CO_2 Output in Logistics

CO_2 emission



Unit CO_2 output



[Reduction of Material Usage]

JTEKT organizes the Resource Conservation Committee as one of the specialized environmental committees to respond to the resource depletion issue. Specifically, we endeavor to reduce usage of primary materials and subsidiary materials including grinding wheels, cutters and grinding fluid.

■ Reducing usage of primary material

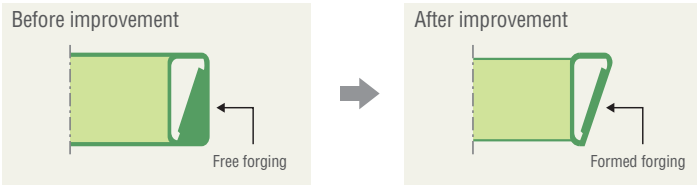
➡ Figure | 01

We reduced material loss by not only changing material or quality of material, but changing production method and reducing machining allowances. We succeeded in reducing material cost by improving the yield ratio. In addition, we utilize punched-out material, for example, we make another product from punched-out materials when making products by molding.

Improving yield ratio of formed and fabricated materials

When forging an inner ring of middle and large sized bearing, we reduced material loss at processing by preparing materials that fit to the form after processing as far as possible. We achieved an effect of 590,000 yen per month.

Inner ring of middle and large sized bearing



■ Reducing Subsidiary Material Usage

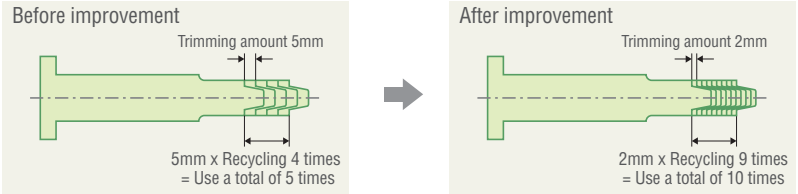
➡ Figure | 02

We succeeded in using the subsidiary materials for a longer term by reviewing the materials of grinding wheels, cutters and dies, or by changing their specification including size and hardness. As a result, we realized a reduction of subsidiary material cost. In addition, we promote recycling of waste oil, grinding wheels, cutters and jigs.

Reduction of mold cost by changing recycling frequency of the heat forging die

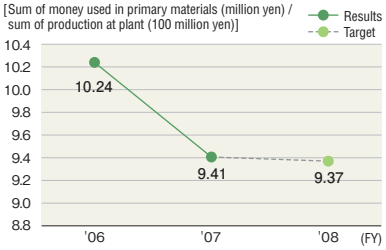
We reuse the metal mold for heat forging (punch) that is washed-up after trimming wearing parts. We quantified the trimming amount and improved it from 5 mm to 2 mm. Thus, we succeeded in increasing recycling frequency.

Punch cross-section



➡ Figure | 01

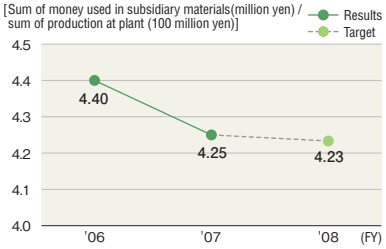
Unit Primary Material Usage



* The date above is from FY2006 onward when the Resource Conservation Subcommittee started.

➡ Figure | 02

Unit Subsidiary Material Usage



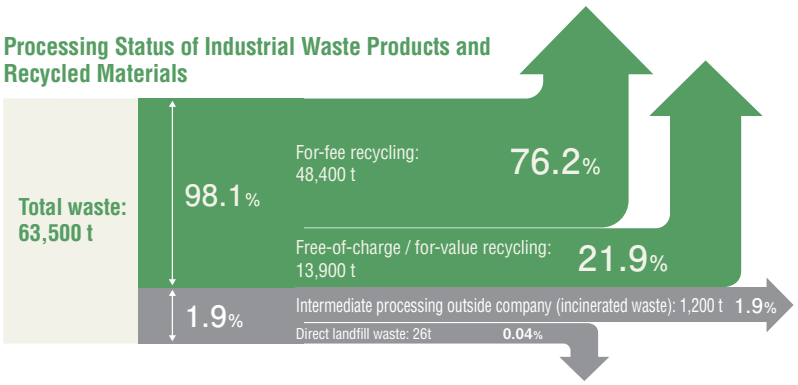
* The date above is from FY2006 onward, when the Resource Conservation Subcommittee started.

[Waste Reduction]

➡ Figure | 03

JTEKT proactively conducts waste reduction activities to address to the shortage of landfill sites and to utilize resources. In addition to reducing the amount of waste hauled to landfill sites or incinerated, we promote reduction of overall waste including for-fee recycling and free-of-charge / for-value recycling. We achieved the FY2010 target, so we set stricter targets and took them up as a challenge.

Processing Status of Industrial Waste Products and Recycled Materials



■ Main Activities Implemented

Toyohashi Plant / For-fee recycling of grinding fluid oil

When changing grinding fluid used for metal processing, we used to pay the cost for recycling it into fuel material. We succeeded in changing it into valuable resource, recycled crude oil material, by separating oil and water with the use of an oil-water separating tank. That changed waste oil of which 170,000 t's were emitted in a year into valuable resource. Also, we succeeded in reducing disposal cost by 340,000 yen per year.

Oil-water separating tank

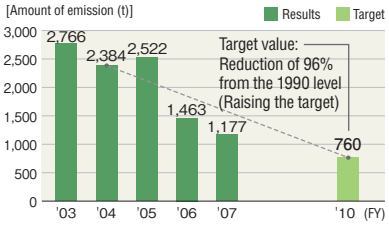
[Management and Reduction of Chemical Substances]

➡ Figure | 04

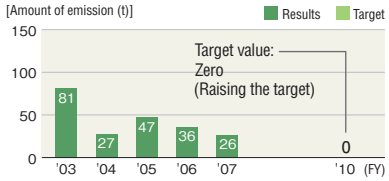
JTEKT established "The Chemical Substances Management Standard" for management of such substances. In addition, we endeavor to reduce the emission of PRTR law subject substances by 60% compared to the 1998 level by 2010. In 2007, we reduced of PRTR law subject substances by 150,000 t's by changing grinding fluid and washing fluid into those that don't contain boron.

➡ Figure | 03

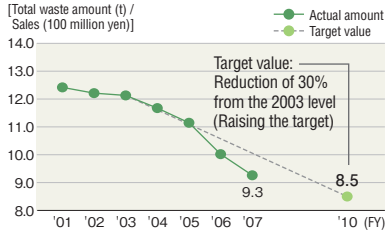
Changes in Incinerated Waste Emission



Changes in Landfill Waste Emission

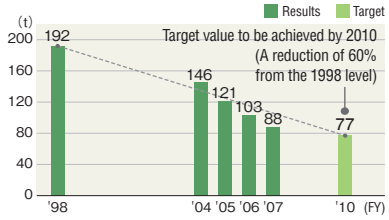


Unit Waste Amount Transition

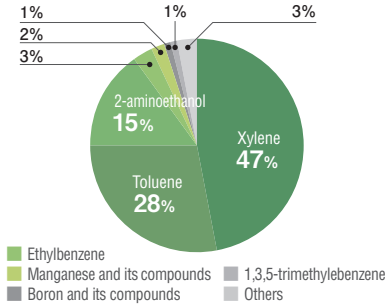


➡ Figure | 04

Changes in Emission and Transportation of PRTR Law Subject Substances



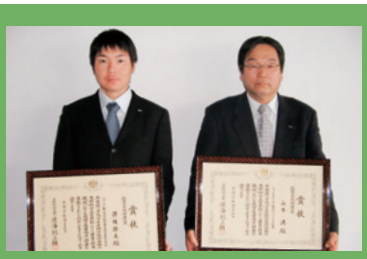
Details of Emission and Transportation of PRTR Law Subject Substances in FY2007



TOPICS

Kaizen Activity at Tokushima Plant Awarded for its originality and ingenuity

Improvement in changing iron oxide fine powder into a valuable resource, a kaizen example reported in our Social & Environmental Report 2007, was awarded a prize by the Ministry of Education, Culture, Sports, Science and Technology. The awarded activity is an endeavor to make available-for-sale the resource of coke from iron oxide fine powder for which we used to pay a recycling fee. We continue such kaizen activities for promoting waste reduction by making the best use of inventiveness.



The person on the right is Mitsuru Yamamoto of Tokushima Plant

Environment Data by Location

JTEKT measures environmental impact on the neighboring area at all of our 12 domestic plants through the Local Environment Subcommittee. (➡Related article, See P.41)
We continuously manage local environment risk, including disclosing measured amounts of subject substances.

Kokubu Plant

Number of employees
1,250
Products
Various types of ball and roller bearings
Ultra-large bearings
Hub units
High-precision bearings

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.0~8.0	7.8	7.0
COD	30	21	13
BOD	30	29	16
SS	60	11	4.5
Oil	4	3.5	1.7
Zinc	4	0.47	0.20
Soluble iron	10	—	—
Soluble manganese	10	—	—
Fluorine	8	ND	ND
Nitrogen	15	11	5.9
Phosphorus	1.5	0.64	0.21
Boron	—	0.39	0.34
Displacement per day (m³)	—	1,192	889

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (for forging)	0.30	0.004
NOx		100	85
SOx		0.5	0.007

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	63
	Afternoon	70	64
	Evening	65	64
	Night	60	58
Vibration	Afternoon	70	46
	Night	65	47

PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
16	2-aminoethanol	10,011	0	30	0	0	9,981	0	0	0
63	Xylene	2,821	2,821	0	0	0	0	0	0	0
311	Manganese and its compounds	1,170	0	23	0	0	421	0	0	726

Kariya Plant

Number of employees
1,417
Products
Machine tools
Damper pulleys
Machined parts

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	5.8~8.6	7.3	7.0
COD	(14)	6.2	4.9
BOD	(20)	11.7	9.2
SS	(20)	1.0	1.0
Oil	5	0.60	0.33
Zinc	2	0.60	0.20
Soluble iron	5	0.53	0.40
Soluble manganese	2	0.25	0.23
Fluorine	5	0.14	0.11
Nitrogen	(17.2)	13	12
Phosphorus	(1.4)	0.05	0.04
Boron	10	0.05	0.03
Displacement per day (m³)	—	1,653	1,159

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (for canteens)	0.1	—
NOx		100	63
SOx		0.5	—
Particulates	Boilers (for cool & hot water generators)	0.1	0.003
NOx		100	46
SOx		0.5	—

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	64	57
	Afternoon	69	62
	Evening	64	63
	Night	59	58
Vibration	Afternoon	68	42
	Night	63	39

PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
40	Ethylbenzene	3,147	2,562	0	0	0	0	0	0	585
63	Xylene	8,674	8,309	0	0	0	0	0	0	364
227	Toluene	12,591	10,111	0	0	0	0	0	0	2,480

Tokushima Plant

Number of employees
1,096
Products
Ball bearings
Water pump bearings
Cylindrical roller bearings
Special-environment bearings

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.0~8.2	7.4	7.0
COD	10	9.8	7.8
BOD	—	—	—
SS	19	13	4.7
Oil	3	2.5	1.8
Zinc	2	0.05	0.05
Soluble iron	10	0.50	0.50
Soluble manganese	10	0.25	0.25
Fluorine	10	0.11	0.11
Nitrogen	25	6.6	4.8
Phosphorus	2.5	0.11	0.05
Boron	—	—	—
Displacement per day (m³)	—	1,058	906

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (for heating)	0.1	0.001
NOx		250	165
SOx		21	0.1
Particulates	Boilers (for absorption cooling and heating machine)	0.1	0.01
NOx		250	79
SOx		21	0.06
Particulates	Diesel engine	0.1	0.03
NOx		950	850
SOx		21	0.1

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	60	57
	Afternoon	65	59
	Evening	60	57
	Night	55	52
Vibration	Afternoon	60	52
	Night	55	52

PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
63	Xylene	4,364	4,364	0	0	0	0	0	0	0

■ Atmospheric data / Maximum value measured
■ Water quality / pH: Hydrogen ion concentration
COD: chemical oxygen demand
BOD: biochemical oxygen demand
SS: suspended solids
Oil: n-hexane extracted substance content,
( ) denotes average volume per day
ND or not detected: less than lower limit
■ Regulation values / Self-regulatory standards (including values stricter than those set by law)
■ PRTR Law Subject Substance / Substance the volume of which exceeds 1,000 kg/year (excluding dioxins)
The substance number indicates the government designated number of a class 1 chemical substance uncer PRTR law.
The volume treated in a plant means the volume of a PRTR sustance which is treated in a plant by conversion to a different substance via incineration, neutralization, decomposition, chemical reaction, etc.
The amount consumed means the amount of a PRTR substance which is converted to a different substance by a chemical reaction and either used in a product or incidentally removed from the plant.

Okazaki Plant

Number of employees
766
Products
Electric power steering
Power steering gear
AT / CVT proportional control valves
CVT oil pumps
Propeller shafts
Cast parts

■ Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.5~8.5	7.7	7.3
COD	20	4.6	3.1
BOD	20	2.8	1.7
SS	20	1.3	1.0
Oil	2	0.30	0.14
Zinc	3	0.10	0.00
Soluble iron	5	0.57	0.25
Soluble manganese	3	0.30	0.10
Fluorine	1	0.10	0.01
Nitrogen	15	8.9	8.0
Phosphorus	2	0.07	0.04
Boron	10	0.06	0.03
Displacement per day (m³)	—	295	206

■ Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (for thickeners)	0.05	ND
NOx		100	54
SOx		0.5	—
Particulates	Boilers (for air conditioning)	0.1	ND
NOx		130	32
SOx		ND	—
Particulates	Melting furnace	0.15	0.01
NOx		100	83
SOx		0.76	—
Particulates	Gas engine (cogeneration)	0.05	0.005
NOx		180	90
SOx		6.08	ND

■ Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	59
	Afternoon	70	59
	Evening	65	59
	Night	60	59
Vibration	Afternoon	70	30
	Night	65	31

■ PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
44	Ethylene glycol monoethyl ether	1,990	0	0	0	0	0	0	0	1,990
63	Xylene	2,101	2,013	0	0	0	0	0	0	88
227	Toluene	4,734	3,802	0	0	0	0	0	0	933
311	manganese and its compounds	55,302	0	0	0	0	1,106	0	0	54,196

Tokyo Plant

Number of employees
465
Products
Needle roller bearings
Constant velocity joints
Driveshafts
Propeller shafts

■ Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	5.8~8.6	7.8	7.3
COD	—	—	—
BOD	150	8.0	3.8
SS	200	18	7.0
Oil	20	5.0	3.0
Zinc	2	—	—
Soluble iron	10	—	—
Soluble manganese	10	—	—
Fluorine	8	—	—
Nitrogen	60	14	7.6
Phosphorus	8	1.2	0.39
Boron	—	—	—
Displacement per day (m³)	—	270	234

■ Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Gas absorption boilers	0.05	0.003
NOx		50	30
SOx		0.1	0.01

■ Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	—	—
	Afternoon	70	69
	Evening	60	58
	Night	55	54
Vibration	Afternoon	60	47
	Night	50	47

■ PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
1	Zinc compounds	1043	0	0	0	0	104	0	0	939
16	2-aminoethanol	1,343	0	0	0	4	1,339	0	0	0
63	Xylene	2,486	2,486	0	0	0	0	0	0	0
227	Toluene	5,284	5,284	0	0	0	0	0	0	0

Kagawa Plant

Number of employees
648
Products
Tapered roller bearings

■ Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	5.8~8.6	7.8	6.7
COD	40	38	33
BOD	40	38	35
SS	50	12	7.3
Oil	3	2.9	2.4
Zinc	2	ND	ND
Soluble iron	10	ND	ND
Soluble manganese	10	ND	ND
Fluorine	8	ND	ND
Nitrogen	60	23	15
Phosphorus	8	1.2	0.53
Boron	—	—	—
Displacement per day (m³)	—	694	540

■ Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers No. 1	0.3	0.0044
NOx		260	65
SOx		5.0	0.89
Particulates	Boilers No. 2	0.3	0.0802
NOx		250	100
SOx		5.0	0.32
Particulates	On-site power generators	0.1	0.0467
NOx		950	860
SOx		5.0	0.69

■ Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	64
	Afternoon	70	65
	Evening	65	63
	Night	60	59
Vibration	Afternoon	49	32
	Night	46	30

■ PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
63	Xylene	2,922	2,922	0	0	0	00	0	0	0
304	Boron and its compounds	1,040	0	42	0	0	999	0	0	0

Nara Plant

Number of employees
633
Products
Electric power steering
Hydraulic power steering
Manual steering

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	5.9~8.5	7.4	6.8
COD	13.5	12	11
BOD	13.5	11	2.5
SS	20	0.50	0.50
Oil	2.7	0.50	0.50
Zinc	2	—	—
Soluble iron	0.9	0.19	0.10
Soluble manganese	0.9	0.17	0.10
Fluorine	8	—	—
Nitrogen	45	44	27
Phosphorus	15	8.6	5.2
Boron	—	—	—
Displacement per day (m³)	—	138	125

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Plant 1, No. 1 (boilers)	0.1	0.01
NOx		150	60
SOx		0.6	0.24
Particulates	Plant 1, No. 2 (boilers)	0.1	0.003
NOx		150	50
SOx		0.6	0.23
Particulates	Plant 2 (cool & hot water generators)	0.1	0.002
NOx		150	60
SOx		0.6	0.14

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	64	62
	Afternoon	67	62
	Evening	64	62
	Night	55	54
Vibration	Afternoon	60	52
	Night	55	47

PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
63	Xylene	14,339	14,339	0	0	0	0	0	0	0
227	Toluene	3,967	3,967	0	0	0	0	0	0	0

Higashikariya Plant

Number of employees
338
Products
Mechatronics products
Sensors
Propeller shafts
Machined parts

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	5.8~8.6	7.9	7.4
COD	29	5.8	4.5
BOD	20	6.8	4.5
SS	20	2.8	1.5
Oil	5	0.40	0.18
Zinc	2	0.35	0.13
Soluble iron	5	0.94	0.43
Soluble manganese	2	0.30	0.20
Fluorine	5	0.33	0.16
Nitrogen	(48)	33	28
Phosphorus	(2.7)	0.07	0.05
Boron	10	0.10	0.03
Displacement per day (m³)	—	126	110

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (cool & hot water generators)	0.15	ND
NOx		130	77
SOx		0.57	ND

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	58
	Afternoon	70	62
	Evening	65	63
	Night	60	57
Vibration	Afternoon	70	41
	Night	60	38

PRTR Law Subject Substance

*No substances handled at rate of 1,000 kg/year or above.

Toyohashi Plant

Number of employees
707
Products
Hydraulic power steering
Hydraulic power steering hoses
Manual steering
Collapsible steering columns

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.1~8.0	6.7	6.5
COD	18	15	11
BOD	10	3.1	1.6
SS	20	17	7.8
Oil	1	1.0	1.0
Zinc	—	—	—
Soluble iron	—	—	—
Soluble manganese	—	—	—
Fluorine	—	—	—
Nitrogen	50	48	36
Phosphorus	5	4.4	2.4
Boron	—	—	—
Displacement per day (m³)	—	90	82

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: K value

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Plant 1 Boilers	0.03	0.0034
NOx		100	73
SOx		0.5	0.0001
Particulates	Plant 2 (cool & hot water generators)	0.03	0.007
NOx		100	26
SOx		0.5	0.004
Particulates	Plant 3 (cool & hot water generators)	0.10	0.093
NOx		180	100
SOx		0.5	0.02

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	60	58
	Afternoon	65	62
	Evening	65	59
	Night	60	58
Vibration	Afternoon	55	37
	Night	50	29

PRTR Law Subject Substance

Unit: kg/year

Substance No.	Substance Name	Amount Handled	Emission			Transfer		Recycled	Treated in Plant	Consumed
			Into Atmosphere	Into Waterways	Into Soil	Sewage	As Waste			
63	Xylene	1,484	1,421	0	0	0	0	0	0	62
346	Molybdenum and its compounds	3,926	0	0	0	0	0	0	0	3,926

Tadomisaki Plant

Number of employees
906
Products
Driveshafts
4WD couplings

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.0~8.4	8.1	7.5
COD	(10)	5.2	3.4
BOD	(10)	4.4	2.2
SS	(20)	1.3	0.93
Oil	2	0.90	0.20
Zinc	2	0.10	0.10
Soluble iron	3	0.10	0.10
Soluble manganese	2	0.10	0.10
Fluorine	5	0.14	0.14
Nitrogen	(34.8)	2.3	1.7
Phosphorus	(3.6)	0.05	0.01
Boron	10	0.30	0.20
Displacement per day (m³)	—	409	252

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Boilers (cool & hot water generators)	0.1	ND
NOx		130	53
SOx		0.5	ND

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	56
	Afternoon	70	56
	Evening	65	56
	Night	59	55
Vibration	Afternoon	70	41
	Night	65	41

PRTR Law Subject Substance

*No substances handled at rate of 1,000 kg/year or above.

Hanazono Plant

Number of employees
1,158
Products
Electric power steering
Hydraulic power steering pumps
Electric control units

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.5~8.5	7.5	7.2
COD	8	5.3	4.3
BOD	8	5.0	2.0
SS	8	2.0	1.1
Oil	1.6	1.0	1.0
Zinc	0.8	0.50	0.12
Soluble iron	4	2.2	0.52
Soluble manganese	2.4	0.31	0.19
Fluorine	0.8	0.10	0.10
Nitrogen	30	27	15
Phosphorus	4	0.07	0.04
Boron	10	1.0	1.0
Displacement per day (m³)	—	304	217

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Small through flow boilers	0.24	0.003
NOx		200	29
SOx		0.62	0.002
Particulates	Boilers (cool & hot water generators)	0.24	0.002
NOx		200	57
SOx		0.62	0.002

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	54	50
	Afternoon	59	51
	Evening	54	50
	Night	49	49
Vibration	Afternoon	63	44
	Night	58	45

PRTR Law Subject Substance

*No substances handled at rate of 1,000 kg/year or above.

Kameyama Plant

Number of employees
248
Products
Ball bearings
Clutch bearings

Water Quality Measurement Data

Unit: mg/ℓ (except pH values)

Item	Regulation Value	Results	
		Maximum	Average
pH	6.0~8.0	7.0	6.4
COD	9	4.0	2.6
BOD	8	5.0	1.5
SS	10	2.0	0.42
Oil	2.7	ND	ND
Zinc	2	0.06	0.02
Soluble iron	10	0.02	0.01
Soluble manganese	10	0.03	0.03
Fluorine	8	0.10	0.05
Nitrogen	—	33	21
Phosphorus	—	0.12	0.03
Boron	1	0.10	0.03
Displacement per day (m³)	—	177	122

Atmospheric Measurement Data

Unit Particulates: g/m³N, NOx: ppm, Sox: m³N/hr

Item	Equipment	Regulation Value	Greatest Measured Value
Particulates	Plant 1 (boilers)	0.1	0.01
NOx		150	83
SOx		1.65	0.08

Noise / Vibration Data

Unit: dB

Item		Regulation Value	Greatest Measured Value
Noise	Morning	65	58
	Afternoon	70	60
	Evening	65	53
	Night	55	51
Vibration	Afternoon	55	36
	Night	50	33

PRTR Law Subject Substance

*No substances handled at rate of 1,000 kg/year or above.