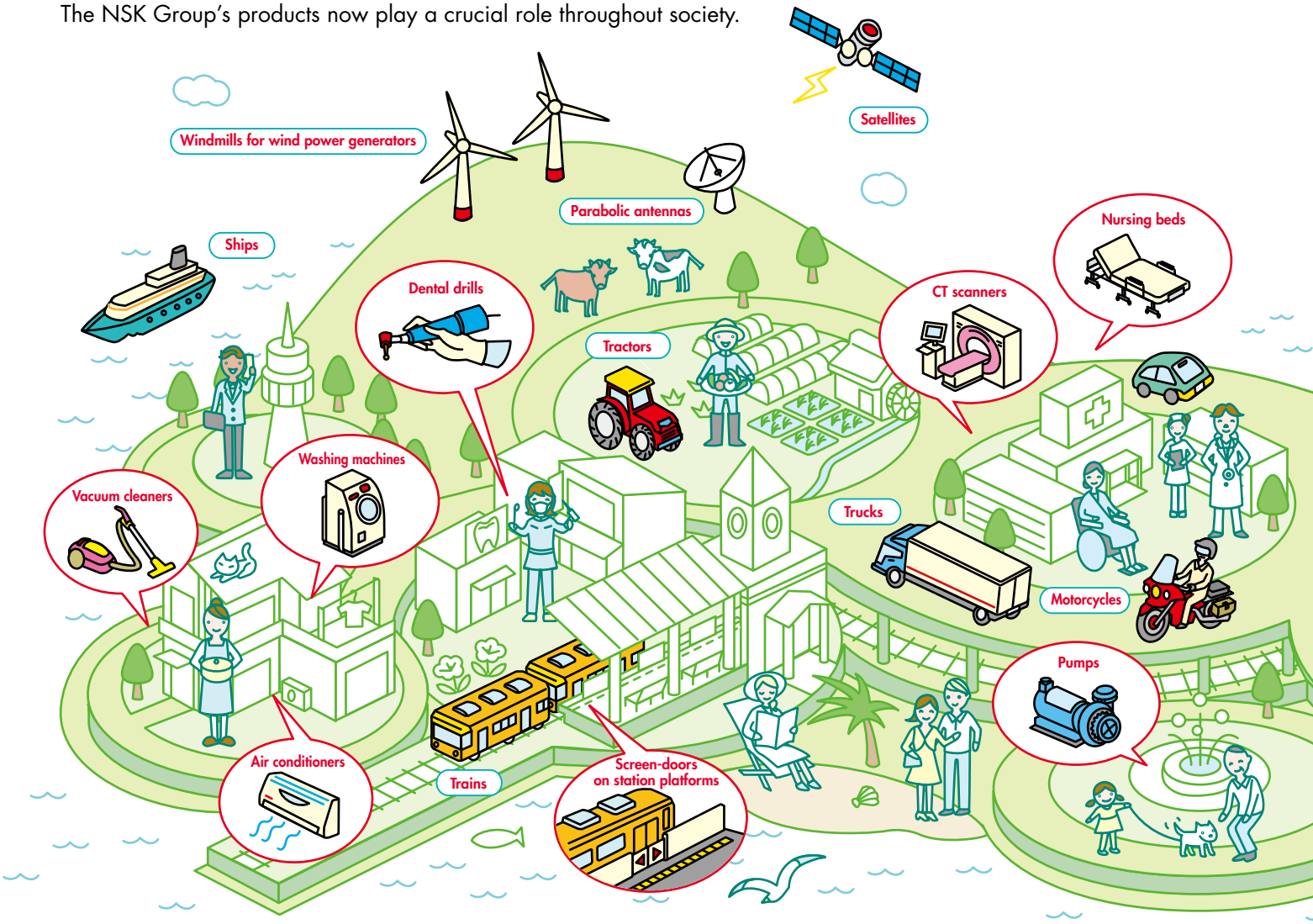
MOTION & CONTROL™
NSK

# CSR Report 2009

The NSK Group's Vision and Initiatives
for Society and the Environment

# NSK in Daily Life

NSK has contributed to the development of a wide range of industries with its advanced technology and high-quality products ever since it produced the first bearings in Japan in 1916.
The NSK Group's products now play a crucial role throughout society.




## The Three Areas of the NSK Group Business

### Industrial Machinery Bearings

Industrial machinery bearings are components used in machines that have parts which rotate. They reduce friction in the rotating parts and support machines' smooth movement. These bearings are used in various products and machines, including home appliances such as vacuum cleaners, railway vehicles such as Japan's bullet trains, steelmaking equipment, large industrial machinery, airplanes, and satellites.

Bearings used in steelmaking equipment

Bearings used in wind turbines

### Automotive Products

Of all the categories of the NSK Group's products, that for automotive vehicles is the most diverse and widely used. The NSK Group is strengthening its research, development, and production capabilities for the various automotive bearings used in the drive parts that transmit the engine's rotational force to the wheels, and for automotive components such as electric power steering systems. In this way, the Group supports automobile safety, comfort, and fuel efficiency.

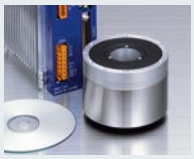
Hub unit bearings with built-in ABS sensors

Electric power steering systems

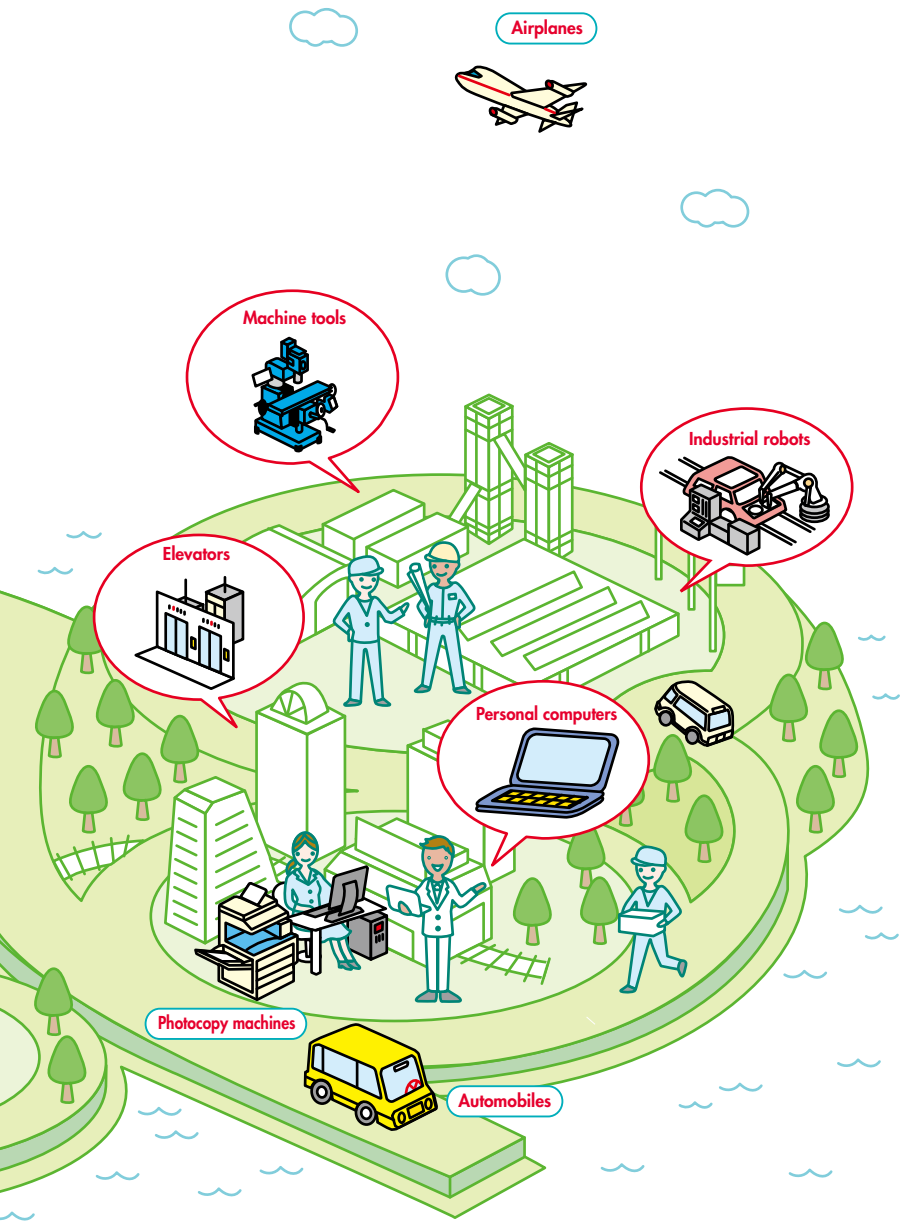
### Precision Machinery and Parts

The NSK Group's precision machinery and parts are used as the core components in the machine tools and industrial robots used to manufacture various products, such as automobiles, mobile phones, and personal computers. They are also found in equipment used to produce the liquid crystal displays and semiconductors that are the foundation for the development of IT equipment and injection molding machines producing plastic parts. The NSK Group's precision machinery and parts in this segment are crucial for the machines at the front-line of manufacturing.

Ball screws



MEGATORQUE MOTOR™

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## Introduction

The NSK Group interprets corporate social responsibility (CSR) as "activities undertaken to ensure the sustainable growth of society and the NSK Group, while meeting the expectations of a wide array of interested people through corporate activities."
Through this report the Group hopes to succinctly convey its thoughts regarding society's expectations and how it is striving to meet those expectations. Effort was also made to give the report a "face" by introducing as many employees as possible.

Attention was paid to making the report visually accessible, including to readers who have issues with color blindness, to help give as many people as possible an understanding of the NSK Group's activities.

**Period of Coverage**
April 2008 to March 2009

**Referenced Guidelines**
*Sustainability Reporting Guidelines* (third edition) by the Global Reporting Initiative (GRI) and *Environmental Reporting Guidelines* (2007 edition) by the Ministry of the Environment of Japan were referenced in preparing this report.

**Scope of Coverage**
The report covers all NSK Group bases and plants, both in and outside Japan. "The Environment and NSK" covers NSK's product manufacturing plants, Group companies in which NSK has a stake of 50 percent or more (NSK brand product manufacturing, machinery manufacturing, logistics), and Group companies that manufacture NSK brand products.

**Scope of "The Environment and NSK"**

**In Japan**
- NSK Ltd. (Fujisawa Plant, Ohtsu Plant, Ishibe Plant, Saitama Plant, Kirihara Branch)
- NSK Fukushima Co., Ltd.
- NSK Steering Systems Co., Ltd.
- NSK Precision Co., Ltd. (Maebashi Precision Machinery and Parts Plant, Saitama Precision Machinery and Parts Plant)
- NSK Micro Precision Co., Ltd.
- NSK Micro Precision Co., Ltd. (Nagano)
- NSK Needle Bearing Ltd.
- NSK Kyushu Co., Ltd.
- NSK-Warner K.K.
- Inoue Jikuuke Kogyo Co., Ltd.
- Chitose Sangyo Co., Ltd.
- Asahi Seiki Co., Ltd.
- Shinwa Seiko Co., Ltd.
- Amatsuji Steel Ball Mfg. Co., Ltd.
- AKS East Japan Co., Ltd.
- NSK Machinery Co., Ltd.
- NSK Logistics Co., Ltd.

**Outside Japan**
- Only production sites that have been in operation for at least three years are included in the scope of coverage.

# "Meeting the expectations of society through our business" The NSK Group sees the creation of a prosperous society and protection of the global environment as our mission.

## Meeting the Expectations of Society

Last fiscal year, we faced an unprecedented downturn in the worldwide economy. Nevertheless, no matter how harsh the economic climate, the fundamental responsibility of a manufacturer is to provide a stable supply of products and services that satisfy its customers. To that end, it is important to maintain consistently dependable management.

The Group fell into the red in the fourth quarter ended March 2009. Returning to the black as quickly as possible is now a pressing task. Directors and employees all share a sense of urgency and are focusing their attention on implementing the necessary measures.

Taking a medium-to long-term perspective, on the other hand, we face the challenges of a whole range of serious issues: climate change as a result of increased emissions of $CO_2$ and other greenhouse gases, shortages of resources and food, and other issues that make one realize the Earth's limits. Balancing the maintenance of a prosperous society with protection of the global environment to achieve a sustainable society has become an issue common to all humanity.

Today, corporate activities have a global reach and enormous influence. Corporations are expected to fulfill their fair share of the responsibility for maintaining a vibrant community. Companies that accurately perceive and actively address social expectations, including environmental protection, consideration for employment issues and human rights, and the creation of safe workplaces, will improve their reputation and be able to continue growing. Companies that fail to make the necessary effort or conduct themselves unethically, on the other hand, are bound to end up in circumstances that endanger their very existence, a fact that has become obvious from the numerous corporate scandals occurring nowadays.

The NSK Group is well aware of this reality and is committed to meeting the expectations of society through its manufacturing activities.

## Manufacturer of Parts Used throughout Society

Bearings—the NSK Group's main product—are quite literally used everywhere, every day: they underpin the smooth rotation of everything from home appliances, such as vacuum cleaners and washing machines, to transport equipment, including automobiles, railway vehicles, and airplanes, and even the industrial robots and machine tools operated in manufacturing plants. For this reason, bearings are called "a staple of industry."

The NSK Group's pursuit of high-quality products helps the machines that support a modern lifestyle throughout society to run as intended. Our commitment to quality improves the reliability of these machines and underpins a smooth-running, safe society. The Group pursues the development of technologies that reduce energy losses, conserve resources, lead to energy savings, and can help protect the global environment.

Moreover, profiting from the basic technology, the NSK Group developed working on bearings, the Group's ball screws, linear guides, electric power steering (EPS) systems, and other product lines are all high-quality products that help to conserve energy and the world's resources.

The NSK Group is determined to improve its products—including enhancing their current strong characteristics—so that they meet customers' needs and fulfill community and social needs. In doing so, the Group will seek to make products that its wide range of customers around the world will choose with pleasure and reassurance. These commitments are the mission that the NSK Group is undertaking, with the aim of contributing to the creation of a prosperous society and to protection of the global environment.


## Helping Create a Prosperous and Sustainable Society through NSK's Business

The NSK Group hopes to be supported by and grow together with local communities by appropriately responding to community expectations.

Rapidly growing China, for example, is seeking to advance its industry as the foundation for realizing a more prosperous society. In response to this, the NSK Group plans to open a new technology center in fall 2009. Thus far, NSK's technology center in China has focused on technological services such as evaluation testing of ball bearings. At the new technology center, though, we also plan to have the local Chinese staff develop products that respond precisely to China's unique needs. In other words, the Group will carry out all the processes, from development to production and after-sales service, domestically in China. In this way, we are committed to developing business activities deeply rooted in the community by enabling true localization of manufacturing.

In terms of the environment, we anticipate the energy sources that support a more sustainable society to shift from fossil fuels—i.e., oil and coal—to wind and solar power, and other sources that generate less $CO_2$ emissions. We also imagine that demand will grow for greater energy efficiency in consumer goods such as automobiles and home appliances.

The NSK Group is therefore strengthening its capacity to assist in the development of renewable energy by supplying bearings for use in wind power generators and parts to manufacturers of solar panels. The Group is also focusing on initiatives* in product development in order to raise the environmental friendliness of NSK's own products. Furthermore, each plant within the NSK Group is steadily pushing forward with measures to improve the energy efficiency of equipment and to conserve resources.

## Human Resources Development

In order to meet the expectations of society, as described above, the NSK Group must return to the basics and make its corporate foundation as solid as possible. Above all, this means developing human resources. Naturally, we will continue providing employees with training concerning quality and technology; and, from fiscal 2009, we will put more effort than ever into education related to CSR, compliance, and corporate ethics. Of course, this effort will not be limited to Japan. We will strive to take initiatives to ensure that all employees of the NSK Group worldwide can thoroughly meet the expectations of society by increasing their awareness and by improving the quality of their work, while adhering to high ethical standards.

## Conclusion

The NSK Group's business is supported by a wide range of stakeholders. I therefore believe it is important for the Group to build better relationships with its stakeholders by sharing information and values. I hope that this Report helps enhance communication with stakeholders, and I look forward to receiving candid feedback regarding the content of the Report itself, as well as regarding the NSK Group's business activities.

*See Eco-efficiency Indicators and Environmentally Friendly Products on page 30 for details.

# The NSK Group's CSR

## The NSK Group's View of CSR

NSK's mission statement reads, "NSK aims to contribute to the well-being and safety of societies and to protect the global environment through its innovative technology integrating MOTION & CONTROL. We are guided by our vision of NSK as a truly international enterprise and are working across national boundaries to improve relationships between people throughout the world." This mission statement makes clear NSK's commitment to contributing to the protection of the global environment and to the development of humanity and society.

In keeping with this mission statement, the NSK Group is steadily working on these activities to create a sustainable, affluent society, which also protects the global environment. In tandem with this, as a manufacturer, the Group aims to keep its customers and other stakeholders around the world satisfied with its products. It seeks to provide the highest quality services and products that are ever more reliable and helpful in cutting energy losses. Naturally, this commitment will lead to an improvement in the NSK Group's corporate value.

## Mission Statement

NSK aims to contribute to the well-being and safety of society and to protect the global environment through its innovative technology integrating MOTION & CONTROL. We are guided by our vision of NSK as a truly international enterprise and are working across national boundaries to improve relationships between people throughout the world.

## Management Principles

1. To serve our customers through innovative and responsive solutions, taking advantage of our world-leading technologies.
2. To provide challenges and opportunities to our employees, channeling their skills and fostering their creativity and individuality.
3. To identify the needs of the times and of the future and to use all of NSK's resources to meet those needs by being versatile, responsive and dynamic.
4. To work together with our employees and contribute to the communities in which we operate.
5. To manage our business from an international perspective and to develop a strong presence throughout the world.

## Corporate Slogan

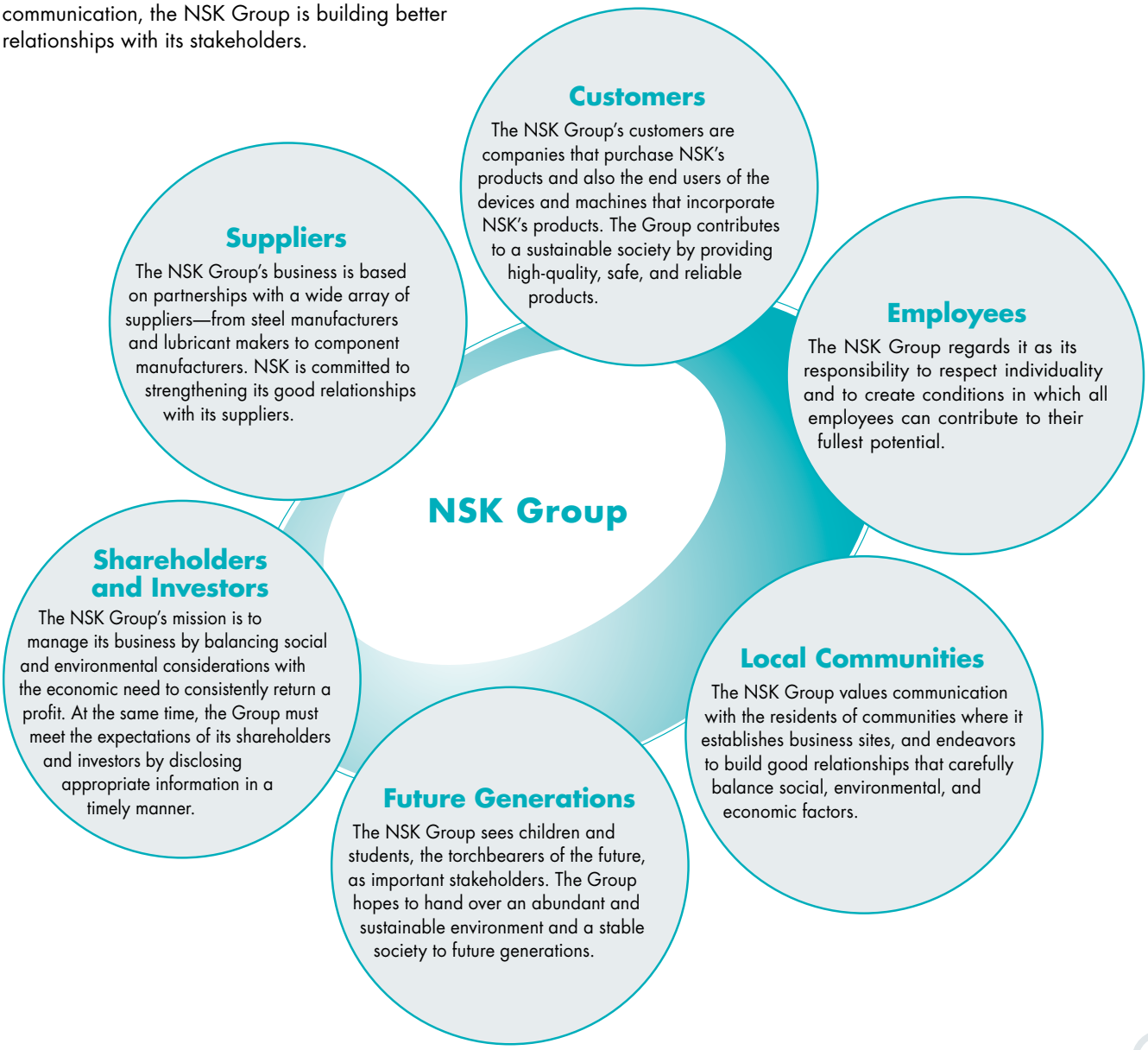
Beyond Limits, Beyond Today

## Corporate Message

Responsive and Creative
MOTION & CONTROL™

## The NSK Group's Stakeholders

The NSK Group's business is built on trust with a variety of stakeholders. Through active communication, the NSK Group is building better relationships with its stakeholders.



# Fiscal 2008 CSR Activity Performance and Fiscal 2009 Targets

Below is a report on the performance in achieving targets set in the *CSR Report 2008*, as well as fiscal 2009 targets established as priority issues or new challenges.

| | Area | FY08 target | Performance in FY08 | Evaluation | Page | FY09 target |
|---|---|---|---|---|---|---|
| Management | Corporate governance | Improve the internal control system | Addressed Internal Control Report System and ensured the effectiveness of internal controls over financial reporting Group-wide | ☺ | p. 16 | Maintain the effectiveness of internal controls over financial reporting and standardize them Group-wide. |
| | | | Established the *NSK Group Business Standards* and began applying them Group-wide, starting from Japan | 😐 | | Roll out the *NSK Group Business Standards* to Group companies outside Japan |
| | Compliance | Revise the NSK Code of Corporate Ethics | Added codes to the NSK Code of Corporate Ethics on:<br>(a) respect of fundamental rights at work, and<br>(b) global environmental protection | ☺ | p. 17 | Roll out the revised NSK Code of Corporate Ethics to Group companies and conduct training sessions |
| | | Provide education on compliance to employees to be posted outside Japan | Held training sessions for employees to be posted outside Japan on compliance in general and on foreign antitrust laws | ☺ | | |
| | | Upgrade the export management system worldwide | Established NSK Group Security Export Control Standards (*NSK Group Business Standards*) and deployed them to Group companies | ☺ | | Roll out the Security Export Management Standards to Group companies in and outside Japan |
| | Crisis management | Strengthen response in case of a major earthquake | • Crisis Countermeasures Headquarters conducted a drill, in preparation for a major earthquake striking Tokyo<br>• Strengthened emergency communication methods | ☺ | p. 18 | • Continue drills and strengthen response measures in preparation for a major earthquake<br>• Improve prevention measures against new strains of influenza and start establishing a BCP |
| | Information security | • Enhance information security education<br>• Conduct awareness-building activities focusing on the sales divisions | • Provided e-learning on information security to all directors and employees who use computers at work<br>• Carried out group training sessions on information security for the sales divisions | ☺ | p. 18 | Enhance information security training (training for the Group companies outside Japan, training for mid-year hires, separate training by occupation) |
| Social initiatives | Quality and safety of products and services | Promote activities to improve operation quality | Started activities to improve operation quality in back-office departments at NSK headquarters | ☺ | p. 20 – p. 21 | • Create educational tools for users in multiple languages<br>• Expand the scope of activities to improve operation quality<br>• Establish Socially Responsible Procurement Guidelines (tentative name) and roll out to suppliers |
| | | Promote socially responsible procurement | • Used procurement policy briefings to request that suppliers implement CSR initiatives<br>• Identified issues through strengthened intra-departmental cooperation and established future policies | ☺ | | |
| | Human resources and career development | Expand education and training programs | • The NSK Institute of Technology began giving lectures at technology centers worldwide<br>• Developed educational system for the sales department, and strengthened occupation- and specialty-based education | ☺ | p. 22 – p. 23 | • Enhance the content of and expand the target areas of self-development training<br>• Enhance e-learning training programs |
| | Creating dynamic workplaces | Support work-life balance | Expanded understanding of work-life balance within NSK by rolling out measures to support work and family (armo program, etc.) and saw an increase in childcare leave-taking (64% in FY07 → 94% in FY08) | ☺ | p. 24 – p. 25 | Establish a model line and implement comprehensive risk management that contributes to health and safety at plants |
| | | Establish subsidiary to provide employment opportunities for people with disabilities | Started operations at NSK Friendly Service Co., Ltd., a special subsidiary providing social participation and occupational independence to persons with disabilities in the city of Fujisawa, Kanagawa Prefecture | ☺ | | |
| | Working with local communities | Contribute to development of local communities | • Continued holding cleanups around plants and distribution centers in Japan<br>• Cooperated in blood drives at sites in and outside Japan | ☺ | p. 26 | Create a model to provide information about plant initiatives to local communities |
| | Educational support for future generations | Expand children's science classes to other regions | Held a new science class for children in the Maebashi area of Gunma Prefecture. | ☺ | p. 27 | Develop a children's science class program that meets needs better |

Achieved | Partially achieved | Not achieved

| | Area | FY08 target | Performance in FY08 | Evaluation | Page | FY09 target |
|---|---|---|---|---|---|---|
| | Communication with shareholders and investors | Enhance IR events | Held an automotive products business briefing and disclosed more relevant information. | Achieved | p. 28 | Enhance IR events (update information for investors (in English and Japanese) on the Company website) |
| | | Improve IR tools such as Company website and annual report | • Enhanced the annual report (strengthened message from management and enhanced content, including business strategy outside Japan)<br>• Currently working to revise the Company website | Partially achieved | | |
| Environmental initiatives (excerpts*) | Environmental management | Promote elimination of underground tanks | Discontinued use of three underground tanks | Achieved | p. 34 – p. 37 | • Maintain zero oil-leak accidents<br>• Establish Product Chemical Management Committees at all plants outside Japan |
| | | Measures to deal with oil leaks in emergencies | Conducted 167 emergency drills assuming an oil-leak accident | Achieved | | |
| | | Raise environmental protection awareness | Conducted various training sessions attended by a total of 18,346 people | Achieved | | |
| | Eco-efficiency indicators and environmentally friendly products | Create environmentally friendly products | Created 14 environmentally friendly products | Achieved | p. 30 – p. 33 | • Develop environmentally friendly products<br>• Evaluate $CO_2$ reductions of NSK products during use |
| | | Promote development of eco-efficiency indicators for products | Established NSK eco-efficiency indicators (Neco) and completed a related calculation manual | Achieved | | |
| | Global warming countermeasures | Establish goals for the reduction of $CO_2$ emissions | Established the goal of reducing $CO_2$ emissions in Japan in FY12 to no more than the level in FY06 | Achieved | p. 38 – p. 41 | • Reduce $CO_2$ emissions in Japan to a level below FY06<br>• Reduce $CO_2$ emissions in Japan per production unit by 9.6% (base year: FY99) |
| | | Promote working group activities for different environmental issues | Groups worked on five issues (compressors, air-conditioning systems, water supply pumps and ventilation fans, hydraulic oil power units, and lighting) and prepared specific improvement proposals | Achieved | | |
| | | Reduce energy consumed per production unit by 2% for distribution operations in Japan (base year: FY06) | Reduced energy consumed per production unit by 3% for distribution operations in Japan (base year: FY06) | Achieved | | |
| | Measures for resource conservation and recycling | Eliminate waste through efficient steel cutting | Reduced scrap generated after cutting rails of linear guides by 60% | Achieved | p. 42 – p. 43 | • Continue to maintain zero emissions<br>• Maintain waste recycling rate of 98% or more (in Japan) |
| | | Eliminate waste of materials | Reduced waste steel scrap 30–40% by revising the press punching method for electric power steering (EPS) parts | Achieved | | |
| | | Maintain a recycling rate of at least 98% | Achieved target in Japan with a recycling rate of 98.8% | Achieved | | |
| | | Maintain zero emissions | Achieved zero emissions (landfill waste disposal rate of 0.8%) | Achieved | | |
| | | Design and promote recycling plan for packaging materials | Started using returnable containers for shipments between Japan and China | Achieved | | |
| | Reducing use of environmentally harmful substances | Implement green procurement for secondary materials | Started trial run of green procurement of secondary materials (anticorrosion oil/adhesives) | Achieved | p. 44 – p. 47 | • Conduct on-site audits at suppliers that require management<br>• Start operation of green procurement management system (two plants in ASEAN) |
| | | Intensify green procurement at plants outside Japan | • Completed English and Chinese versions of the *NSK Group Green Procurement Standards*<br>• Held seminars on the revised *NSK Group Green Procurement Standards* at all plants in China | Partially achieved | | |
| | | Further reduce the use of machining fluids containing chlorine additives | Reduced purchased number of machining fluids containing chlorine additives by 91% (in Japan) | Achieved | | |

*See pages 34–35 for more information about environmental initiatives.

# Our "Can-do" Declarations

# Mechanisms Supporting CSR

## Crisis Management

We are members of the major earthquake countermeasures team. We will cooperate to minimize damage from a large-scale earthquake, based on a "human life first" principle, and we plan and roll out measures to achieve the quickest possible recovery.

**Youichi Kajikawa**
General Affairs Dept., NSK Ltd.

**Toyohisa Yamamoto**
Global Human Resources Office, Human Resources Dept., NSK Ltd.

**Masahiko Ukai**
Secretariat for Crisis Management Committee, NSK Ltd.

**Yoshiharu Koike**
Manufacturing Strategy Division-Headquarters, NSK Ltd.

## Corporate Governance

I will work on developing rules that support the improvement of service quality worldwide so that NSK becomes "No.1 in Total Quality."

**Yasushi Tsuchiya**
Corporate Planning Division-Headquarters, NSK Ltd.

## Information Security

I will help to give the NSK Group a heightened awareness of security that employees are willing to accept and put into practice.

**Manabu Yamada**
IT Planning Group, IT & Business Coordination Logistics Division-Headquarters, NSK Ltd.

## Compliance

I will develop awareness-building and educational activities on the NSK Code of Corporate Ethics so that its words are put into action!

**Tomomichi Kudo**
Legal Department, Compliance Division Headquarters, NSK Ltd.


## Reducing Use of Environmentally Harmful Substances

We will all make more environmentally friendly purchases at our plant in order to protect the environment!

**Jin Chunhua**
Purchasing Section, NSK Steering Systems Dongguan Co., Ltd.

# Environment

## Environmental Management

I believe in a commitment to environmental excellence. It demonstrates being more than a "good neighbor"—it is a measurement of business success.

**Marcia Fournier**
Quality Assurance Department, NSK Corporation

# Society

## Educational Support for Future Generations

Our legacy to future generations should be more than preparing them for success. We should protect the environment and care for children: These are the two pillars that will build tomorrow for humanity and for the whole of creation.

**Maria Edvania Simoes**
Industry Business Unit, NSK Brasil LTDA.

## Creating Dynamic Workplaces

Diversity means trying to connect the Company's growth with personal happiness by respecting individuality. I will push forward efforts to make this concept known among employees.

**Yoshiharu Mitsuka**
Diversity Development Team, NSK Ltd.

## Human Resources and Career Development

I want to provide support through education so that everyone who works at NSK can work cheerfully, happily, and with a lot of drive!

**Xin Xue**
Human Resources Department, NSK (China) Investment Co., Ltd.

## Quality and Safety of Products and Services

I will strive to improve the quality of NSK's products by developing manufacturing processes that produce zero defective goods and zero machine stoppages, and deploy these processes across the organization.

**Mitsuru Kanazawa**
Quality Assurance Section, NSK Fukushima Co., Ltd.

## Working with Local Communities

We can always look within ourselves and our organizations, and it's not hard to find that each of us has many gifts, whether big or small, to offer to those without!

**Francis Tan**
Finance Department, NSK International (Singapore) Pte Ltd.

## Communication with Shareholders and Investors

I am studying every day with the aim of accompanying executives to IR events outside Japan. I will do my best to enhance NSK's image among shareholders and investors and attract more NSK fans!

**Kanako Hayashi**
IR and CSR Office, NSK Ltd.

## Measures for Resource Conservation and Recycling

We have committed ourselves to obeying environmental legislation and regulations as well as other applicable requirements. Our environmental approach will bring results in reducing the waste generated. Simultaneously, intensified effort will be undertaken towards waste recycling as the way to decrease the impact on the environment and the cost of waste disposal.

**Małgorzata Skuza**
Environmental Protection Specialist, NSK Bearings Polska S.A.

## Global Warming Countermeasures

I will work hard to reduce greenhouse gas emissions linked to global warming, for our children's future.

**Koichi Ikeya**
Global Environment Department, NSK Ltd.

Special Article

# The Road to Happiness

## Steering Systems—Connecting People, Cars, and the Future

### Helping People and Their Cars Communicate

What kind of car would you like to drive? Most people want to drive a car that is environmentally friendly, safe, and comfortable. They also want it to drive smoothly and be easy to control. Drivers give "instructions" to their cars.

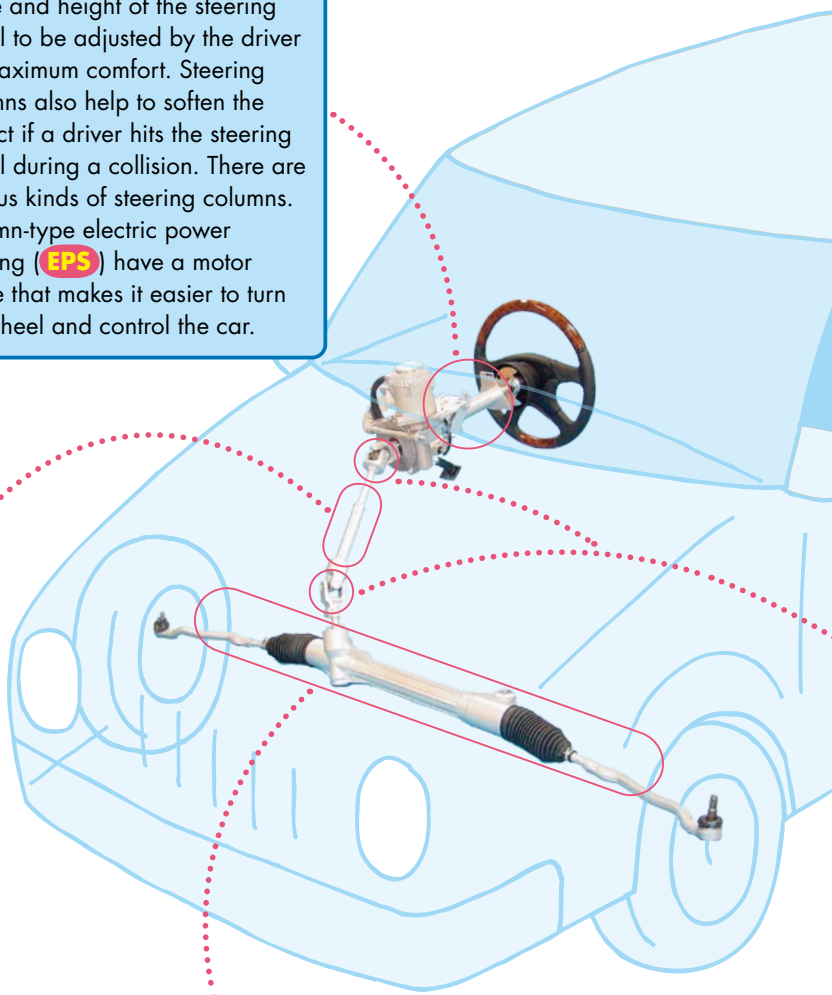
For example, they turn the steering wheel to the right when they want to go right, and to the left when they want to go left. The steering system then sends the driver's turn instructions to the wheels of the car.

The steering system not only tells the wheels where drivers want to go; it also gives drivers important information from the wheels. The steering wheel lets drivers know if they are on a rough road or a slippery surface by how it feels in their hands. The steering system gives people a real feel for their car, so they can enjoy driving with peace of mind.

To put it simply, without the steering system, there would be no communication about road conditions between the driver and the car. The steering system makes the car almost like an extension of the driver's body—that's how close the communication is.

**Steering Column**

Some steering systems have a steering column that allows the angle and height of the steering wheel to be adjusted by the driver for maximum comfort. Steering columns also help to soften the impact if a driver hits the steering wheel during a collision. There are various kinds of steering columns. Column-type electric power steering (EPS) have a motor inside that makes it easier to turn the wheel and control the car.



**Intermediate Shaft**

As its name suggests, the intermediate shaft connects the two main halves of the steering system: the steering wheel part and the wheel part. It helps to make sure the steering wheel doesn't vibrate or shudder, so the drive feels smooth.

**Rack & Pinion**

The rack and pinion convert the torque created when the driver turns the steering wheel into linear force. This force then turns the direction of the wheels to the left or the right. A low-friction, high-precision rack and pinion mechanism helps the car handle smoothly. An EPS with the steering-support motor built into this part is called a pinion-type EPS.

## With EPS, Driver and Car Act as One

Before power steering system was popular, many people thought it was far too difficult to turn the steering wheel, especially when doing things like backing into a garage. Power steering, which gives a mechanical boost to the driver's work at the wheel, made driving tasks like this much easier. With power steering, the elderly and others without as much strength are able to drive easily, and now almost anyone can get around freely by car.

NSK is hard at work making better electric power steering systems. NSK's EPS use electricity to run the motor only when needed, and use power from the motor to help turn the steering wheel. For this reason, they have better fuel economy than conventional hydraulic power steering. What is more, an electric control unit (ECU) watches the status of the car and controls the feel of the steering wheel. This makes the steering seem light at low speeds and solid at high speeds. NSK's EPS help people to drive safely by making sure the car really follows the driver's "instructions." Thanks to the increased energy savings, EPS will probably become more and more common, especially if more cars run on electricity in the future. In other words, EPS may be the best technology for the times.

### Joint

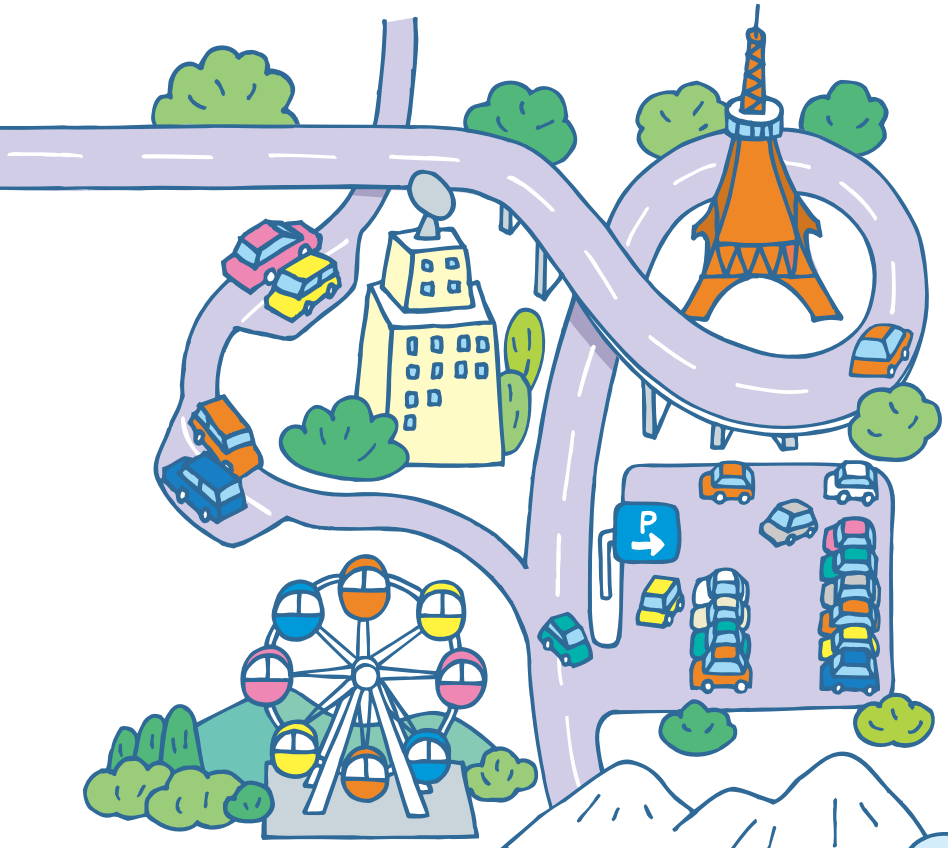
The joint connects the two shafts. Even if the angle between the two shafts changes, the torque created when the driver turns the steering wheel is sent properly to the next shaft. The greater the precision of the joint, the smoother the steering wheel feels in the driver's hands.

### Top Three EPS Advantages

| | | |
|---|---|---|
| E ECO | **Environmentally friendly** | EPS is reported to improve fuel economy by 3–5 percent compared to conventional hydraulic power steering. This is about the same energy-saving effect as reducing a vehicle's weight by 30–50 kg. |
| P PLEASANT | **Comfortable** | With EPS, the feel of the steering wheel is controlled by a computer, which allows the amount of steering-support provided to change depending on driving conditions. EPS makes it possible to give even an economy car the graceful feel of a luxury vehicle. |
| S SAFETY | **Safe** | EPS sends a clear message to the driver about the condition of the car. For example, it lets the driver know through the feel of the steering wheel if the tires are slipping. This gives the driver the chance to steer out of the slip. EPS means safer driving. |

# Taking the Wheel Has Never Felt Better: NSK's EPS Makes Driving Fun and Easy

Cars and car culture are changing a lot. The keywords today are: environment, safety, and comfort. NSK's EPS technology is great in all three areas.



ECO PLEASANT

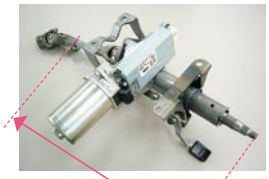
## A Breeze on Narrow Roads, Easy to Park, and Fuel-Efficient

Do you find parking in tight spaces difficult? Does passing other cars on narrow roads make you nervous? Don't you think it would be easier to drive a more compact car in these situations? A compact car would also save you money at the pump.

Excellent compact cars need a small, high-performance EPS. NSK has successfully developed the world's smallest EPS.* Thanks to NSK, EPS can be used even in small cars, which are better for the environment. With the EPS unit not very long, even compact cars can be made with plenty of interior room.

The key to the successful development of this EPS was to combine the machines (motor and reducer) and the ECU into a single unit. This system, a kind of "mechatronical integration," will help automobile manufacturers build the ideal compact car.

* According to research carried out by NSK in January 2009.



Shortest EPS in the world: just 30 cm

PLEASANT SAFETY

## Regaining Traction Before You Even Lose It

Have you ever been scared when your tires slipped on a snowy road? NSK's EPS increases the safety of your car in a situation like that.

When the tires seem as though they are about to slip, this information is sent to the ECU, which is a control unit not unlike a human brain. The ECU instantly determines a way to prevent the slip and changes the feel of the steering wheel, communicating to the driver the best maneuver to make. Animals do not fall when they feel a slippery surface under their feet because the brain sends certain orders to the muscles. NSK's EPS prevents slipping through a similar advanced mechanism.


EPS without function to prevent slipping


NSK's EPS with function to prevent slipping

PLEASANT SAFETY

## Putting an End to Vibrations

Uncomfortable vibrations from the steering wheel can make drivers very tired during long drives on the highway. One reason for this is that the vibration of the tires gets passed along the steering wheel to the hands. NSK has developed an EPS that reduces these uncomfortable vibrations.

The part that does this works something like headphones that reduce unwanted ambient noise. When vibrations are felt, the ECU orders the motor to move as needed to cancel out the vibrations. Called "anti-phase," this system dramatically reduces vibrations from the steering wheel.

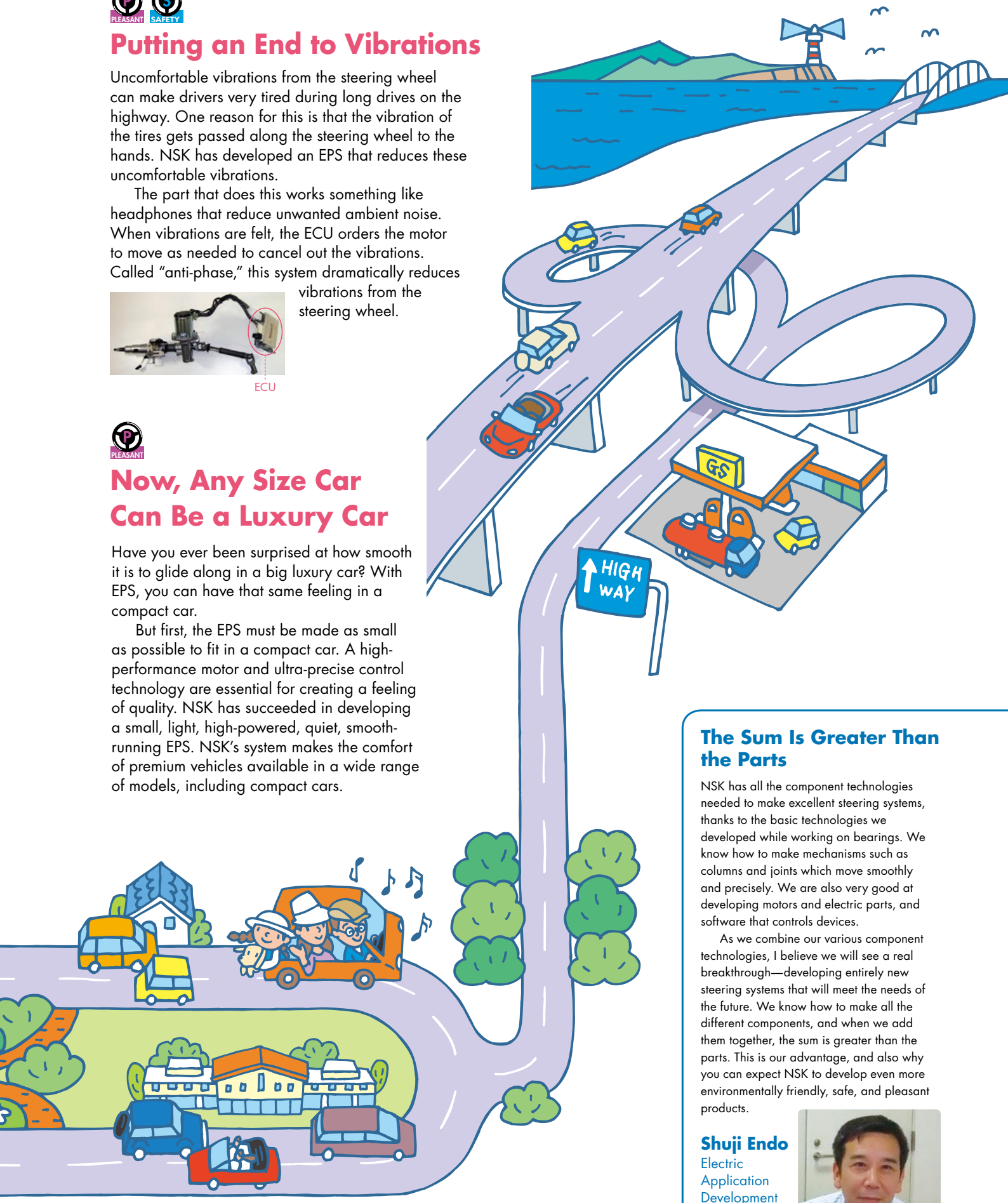



PLEASANT

## Now, Any Size Car Can Be a Luxury Car

Have you ever been surprised at how smooth it is to glide along in a big luxury car? With EPS, you can have that same feeling in a compact car.

But first, the EPS must be made as small as possible to fit in a compact car. A high-performance motor and ultra-precise control technology are essential for creating a feeling of quality. NSK has succeeded in developing a small, light, high-powered, quiet, smooth-running EPS. NSK's system makes the comfort of premium vehicles available in a wide range of models, including compact cars.




### The Sum Is Greater Than the Parts

NSK has all the component technologies needed to make excellent steering systems, thanks to the basic technologies we developed while working on bearings. We know how to make mechanisms such as columns and joints which move smoothly and precisely. We are also very good at developing motors and electric parts, and software that controls devices.

As we combine our various component technologies, I believe we will see a real breakthrough—developing entirely new steering systems that will meet the needs of the future. We know how to make all the different components, and when we add them together, the sum is greater than the parts. This is our advantage, and also why you can expect NSK to develop even more environmentally friendly, safe, and pleasant products.

**Shuji Endo**
Electric Application Development Department, Steering Technology Center, NSK Ltd.

# Turn the Steering Wheel, and Face the Future

What kind of car do you want to drive on the roads of the future? If you hope to enjoy both safe driving and environmental responsibility, steering systems are going to have to change a lot. Of course, basic turning performance will continue to improve, but tomorrow's steering systems will also need to have advanced functions that can only be offered by combining several technologies.

If, for example, steering systems become more integrated with the accelerating and stopping functions, cars will be safer, more comfortable, and more fun to drive in every situation. Not only that, with advances in technology that allows vehicles to see, sense, and make judgments about road conditions, it may not be too long before we have cars that can drive themselves.

NSK is determined to continue enriching society by using its advanced technologies to deliver environmental friendliness, safety, and comfort. The wellspring of NSK's technology is Motion & Control. NSK's goals are to help create vehicles that appeal to human sensibilities thanks to their reliable, high-precision parts and to develop the technologies needed to control them.

Wouldn't you like to drive this kind of car in the future? NSK steering systems are helping to create the cars of tomorrow.

## Technology Development Award for the Toyota iQ

In fiscal 2008, NSK's EPS was employed in the iQ model developed by the Toyota Motor Corporation. The system won a technology development award from Toyota thanks to its "contribution, as a space-saving technology, to the development of a new model." The mechatronic EPS, which combines a motor and ECU into a single unit, is a source of great pride for our team: it's lightweight, compact, and minimizes energy loss.

When the Toyota iQ, equipped with NSK's EPS, won the 2008–2009 Japanese Car of the Year award, nearly five years after we first conceived this EPS, we were as happy as if we ourselves were getting the award.



**Tsuyoshi Senba**
First Design Department,
Steering Technology Center,
NSK Ltd.

# Mechanisms Supporting CSR

## Management

To fulfill the NSK Group's corporate social responsibility (CSR), it has established a solid foundation for sincerity in its business activities. The Group is building upon that foundation by undertaking a variety of initiatives. The NSK Group regards the first stage of its CSR policy as maintaining this solid foundation—i.e., the mechanisms supporting CSR.

**Upgraded internal controls related to financial reporting.** p.16

**Revised the NSK Code of Corporate Ethics.**
**(Added guidelines about respecting fundamental rights at work and global environmental protection)** p.17

**Strengthened export management system.** p.17

# Corporate Governance

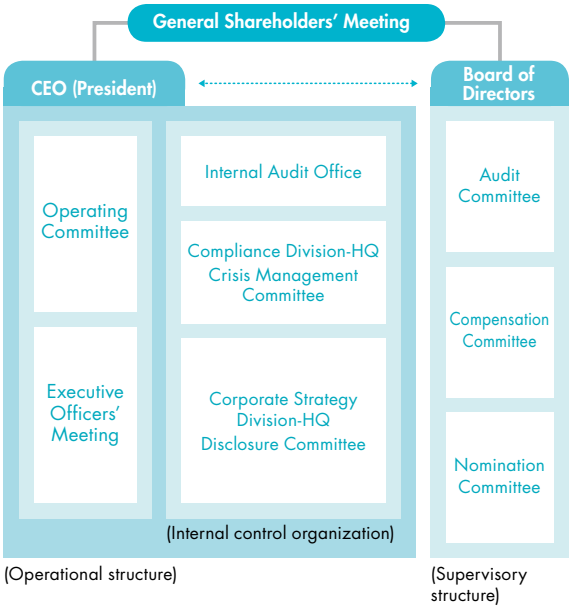
## Approach to Corporate Governance

The NSK Group defines corporate governance as a structure by which its executive organization can focus on business expansion and increasing profit under the supervision of the Board of Directors. The Group strives to strengthen its corporate governance to enhance both the flexibility of its management and the effectiveness of management supervisory functions.

## Corporate Governance Framework

NSK operates under a "company with committees"*1 system. There are three committees, namely the Audit Committee, Compensation Committee, and Nomination Committee under the Board of Directors. This Board supervises executives and oversees the establishment of basic management policies. Each committee consists of two independent directors and one internal director. The CEO makes all final decisions following deliberations by the Operating Committee, and each executive officer drives forward the specific business and affairs of the company that he or she is in charge of. The Executive Officers' Meeting functions as a forum to share information across management on matters such as the direction of business development and to report current business conditions.

**Figure 1: Governance Framework**




*1: "Company with committees" refers to a stock corporation with three committees—namely the Audit Committee, Compensation Committee, and Nomination Committee. The intention is to improve the checks and balance on management by separating the executives who carry out the business and affairs of the Company (on the left in Figure 1) from the Board of Directors, which performs the supervisory function.

## Internal Control System

NSK's Board of Directors has established a Basic Policy on Developing Internal Control Systems. The Company also established basic principles governing intra-Group internal controls in its NSK Group Management Rules. An Internal Audit Office, Compliance Division-Headquarters, and Corporate Strategy Division-Headquarters were established to reinforce internal auditing and risk management functions, as well as to enhance the Group's internal control system.

**Figure 2: NSK Group Management Rules**


## Addressing the Internal Control Report System over Financial Reporting*2

The dedicated function at NSK headquarters oversees the Group's overall activities. By coordinating with Group companies in and outside Japan, headquarters aims for a global improvement of internal controls over financial reporting, with stabilizing procedures and assessment schemes.

Following the activities of this project since fiscal 2006, fiscal 2008 was the first year of operation of the new reporting system. NSK carried out a comprehensive survey, assessment of the status of development and the operation of internal controls at all Group companies, and verified that those internal controls are effective. NSK has also been provided with an audit certification (unqualified opinion) by the independent auditors. Going forward, the NSK Group will reinforce its efforts from a global perspective, focusing on strengthening internal controls as an important step in achieving its objective of becoming "No. 1 in Total Quality."

*2: A system requiring listed companies ensure their own internal controls over financial reporting and submit to the Financial Services Agency an annual Internal Control Report with audit certification, together with an Annual Report.

# Compliance

## Compliance Promotion System and NSK Code of Corporate Ethics

NSK regards compliance (observance of laws and corporate ethics) as crucial for the Group to remain deserving of the trust it has earned. Accordingly, NSK's Compliance Division Headquarters spearheads the compliance activities in the Group, such as the development of corporate rules and compliance-related education, auditing, and a variety of improvement activities.

The NSK Code of Corporate Ethics, which stipulates the basic rules that all directors and employees must observe, is the foundation of the NSK Group's CSR and compliance. In response to concerns in society, in January 2009 NSK added codes about respecting fundamental rights at work and global environmental protection. In the future, NSK will make these codes applicable to Group companies outside Japan.

**NSK Code of Corporate Ethics (extract)** (Established: February 22, 2002 Revised: January 1, 2009)

NSK Code of Conduct concerning Compliance (by item)

1) Compliance with Antitrust Laws
2) Compliance with Export-related Laws and Regulations
3) Prohibition of Commercial Bribery (handling of entertainment, gifts, etc.)
4) Transactions with Public Institutions and Handling of Political Donations
5) Accurate Recording and Processing
6) Prohibition of Insider Trading
7) Handling of Intellectual Property
8) Prohibition of Illegal Activities and Anti-social Conduct
9) Protection of Corporate Assets
10) Handling of Confidential Information
11) Relations with Customers
12) Relations with Suppliers
13) Relations with Competitors
14) Prohibition of Discrimination and Cultivation of a Sound Workplace
15) Respect of Fundamental Rights at Work
16) Global Environmental Protection

Note: NSK Code of Corporate Ethics applies to NSK Ltd., its consolidated subsidiaries (unless they have established their own code independently), and NSK-Warner K.K.

## Compliance Education

NSK periodically has all employees of its Group companies in Japan, including directors and temporary employees, take an e-learning course about ethical and legal compliance. This course supplements the rank-based compliance education provided for all new employees and managers. These activities were designed to familiarize employees with the NSK Code of Corporate Ethics. NSK also holds workshops on individual topics such as insider trading, antitrust laws, and trade issues. In fiscal 2008, NSK started holding compliance workshops dealing with foreign antitrust laws, etc. for employees to be posted outside Japan.

## Compliance Hotlines

In order to uncover illegal conduct as soon as possible and take appropriate action, NSK operates a hotline for reporting compliance concerns. To complement the in-house hotline at the Compliance Division Headquarters, a hotline staffed by an outside lawyer has been established. Employees and suppliers to Group companies in Japan can also send reports by e-mail or post through this channel. The system allows whistle-blowers to remain anonymous, and they are protected from any negative repercussions that may arise from the reported information.

## Security Export Management

To assist in working toward worldwide peace and security, and in conforming to export-related legislation, NSK has established the Security Export Control Office and created an export management system. Similarly, in recent years international regulations have been strengthened regarding not only the spread of weapons of mass destruction, but also the excessive stockpiling of conventional weapons. In response, the NSK Group is making every effort to prevent unauthorized export through rigorous screening and careful judgment, and through education for relevant departments. In fiscal 2008, the Group established the NSK Group Security Export Control Standards in order to strengthen export management at Group companies in and outside Japan. NSK also refused to conduct a transaction with a military-related organization outside Japan, when it could not confirm the intended use of the requested product.

**NSK Action**

### Participation in a Workshop on Foreign Antitrust Laws

I thought I had at least a certain understanding of antitrust laws in countries outside Japan. But, when I attended the workshop, I learned for the first time that some people have violated antitrust laws through unthoughtful actions which they presumed were good for the company, resulting in large fines and prison sentences for the individuals. From now on I will strongly encourage my staff in the USA to raise awareness of compliance.

**Kenjiro Kikuchi**
NSK Precision America, Inc.

*Please see the following web page for more information about NSK Code of Corporate Ethics: http://www.nsk.com/sustainability/mancomp.html

# Crisis Management/Information Security



## Crisis Management

### Crisis Management Structure

The NSK Group established the Crisis Management Committee and carries out measures that prioritize human life in the event of crises such as major natural disasters.

This management-level committee considers and implements preventative measures aimed at counteracting the significant risks posed by major earthquakes, fires, environmental pollution accidents, and widespread outbreaks of infectious diseases that could affect the Group's business. The committee also provides proper direction during actual emergencies.

In order to educate all employees about the concept of crisis management, the committee prepared the *Crisis Management Manual* as guidelines for preventing crises and for taking appropriate action in emergencies.

### Initiatives for a Business Continuity Plan (BCP)

In recent years, major natural disasters have occurred with increasing frequency both in and outside Japan, making it all the more important that the NSK Group strengthens its ability to withstand disasters. The Crisis Management Committee takes a central role in establishing a BCP*1 to ensure the safety of its employees and their families, as well as to fulfill its responsibility of rapidly supplying products to customers in the event of a disaster.

Specifically, the Group is devising a system to maintain and backup head office functions in case of a major earthquake, carrying out construction work to reinforce the earthquake resistance of production plants and facilities, improving emergency manuals, developing means of emergency communication between offices, and preparing stockpiles of food and other emergency supplies. In fiscal 2008, the Crisis Countermeasures Headquarters conducted a drill simulating a major disaster in the Tokyo region, which is the location of key Group functions.

Photo 1: Tension-filled drill at the Crisis Countermeasures Headquarters

*1: Business continuity plans lay out preparations and steps that would enable the company to maintain office functions or limit the duration of any interruption in operations in the event of a catastrophe such as a natural disaster or accident.

## Information Security

### Information Security Management System

The NSK Group has established a structure for maintaining and managing information security globally by setting up information security management organizations in each region, including in Japan, the Americas, Europe, China, and ASEAN. NSK has also established information security management organizations in Group companies, particularly in Japan. Now, uniform information security can be maintained Group-wide.

In addition, NSK has been continuously working to improve office security. Since 2007, the Office Security Committee (OCS), which is composed of members from the IT, general affairs, and human resources departments, has encouraged the installation of electronic locks to control access to office rooms.

### Employee Education

The information security issues surrounding companies change on a daily basis. Accordingly, the companies must continually and effectively provide employees with up-to-date educational and awareness-building training.

The NSK Group regularly provides Group-wide e-learning programs with the aim of improving employees' knowledge of information security. In fiscal 2008, 7,392 employees took these courses.

Additionally, the Group makes timely announcements and conducts classroom-based training sessions aimed at raising awareness so that employees can handle information correctly and act appropriately.

Photo 2: Group training session for sales employees

# Society and NSK

## Contributing to Society through MOTION & CONTROL Technology

The NSK Group is supported by a wide range of stakeholders, including customers, suppliers, employees, members of local communities, shareholders, and investors. The Group undertakes a variety of initiatives through its business activities in an effort to make everyone's life more convenient, comfortable, prosperous, and secure.

**Improved training programs for customers and distributors.**

pp. 20–21

**Expanding employee education Group-wide.**

pp. 22–23

**The special subsidiary NSK Friendly Services Co., Ltd., has begun operations.**

p. 25

# Quality and Safety of Products and Services



## Ensuring Quality and Customer Satisfaction

The NSK Group believes that improving the quality of all the products, information, and services it offers to customers will go a long way toward maximizing customer satisfaction. This is fundamental to the Group's approach to manufacturing. The Quality Assurance Division-Headquarters is promoting initiatives throughout the Group: the NPDS (NSK Product Development System) program, the NQ1 (NSK Quality No. 1) program, and human resource development programs.

### NPDS for Prompt and Reliable Handling of Customer Orders

NPDS is a management system that the NSK Group deploys globally in order to ensure a prompt and reliable response to new orders from customers and to maintain stable and efficient production worldwide. With this program, members of the relevant departments thoroughly discuss a new order's technological challenges, capital investment, relevant patents, and other matters to determine whether the product can be manufactured to satisfy the customer's needs, and to assess whether the order can be accepted. At the same time, projects are ranked by degree of difficulty, with a cross-sectional team formed to undertake difficult projects. At each juncture in the process, from product planning, development and design, and prototype manufacture to mass production, the team verifies that issues are being resolved, thus ensuring stable production.

In fiscal 2008, NSK Steering Systems Europe (Polska) SP.ZO.O. achieved more efficient and stable production by applying the NPDS system.

Photo 1: Checking mass production of a new product at NSK Steering Systems Europe (Polska)

### NQ1 Program to Eliminate Defective Products

The NQ1 program is carried out at the Group level with the aim of optimizing the flow of products and information throughout the production process, from procurement of parts and materials to customer delivery. The program emphasizes closer coordination between departments: production, design and development, quality assurance, marketing, logistics, and administrative divisions. Based on scientific methods, this program is intended to eliminate as many defective products as possible to ensure more efficient and stable production.

### Human Resource Development Programs Underpin All Activities

All employees must be aware of their own roles, enhance their communication, and improve the quality of their work in order to achieve customer satisfaction. The NSK Group strives to develop the abilities of its employees through participation in activities to improve operations and through education and training sessions.

Beginning in fiscal 2008, NSK started nurturing instructors who will form the core of quality knowledge education programs at sites outside Japan (see page 23 for details). At NSK headquarters initiatives have been implemented to improve the quality of back-office operations.

Photo 2: An initiative to improve the quality of operations at NSK headquarters

## Supporting Customers and Distributors

The NSK Group is putting effort into technological support to maximize the performance of its products by helping customers to deepen their understanding of products and to use them correctly.

NSK Brasil LTDA. has established training centers staffed by NSK employees throughout the country. At these centers, customers and distributors can receive technical trainings in skills such as changing bearings. In February 2008, the company opened a new training center in the Brazilian Technology Center located in the suburbs of Suzano. The center was outfitted with commonly used equipment in order to provide the best opportunities for technical trainings in bearings and precision machinery components.

Photo 3: Training session at the Brazilian Technology Center

## Quality Management System

The NSK Group has obtained ISO 9001 and ISO/TS 16949* certification for quality management systems and produces high-quality products that meet customer demands. As of March 31, 2009, all 51 targeted sites of NSK Group companies had obtained the certification.

*ISO/TS 16949 aligns ISO 9001—the criteria for quality management systems set by the ISO (International Organization for Standardization)—with the quality system requirements for automotive-related products.

### Product Safety

The NSK Group has a system in place to ensure that it responds rapidly in an integrated manner in the event that a Group product on the market is determined to have a critical flaw or the possibility of such a defect. An occurrence of this kind would be designated as a serious quality problem. The Group would promptly contact relevant customers and organizations to arrange for recalls and exchanges.

## Partnership with Suppliers

The NSK Group's transactions with suppliers are fair, equitable, and transparent. The Group is strengthening communication with suppliers to reinforce competitiveness and to further both suppliers' and the NSK Group's sustainable development.

### Socially Responsible Procurement Initiatives

NSK recognizes the importance of observing the law, and of respecting environmental conservation, human rights, and health and safety in its business operations. These activities must be promoted throughout the entire supply chain. Accordingly, since fiscal 2007, the Company has been using procurement policy briefings and other opportunities to request suppliers also take initiatives.

In fiscal 2008, the NSK Group started organizational efforts, with the Compliance Division-Headquarters, Procurement Division-Headquarters, and other relevant departments to coordinate activities more closely.

**NSK Action**

### We Are Growing as We Introduce Our Technologies to Customers

During the 24th Japan International Machine Tool Fair (JIMTOF 2008), I was leader of a team introducing the A1 Series Grease-retaining, High-Speed, High-Load Ball Screws. We were busy every day, but we were able to really sense the future demand when we noticed the surprise of many visitors on seeing the grease-retaining ability of this seal. As a product developer I felt satisfied, and at the same time I could see potential improvements that could make the product more user-friendly and optimized for customers' machine tools. Taking advantage of this experience, I am working hard to continue developing products that meet diverse needs.

**Yoshinori Yano**
Technology Division Headquarters Ball Screw Technology Department, NSK Precision Co., Ltd.

# Human Resources and Career Development



## Resources Development Programs Underpin Growth

### New Employee Training

The essence of the NSK Group's approach to its human resources is to nurture independent employees who wish to develop themselves and show initiative in their thoughts and actions. Accordingly, NSK systematically conducts new employee training programs. During the first two years in the Company, each new employee is assigned a mentor and a manager trained in providing on-the-job training (OJT)*. The managers carefully guide the new employees as they acquire work knowledge and skills.

Just before the end of the second year, new employees go through a "gate check"—an opportunity for them to sound out their potential and discuss their next career step in consultation with their supervisors and the Human Resources Department.

*Instruction regarding necessary knowledge, technology, skills, manners, and other matters given by supervisors and senior employees to subordinates, while performing specific work.

### Developing the Leaders of the Next Generation (NSK Management College)

The NSK Group established the NSK Management College in 2003 to provide a selective training program for nurturing the next generation of business leaders. This year-long program is designed to foster human resources who can play an active role in a global business environment. The program consists of a Manager Course for mid-career employees and a General Manager Course for senior managers. The more than 200 graduates of the program are active globally as key members of the Group.

### Voluntary Participation Training (Saturday Business College)

The Saturday Business College offers elective courses focusing on fundamental business skills such as business accounting, logical thinking, and marketing. Nine courses were held in fiscal 2008.

The NSK English Self-Training Course (NEST), which was first offered in fiscal 1998, is part of NSK's efforts to develop internationally proficient human resources. Thus far, the course has provided nearly 1,000 students with an independent study method for improving their command of business English.

### Dispatch to Study at a University and Other Training Programs

The NSK Group makes available opportunities for study at universities and graduate schools in and outside Japan with the aim of fostering human resources who are competent in the global arena. In fiscal 2008, the Group sent students to the Toyota Technological Institute, the International University of Japan, the University of Tokyo, the Tokyo Institute of Technology, Kyushu University, the University of California, Berkeley, and to other schools.

The NSK Group has also developed diverse training programs, including programs for learning the basics of diversity management and programs on cross-cultural communication.

### Field-specific Training

The NSK Group offers a broad range of educational programs worldwide to improve the professionalism of employees and to respond to the Group's expanding business development. In the production field, NSK established the NSK Manufacturing Education and Training Center in 2005. The center is working to transfer technical skills and to foster production site leaders. In the technology field, NSK established the NSK Institute of Technology (NIT). Opened in fiscal 2008, NIT is a venue for comprehensive technical education. In the sales field, NSK offers training to improve communication skills and to increase product and quality knowledge, all of which help build relationships of trust with customers.

Photo 1: NIT (course taught in the USA)

## Human Resources System Underpinning Career Advancement

### Performance Agreement System

The NSK Group adopted a performance agreement system as a means of aligning the trajectories of the company's and individuals' goals. Employees meet regularly with their supervisors to set goals at the outset, verify interim progress, and conduct a results follow-up at the end. Further, NSK uses a questionnaire for providing feedback to employees as a means of checking that two-way communication is being achieved. NSK regards this system as an important key in human resources development and has deployed it worldwide.

**Table 1: Results of the Fiscal 2008 Performance Agreement System Questionnaire**

| | FY2006 | FY2007 | FY2008 |
|---|---|---|---|
| Questionnaires distributed | 3,055 | 3,522 | 3,646 |
| Questionnaire recovery rate | 92% | 94% | 95% |
| Execution rate for feedback from supervisors | 97% | 96% | 97% |
| Level of satisfaction in feedback | 78% | 79% | 85% |

(excluding managers)

### Self-Reporting System

The NSK Group gives employees an opportunity to submit a self report directly to the Human Resources Department once a year, informing it of circumstances in their current workplace environment, their wishes concerning future work content, personal information that the company should know, and other concerns. Employees may have an interview with the Human Resources Department if they so desire, and 189 employees were interviewed in fiscal 2008. NSK makes strategic personnel transfers based on the outcome of the self report and interview in order to enable individuals to demonstrate their full abilities.

## Global Human Resources Strategy

With the global expansion of the NSK Group's business, the strengthening of cooperation between bases in and outside Japan has become more important than ever. Accordingly, production, technology, sales, and other departments within the Group have been cooperating across borders to conduct education that contributes to the standardization and upgrading of services provided to customers.

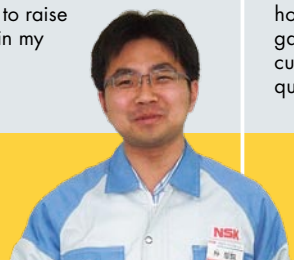
Furthermore, since fiscal 2006 the Human Resources Department has been holding global human resources conferences attended by the heads of human resources departments from each region worldwide in order to maintain close cooperation with bases outside Japan and push its global human resources strategy forward. Conference participants exchange information and discuss a wide range of issues, including their respective human resources systems and human resources development programs.



**NSK Action 1**

### Participation in Training Session at the NSK Manufacturing Education and Training Center

I had a very fulfilling experience at the training center located at the Ishibe Plant in Shiga Prefecture. With the instructors and trainees from different plants, we worked to overcome cultural barriers. I will pass on the skills I learned at the center to the plant in Korea, and will work to raise the quality of NSK's products even higher in my quality assurance work.



**Park Sung Ho**
Quality Assurance Team, Changwon Plant, NSK Korea Co., Ltd.

**NSK Action 2**

### Spreading Ideas and Techniques for Achieving High Quality at Sites in the USA

Six people from the USA participated in an instructor training program in Japan for quality knowledge education. The program was designed to enable the participants to teach ideas and techniques for achieving high quality at bases back home. We will spread the valuable knowledge we gained here, including the quality-first/customer-first culture and process management for improving quality, to NSK Group sites in the Americas.

**David Jones**
Quality Assurance Department, NSK Americas, Inc.

# Creating Dynamic Workplaces



## Workplace Health and Safety and Healthcare Measures

### Occupational Health and the Safety Management System

The NSK Group believes it is important to provide a workplace environment where employees can give full play to their strengths. To this end, the Group actively promotes health and safety activities at work as a basic principle of management for manufacturing. In line with this belief, the NSK Central Occupational Health and Safety Council meets regularly together with labor and management to determine the Group-wide direction and to encourage the creation of a safety-first culture that is embraced by all employees.

In fiscal 2008, the NSK Group started adopting risk assessment practices.*1 The risks associated with new equipment are evaluated objectively and quantitatively, and reliable measures are taken in an effort to create safer workplaces. The Group is currently constructing an occupational safety management system to continually improve safety and health across the organization.

*1: The comprehension and identification of risks and their assessment in terms of rate of occurrence and degree of effect, followed by the taking of appropriate countermeasures.

**Table 1: Number of On-the-Job Accidents**

| | FY2006 | FY2007 | FY2008 |
|---|---|---|---|
| Accidents not resulting in absence from work | 20 | 25 | 33 |
| Accidents resulting in absence from work | 6 | 6 | 4 |
| Total | 26 | 31 | 37 |

Note: Accidents suffered by temporary employees are included from fiscal 2007.

### Healthcare Initiatives

The NSK Group provides managers with annual training on mental health, focusing on the care of the workers for whom the manager is responsible. In addition there are regular health checkups that are helpful for self-care, encouraging employees to maintain their health. This training is intended to enable supervisors to consider the healthcare of employees by giving appropriate advice through daily communication.

## Diversity and Equal Opportunity Initiatives

### Supporting Women's Careers

NSK supports the careers of working women in a variety of ways. From 2006, NSK has set up a Diversity Development Team, carried out internal surveys on work and childcare, and held "free talk" sessions during which female employees and the Company can talk freely about the work environment. The views expressed in these sessions form the basis of the *Guidebook on Support for Work-Life Balance*. This guidebook deepens understanding of the work-life balance, describing childcare leave and other support systems, giving childcare support advice to men, and indicating issues that supervisors should consider.

In fiscal 2008, the percentage of employees taking childcare leave increased 30 points over the previous year, to 94 percent. NSK has adopted the "armo program" provided by Work Life Balance Co., Ltd., to facilitate a smooth return to work after childcare leave and to support a rich family life. The armo program enables participants to communicate through the Internet with their workplace supervisors and senior employees who have childcare experience, as well as to access childcare information and improve skills through online courses.

**Table 2: Related Employee Data** (As of end of March each fiscal year)

| | FY2006 | FY2007 | FY2008 |
|---|---|---|---|
| Average years of employment | 18 years | 18 years | 17 years |
| Average age | 41 years old | 40 years old | 40 years old |
| Proportion of female employees | 5.6% | 5.5% | 5.5% |
| Rate of childcare leave taken* | 69% | 64% | 94% |

[*People taking childcare leave / (people taking childcare leave and then returning to work + people leaving job due to pregnancy or birth)]

### Re-employment System for Retirees

Since April 2001, the NSK Group has offered a place of employment to union members, who have reached the age of retirement, through a re-employment system called "A Seniors." NSK used to sign non-regular employment contracts with retired managers on an individual basis according to the Company's needs, but it introduced a new re-employment system for managers (called the "M Seniors") in 2006. In this way, NSK is striving to create systems that enable

healthy persons who are eager to work to make full use of the wealth of experience and advanced skills they have built up over their years in the Group.

**Table 3: Number of Re-employed Persons (over 60 years of age)**

(As of end of March each fiscal year)

| | FY2006 | FY2007 | FY2008 |
|---|---|---|---|
| A Seniors (former union members) | 68 | 115 | 156 |
| M Seniors (former managers) | 7 | 23 | 35 |
| Others (part-time employees, etc.) | 72 | 62 | 77 |
| Total | 147 | 200 | 268 |

## Employment System for People with Disabilities

The NSK Group believes that creating employment for people with disabilities who have the will and ability to work, and offering a place in which they can be a part of society is an important social responsibility for companies. In May 2008, NSK Friendly Services Co., Ltd., a special subsidiary,*2 started operations, expanding the employment of persons with disabilities within the NSK Group. This initiative was well received, and the company was given a letter of appreciation from the city of Fujisawa, where it is located, recognizing its status as an outstanding employer of persons with disabilities.

Photo 1: Employees reciting safety maxims before starting work

*2: A subsidiary regarded as a part of its parent company for the purpose of calculating the percentage of employment of persons with disabilities, and that has been approved by the Minister of Health, Labour and Welfare after fulfilling certain requirements.

## Respect for Human Rights

The NSK Code of Corporate Ethics (see page 17) explicitly prohibits discrimination based on such things as race, physicality, creed, sex, religion, family origin, ethnicity, nationality, age, or disability, as well as forced labor and child labor. In addition, the NSK Group provides rank-based education and human rights education. The Group has established an internal whistle-blowing system and a harassment help-line as means of preventing human rights infringements, and is otherwise striving to foster a workplace in which all employees can work without unnecessary worry.

## Improving the Work Environment through Labor-Management Cooperation

Employees of the NSK Group are represented by a single organization, the NSK Labor Union. Regular labor management consultations are conducted at a Group-wide labor-management conference (Central Management Council) three times a year, and at a labor-management conference at individual business sites (Single Unit Management Councils) once a month. These labor-management conferences enable an exchange of opinions not only about the improvement of working conditions and the company's management policies, but also about the improvement of the work environment with a view toward solving issues through labor-management communication.

### NSK Action 1 Widening My Views by Taking Childcare Leave

I took one month of childcare leave. With the understanding and support of my supervisor and colleagues, I was able to make a smooth return to work by maintaining contact while on leave. By spending valuable time with my child, my views on subjects other than the company expanded, and I am really glad I took a long leave. I think that if it becomes commonplace for men to take childcare leave, mutual understanding between men and women in the workplace will improve.

**Masaaki Iwai**
No. 6 Manufacturing Section, Haruna Plant, NSK Needle Bearing Ltd.

### NSK Action 2 I am Happy to See the Growth of Persons with Mental Disabilities.

One year has passed since I started to work with seven persons with mental disabilities. At first, some members said that they were not sure if they could continue and that the work was difficult, but now they are working with self-confidence and responsibility. Recently, we accepted a new trainee, and the existing members are acting as instructors. I am happy that all our members, with a range of personalities, have grown significantly over the past year.

**Toshiji Abe**
NSK Friendly Services Co., Ltd.

# Working with Local Communities



## Singapore — Bringing Smiles to Children's Faces

NSK Singapore (Pte) Ltd., and NSK International (Singapore) Pte Ltd. undertake a variety of community services led by a volunteer committee. During 2008 one of the activities was a visit to a children's home. The children come from broken families, and are also court referrals or runaway kids. 15 employees participated as volunteers. The event was attended by about 50 children. There were games, craftwork, and a supply of delicious donuts. It turned out to be a fun day filled with the sound of the children's joy and laughter.


Photo 1: Volunteers said the event was a challenging but meaningful experience.

## Thailand — Donating Books and Sports Equipment to Rural Schools

NSK Bearing Manufacturing (Thailand) Co., Ltd., makes annual donations of stationery and support funds to rural schools where educational spending is inadequate. Recipient schools are nominated by employees and selected by a committee composed of department heads. In fiscal 2008, a kindergarten in Maha Sarakham Province was selected.
A 20-member group of executives and employees visited the school to deliver the donation, which included books, sports equipment, and desks.

Photo 2: Children lining up to receive stationery

## USA — Giving Christmas Presents to Facilities for Those in Need

NSK Corporation's Clarinda Plant donates Christmas presents to a local facility which helps persons with disabilities. The facility provides necessary life skill training to its residents, all of whom are mentally or physically challenged. Many of these residents do not have families to remember them at Christmas, or have families that lack the finances to provide presents. For many years the Clarinda Plant's employees have played Santa Claus out of a commitment and a deep desire to help others enjoy the Christmas season. They bring the joy of the season and help the residents realize they are remembered. In 2008, they brought some happiness with 220 presents.


Photo 3: A happy resident and thank you card

## Japan — Cleaning Up Communities

NSK Logistics Co., Ltd., which is in charge of distribution for the NSK Group, holds periodic cleanups around its site. Moreover, it actively urges nearby plants and partner companies to pitch in and make the cleanups more thorough, in a continual effort to help preserve the local environment.

Photo 4: Employees cleaning up around the site

# Educational Support for Future Generations

## Japan — Science Classes for Parents and Children

In July 2008, NSK Precision Co., Ltd.'s Maebashi Precision Machinery and Parts Plant held a science class for parents and children. The class was held as a Summertime Plant Tour for Parents and Children sponsored by the city of Maebashi, Gunma Prefecture. The class included experiments to experience friction, a demonstration on building a ball screw, as well as a tour of the plant. The children showed tremendous interest in the numerous products that one doesn't usually get to see. They also worked enthusiastically on the experiments.

Photo 1: Children carefully watching a demonstration on building a ball screw

## Japan — Internship for University Students

For about six years now, NSK Machinery Co., Ltd., has provided internships at the request of universities. The length of the internships varies according to the university, but in each case the interns gain real work experience and practical training, including performing parts inspections, using precision measuring instruments, and finishing machine assembly. Many students are surprised at the exactitude of the precision and the quality requirements, in contrast to the practical training they receive at universities. The company plans to continue providing internships in support of education.

Photo 2: Practicing scraping by hand to create a very smooth surface that is not possible using a machine

## England — Supporting Work Experience for Students

NSK Steering Systems Europe Ltd. conducts work experience programs lasting between one and two weeks at the request of local educational institutions and industrial associations. The programs, which are for students aged 14 to 17, are especially popular among students in engineering courses. Being able to use various machines, process parts with machine tools, and actually work as a team member seems to provide a good opportunity for the students to think about their future careers.

Photo 3: A student learning from an instructor

## China — Scholarships and Award for Paper for University Students

Changshu NSK Needle Bearings Co., Ltd. (Changshu NSK), established the Changshu NSK Scholarship, which is awarded to 20 students at the Changshu Institute of Technology (photo 4). Changshu NSK started a scholarship program in fiscal 2008 to contribute to the nurturing of the next generation, who are the stewards of the future and responsible for the development of local communities.

Furthermore, in 2003 NSK established the NSK Mechanical Engineering Dissertation Awards for Sino-Japanese Cooperation with the aim of fostering talented human resources in engineering together with Tsinghua University to support graduate students. In June 2008, NSK received a letter of appreciation from the university (photo 5) in recognition of this program's results.

Photo 4: Students being awarded scholarships

荣誉证书

日本精工株式会社（NSK Ltd.）于2002年在清华大学机械工程学院设立"中日友好NSK机械工学优秀论文奖"，该论文奖至今已成功运作五年，促进了我院在校研究生对机械工学基础理论的学习与研究，为优秀学生提供了脱颖而出的平台。

特发此证，以感谢NSK Ltd.的支持。

清华大学 机械工程学院

2008年6月6日

Photo 5: Letter of appreciation from Tsinghua University

# Communication with Shareholders and Investors

## Information Disclosure and Communication

Shareholders and investors require that companies disclose the wide range of information needed to make investment decisions. This includes decisions related to business performance and to medium-to long-term strategies. By enhancing IR*1 events and tools, the NSK group is striving to disclose business information appropriately and in a timely manner.

### Communication at IR Events

In Japan, NSK makes an effort to deepen shareholders' understanding of its business by displaying products and providing visual aids at briefings given at the General Shareholders' Meeting held every June. NSK makes the best use of these meetings as a forum for important communication in which the Company asks shareholders to share their opinions frankly. NSK also holds financial conferences, business briefings, plant tours, and small group meetings for analysts and institutional investors.

Outside Japan, management executives regularly visit shareholders and institutional investors to discuss company policies and medium- to long-term strategies.

Photo 1: Financial conference

### Timely and Appropriate Dissemination of Information

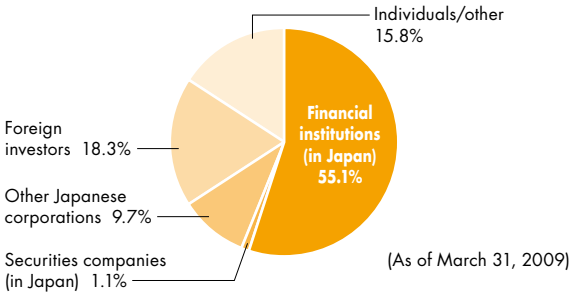
The NSK Group makes financial information and financial conference briefing materials available on the Group's website as part of its efforts to ensure timely disclosure. The Group outlines its business performance and strategies and the Group's various activities in an annual report and in the *NSK Group Report* sent to shareholders every six months.

*1: Investor Relations: Activities for the development of a good relationship with shareholders and investors by providing timely, equitable, and continuous information and exchanging opinions about business initiatives.

## Return of Profit to Investors

The return of profit to shareholders is an important management policy at NSK. The Company's basic policy is to maintain stable dividend payouts, which are determined for consideration factors such as the payout ratio and business performance on a consolidated basis. The company paid a full year dividend of 14 yen per share in fiscal 2008.

**Figure 1: Distribution of Shares by Shareholders (Number of Shares Held)**




(As of March 31, 2009)

## Inclusion in SRI Indexes

The NSK Group was included in representative SRI*2 indexes in and outside Japan in fiscal 2008.

**Figure 2: Inclusion in Major SRI Indexes**

| | |
|---|---|
| **Dow Jones Sustainability Indexes** http://www.sustainability-indexes.com | Dow Jones Sustainability Indexes |
| **FTSE4Good Global Index** http://www.ftse.com/Indices/FTSE4Good_Index_Series/index.jsp | FTSE4Good |
| **Ethibel Sustainability Indexes** http://www.ethibel.org/index.html | ETHIBEL EXCELLENCE |
| **Morningstar Socially Responsible Investment Index** http://www.morningstar.co.jp/sri/index.htm | MS-SRI |

(As of March 31, 2009)

*2: Socially Responsible Investment: The concept and method of evaluating social and environmental efforts, and investing in companies that fulfill these responsibilities.



*Please see the following web page for more information: http://www.nsk.com/investors/

# The Environment and NSK

## Conserving the Global Environment through Motion and Control Technology

NSK is contributing to the conservation of the global environment through its products. The fundamental characteristic of NSK's products is that they control and reduce friction. This helps NSK's customers make products that conserve energy and resources. And of course the NSK Group is also working to conserve energy and resources in its own manufacturing and distribution. This section of the Report describes the Group's environmental management system and the targets and successes of its environmental initiatives.

- Throughout this section, the following symbols are used to categorize initiatives.

**Development/ design** **Procurement**

**Manufacturing** **Distribution**

**Quantified the degree of environmental friendliness of products with NSK eco-efficiency indicators (Neco).**

p. 30

**Plants worked together efficiently to reduce $CO_2$ emissions.**

p. 38

**Revised *List of NSK Environmentally Harmful Substances*. Expanded green procurement worldwide and improved green procurement efforts.**

p. 45

# Eco-efficiency Indicators and Environmentally Friendly Products



## Eco-efficiency Indicators

The NSK Group's products contribute to energy savings and resource conservation as parts used in all kinds of products, equipment, and machinery: automobiles, home appliances, IT devices, iron and steel equipment, construction machinery, machine tools and production equipment used in factories, and much more. In recent years, demand for environmentally conscious products has been growing as awareness of environmental preservation increases.

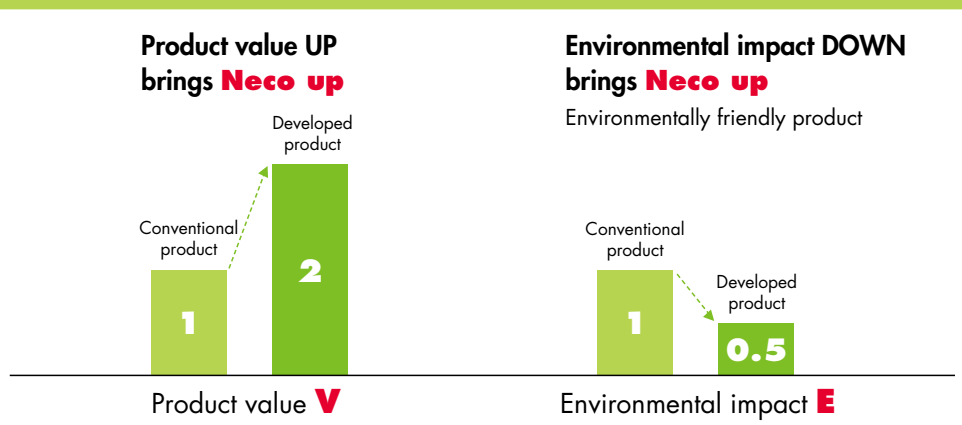
In fiscal 2008, the NSK Group established its own NSK Eco-efficiency Indicators (Neco) as a yardstick for quantitatively assessing the degree to which products developed by the Group contribute to the environment—i.e., their environmental friendliness.

As indicated below, Neco is a numerical value obtained by dividing a product's value, V, by its environmental impact, E. Product value is composed of items that should improve functional capabilities, such as the life of the product and the maximum rotational speed. Environmental impact is composed of items that should be minimized, such as a product's weight and its power consumption. The greater a product's Neco value, the more environmentally friendly it is.

NSK has also created a Neco calculation tool that enables NSK Group engineers to easily calculate the Neco value by inputting the E and V values for products in development, and for conventional products. Going forward, calculating the Neco value when developing new products will facilitate the development of environmentally friendly products. All members of the development division will benefit from a quantitative awareness of the environmental friendliness of new products.

### Neco: NSK Eco-efficiency Indicators

$$\text{Neco} = \frac{\text{Product value V (product life, functions)}}{\text{Environmental impact E (resource conservation, energy savings)}}$$



## New Standard of High-Performance HPS™ Angular Contact Ball Bearings for Industrial Machinery

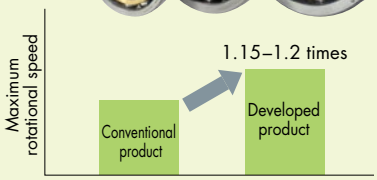
***Next Generation Bearings Contributing to Energy Conservation***

Bearings are used in a wide range of industrial machinery, including robots, pumps, compressors, and gearboxes. This machinery must be highly reliable under a wide range of conditions. It must be easy to maintain and highly efficient. It must have a low operating cost and low energy consumption. Finally, it must be environmentally friendly. Consequently, bearings used in industrial machinery must have a long service life, high-speed rotation capability, and high precision.

Leveraging optimal internal design, proprietary material technology, and precise processing and manufacturing technology, NSK doubled the service life of the conventional product. In addition, NSK achieved weight reductions of up to 30 percent compared to bearings with the same service life. Lastly, the maximum rotational speed was increased by 15–20 percent compared to conventional products.

NSK expects this product to contribute to resource conservation across a range of machinery and equipment.

**Neco = 1.57**




## A1 Series Grease-retaining, High-Speed, High-Load Ball Screws

***Contributing to Resource Conservation through Development of Advanced Seals***

Recently, demand for certain plastic parts has been shifting toward thinner walls and higher precision. This demand has been driven by efforts to develop smaller, more advanced cell phones, video games, and other products. The battery pack in a cell phone, for example, used to have a wall thickness of about 0.3 mm. This has been reduced to about 0.1 mm by using strengthened resin material and by significantly increasing the speed at which the resin is injected into a metal mold. Creating thinner walls enabled the battery volume to be increased, which meant battery life could be extended. The injection molding machines being used to make these kinds of advanced molded parts need the capability to finely control the speed and pressure at which resin is injected into the mold; they need easy-to-operate, high-speed, high-load-bearing ball screws for the feed mechanism rather than conventional hydraulic cylinders.

The NSK Group has developed a low-torque seal with advanced grease-sealing capacity for these kinds of ball screws. The seal prevents grease sprays contaminating the interior of the molding machines, and reduces leakage of enclosed grease by about a third, compared to the conventional product. Thus, these ball screws contribute to resource conservation by reducing the amount of grease refills required.

**Neco = 2.14**

## Low-Profile, MEGATORQUE MOTOR™ PN Series

***Contributing to Resource Conservation and Energy Savings through Low-Profile Motors***

The Megatorque Motor is used for positioning during processing and assembly, and for transporting products on the manufacturing line. As competition intensifies, there is an ever-increasing demand for efficiency and space saving, particularly in the case of manufacturing equipment for semiconductors, LCDs, solar batteries, and electronic components.

In response to this need, the NSK Group developed the PN Series Megatorque Motor. This product features a body that is up to 32 percent less in height and 22 percent lighter than the conventional product, and has 7 percent better operational efficiency. This results in reduced energy consumption. In addition, increased output torque shortens positioning time and reduces cycle time. The PN series is not only a solution to the need for high-speed transportation and positioning of large, heavy objects; it can also contribute to miniaturization and weight reduction of devices, better energy savings, and improved productivity. What is more, these environmentally friendly motors are compliant with the EU's RoHS Directive.

**Neco = 1.99**

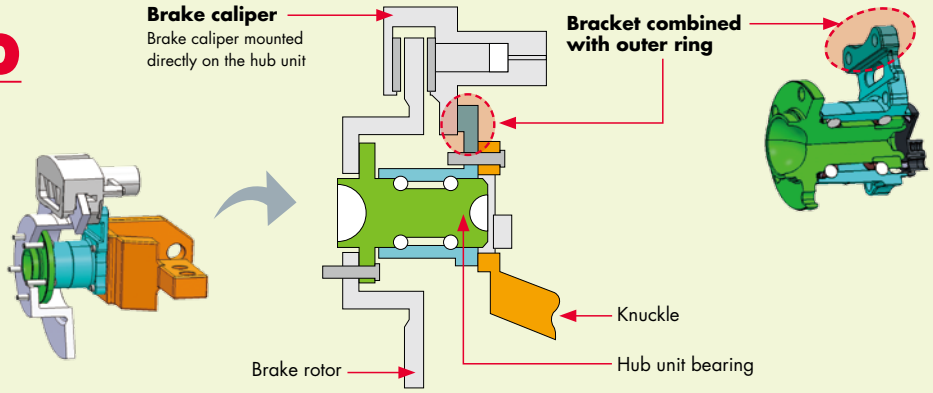
## Hub Unit Bearing Integrated with a Bracket for Brake Caliper Mounting

***Contributing to Weight Reduction, Resource Conservation, and Improved Reliability of Automobiles***

Hub unit bearings support automobile wheels and help ensure safety by enabling the wheels to turn smoothly when the vehicle is moving, and by supporting the load borne by the wheels from the road surface.

This product—developed by NSK—allows more modularization of the bearing and surrounding components. For example, the brake caliper, which is directly attached to an auto body component known as a knuckle, is changed to attach to the bracket set on the outer ring of the hub unit bearing. Although this slightly increases the weight of the bearing, it allows the overall surrounding components' weight to be reduced by about 5 percent of the bearing weight by eliminating the need for a bracket on the knuckle side. Moreover, the product allows an enhanced braking sensitivity by increasing both the precision of the brake component mounting and the rigidity of the brake system. The product has been praised by auto manufacturing customers for its increased ease of mounting onto the auto body.

**Neco = 3.70**



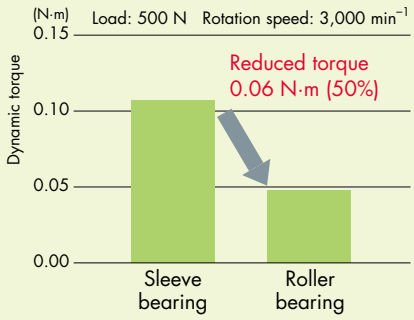

## World's Thinnest*1 Drawn-Cup Needle Roller Bearings with Seal Rings

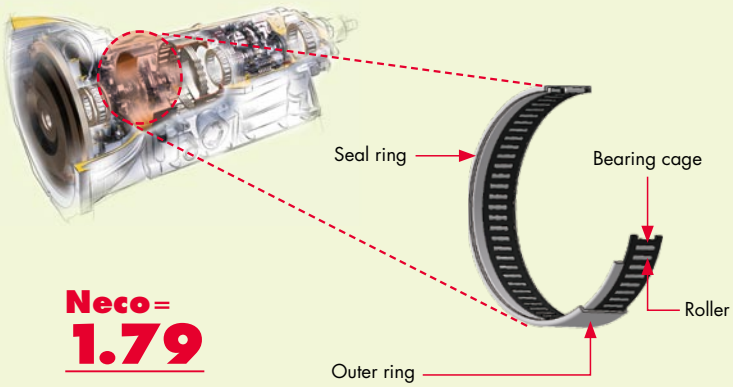
***Contributing to Automobile Energy Savings by Expanding Applicability***

Sleeve bearings called bushings are used to support rotating shafts, such as those in an automobile engine and transmission. There are, for example, about ten bushings in an automatic transmission. Drawn-cup needle roller bearings with seal rings support rotating shafts in the same way as bushings do, and also work to control the flow of lubricant.

Rotating torque (rotational resistance) can be reduced 50 percent by replacing bushings with drawn-cup needle roller bearings with seal rings. NSK's development of an extremely thin seal ring with a thickness of only 0.85 mm means that thin-walled bushings (bushings with a 1.5-mm cross section) that could not previously be replaced are now replaceable. In coming years, this product will help improve the fuel economy of automobiles.

*1: According to an NSK investigation in December 2008.




**Neco = 1.79**

## Compact, Lightweight Integrated Structure Motor and ECU Column-Type Electric Power Steering

***Contributing to Resource Conservation and the Downsizing of Automobiles***

For both large and small vehicles, electric power steering (EPS) have become popular the world over. This popularity is due to the superior fuel economy and the enhanced steering control EPS offer compared to conventional hydraulic power steering. In recent years, increasing environmental awareness in Japan, and in Europe, has stimulated demand for significantly smaller vehicles. Such vehicles are also popular because they are easier to park. In emerging markets, where demand for motorization is growing, the demand for small cars is also increasing rapidly.

NSK successfully developed the world's shortest,*2 lightest, and most compact high-output column-type EPS by employing a fully integrated mechatronics system. The motor, electronic circuitry, gearbox, and torque sensor are incorporated into a single unit. The EPS will continue to contribute to better fuel economy and to advances in the downsizing of vehicles.

*2: According to an NSK investigation in January 2009.

**Neco= 1.32**

## Voice

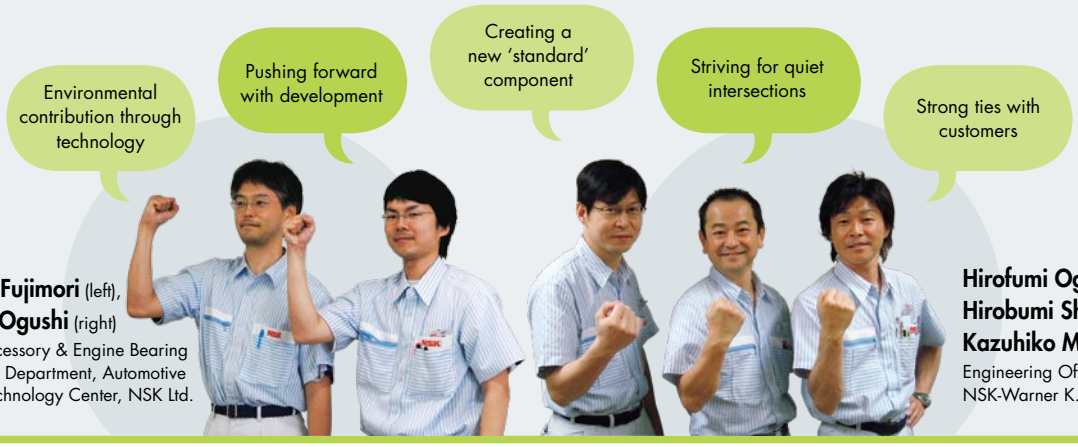
### One-way Clutch and Bearing for Permanently Engaged Geared Idle Stop System

Systems that stop the engine when idling at traffic lights are increasing as a means of improving a vehicle's fuel economy and reducing $CO_2$ emissions. We developed an idle stop system with the goal of eliminating the discomfort that can be felt when the engine stops and starts. The system has been installed in vehicles since the fall of 2008. An engine that stops and starts quietly and smoothly minimizes any discomfort felt by the driver and passengers. This requires a one-way clutch to automatically switch between starting and stopping, and a bearing that supports all the parts within a limited space. Mobilizing its engineering capabilities, the NSK Group eliminated the delays and abnormal noises that were a problem in conventional systems when the engine was started.

We will continue improving this system, and is determined to see it installed in as many vehicle types as possible.

**Neco= 4.39**


▲ One-way clutch and bearing imbedded in ring gear driven by the starter motor




**Daisuke Fujimori** (left), **Keisuke Ogushi** (right)
Electric Accessory & Engine Bearing Technology Department, Automotive Bearing Technology Center, NSK Ltd.

**Hirofumi Ogata** (left), **Hirobumi Shirataki** (center), **Kazuhiko Muramatsu** (right)
Engineering Office NO2, NSK-Warner K.K.

# Environmental Management



## Environmental Policy*1

The NSK Group adheres to the principle that global environmental protection, as outlined in the Group's mission statement, must be an ever-present concern in all business activities. The NSK Environmental Policy aims to protect the global environment by developing products that are environmentally friendly and to strive to produce these products with minimal impact on the environment. In addition, the Group has established an Environmental Code of Conduct that helps all employees and the whole organization to adhere to the NSK Environmental Policy by encouraging individual awareness.

## Progress of the Third Environmental Voluntary Action Plan

The NSK Group has been conducting activities in accord with its Third Environmental Voluntary Action Plan (Table 1), aiming to achieve targets set for fiscal 2010, and to realize the purpose of the NSK Environmental Policy. In fiscal 2008, the Group accomplished nearly all its goals for the year.

In the area of environmental management, the NSK Group put in place a system enabling highly effective management of chemical substances, including establishing a Product Chemical Management Committee at each plant and starting internal audits. In the development of environmentally friendly products, the Group established eco-efficiency indicators to quantitatively assess the environmental friendliness of products. Going forward, the Group will use these indicators to push the development of such products. In terms of global warming countermeasures, the Group worked aggressively on issues common to all plants with the aim of reducing $CO_2$ emissions. In the area of resource conservation and recycling, the Group maintained its zero emissions status and achieved its recycling rate goal. Regarding the reduction of environmentally harmful substances, the Group revised its *Green Procurement Standards* and *Chemical Substance Management List* and will continue expanding green procurement worldwide.

**Table 1: Third Environmental Voluntary Action Plan**
(Scope: NSK and Group Companies in and outside Japan, see page 1)

| Area | | Targets to be achieved by FY10 |
|---|---|---|
| Environmental management | In Japan | Maintain ISO 14001 certification |
| | | Improve environmental education |
| | | Establish management system for chemical substances in products |
| | | Observe laws and regulations |
| | | Maintain zero oil-leak accidents |
| | Outside Japan | Obtain ISO 14001 certification within three years of starting operations |
| | | Establish management system for chemical substances in products |
| | | Observe laws and regulations |
| | | Maintain zero oil-leak accidents |
| Eco-efficiency indicators and environmentally friendly products | In Japan | Create environmentally friendly products |
| Global warming countermeasures | In Japan | • Reduce $CO_2$ emissions per production unit (amount of $CO_2$ emissions per value-added production) by 1% annually from FY1999<br>• Reduce $CO_2$ emissions for FY2012 to a level below FY2006*4 (added) |
| | | Reduce energy consumed per production unit by 1% annually for distribution from FY2006 |
| | Outside Japan | Reduce $CO_2$ emissions per production unit by 1% annually since ISO 14001 certification obtained |
| Measures for resource conservation and recycling | In Japan | Efficiently utilize resources (added) |
| | | Maintain zero emissions (landfill disposal rate no more than 1%) |
| | | Maintain waste recycling rate of 98% or more |
| | | Promote switch to environmentally friendly packaging |
| | Outside Japan | Maintain waste recycling rate of 90% or more |
| Reducing use of environmentally harmful substances | In Japan | Reduce environmentally harmful substances |
| | | Promote green procurement and manage latest version of standards manual |
| | | Maintain applicable green product purchasing rate of 90% or more |
| | | Reduce purchased number of PRTR-designated products by 72% (base year: FY2000) (revised upward) |
| | | Reduce purchased number of machining fluids with chlorine-based additives by 97% (base year: FY2000) (revised upward) |
| | Outside Japan | Promote green procurement |
| | | Continue reducing use of machining fluids with chlorine-based additives |

*1: Please see the following web page for information about the NSK Environmental Policy and Environmental Code of Conduct: http://www.nsk.com/sustainability/envman.html

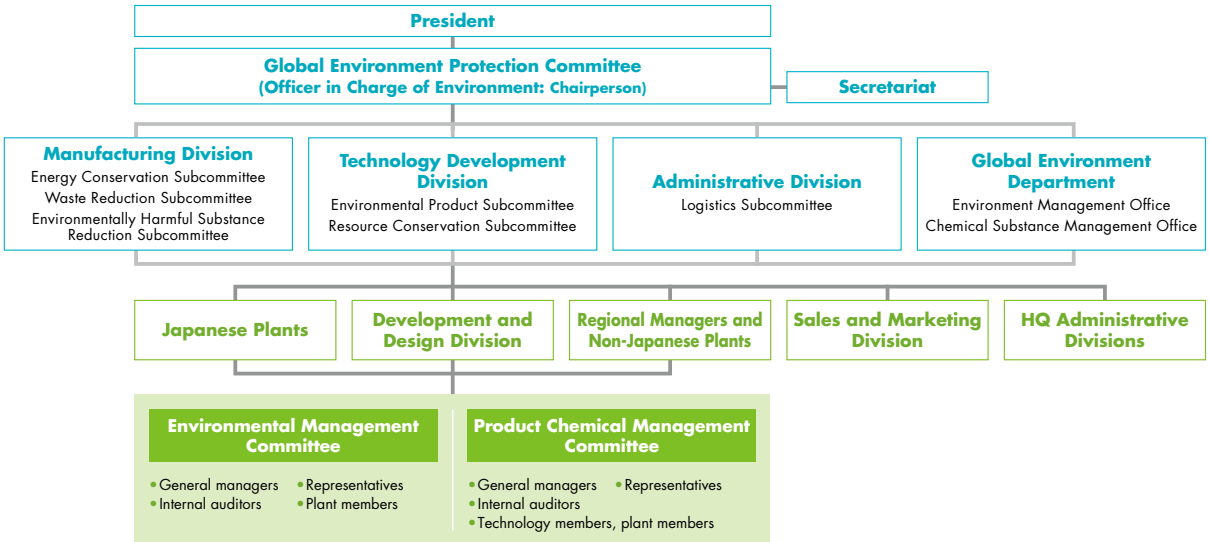
○: Achieved △: Partially achieved ×: Not achieved

| Targets to have been achieved by FY08 | Performance in FY08 | Evaluation | Targets to be achieved by FY09 |
|---|---|---|---|
| Maintain ISO 14001 certification for all sites | ISO 14001 certification maintained for all sites | ○ | Maintain ISO 14001 certification for all sites |
| • Continue providing education at NSK Manufacturing Education and Training Center<br>• Continue providing rank-based education | • Provided education at NSK Manufacturing Education and Training Center (6 sessions/50 people in total)<br>• Provided education to new employees (154 people)<br>• Provided rank-based education at plants (total of 18,142 people) | ○ | • Train internal auditors for management of chemicals in products (two or more auditors per plant)<br>• Continue providing rank-based education |
| Establish a product chemical substance committee | • Established product chemical substance committees at each plant<br>• Conducted internal audits regarding chemicals in products (five plants) | ○ | Conduct internal audits regarding chemicals in products and promote corrective actions (all plants) |
| • Observe laws and regulations<br>• Pre-register for REACH regulations*2 | • Zero legal violations<br>• Completed pre-registration for REACH regulations | ○ | Observe laws and regulations |
| Maintain zero oil-leak accidents | • Zero oil-leak accidents*3<br>• Discontinued use of three underground tanks<br>• Conducted 167 emergency drills assuming an oil-leak accident | ○*3 | Maintain zero oil-leak accidents |
| Obtain ISO 14001 certification at one site | Expanded certification to 31 sites with two new sites gaining certification | ○ | Obtain ISO 14001 at one new applicable site (32 sites in all) |
| Establish management system of chemical substances in products (China and ASEAN) | • Prepared an audit checklist for chemical substances in products (English version)<br>• Conducted self-audits regarding chemical substances in products (two plants) | △ | • Establish Product Chemical Management Committees at all plants<br>• Conduct self-audits regarding chemical substances in products (China and ASEAN) |
| • Observe laws and regulations<br>• Pre-register for REACH regulations*2 | • Zero legal violations<br>• Completed pre-registration for REACH regulations | ○ | Observe laws and regulations |
| Maintain zero oil-leak accidents | Zero oil-leak accidents | ○ | Maintain zero oil-leak accidents |
| • Create environmentally friendly products and conservation technologies<br>• Institute eco-efficiency indicator | • Created 14 environmentally friendly products and technologies<br>• Established NSK Eco-efficiency Indicators (Neco) | ○ | • Create environmentally friendly products and technologies<br>• Start using NSK Eco-efficiency Indicators (Neco)<br>• Evaluate $CO_2$ reductions of NSK products during use |
| Reduce $CO_2$ emissions per production unit by 8.6% (base year: FY1999) | • Reduced $CO_2$ emissions per production unit by 10.0% (base year: FY1999)<br>• Reduced $CO_2$ emissions by 12.7% (base year: FY2006)<br>• Implemented cross-plant theme-based improvement activities | ○ | • Reduce $CO_2$ emissions per production unit by 9.6% (base year: FY1999)<br>• Reduce $CO_2$ emissions to a level below FY2006 |
| Reduce energy consumed per production unit by 2% (base year: FY2006) | Reduced energy consumed per production unit by 3% (base year: FY2006) | ○ | Reduce energy consumed per production unit by 3% (base year: FY2006) |
| Ascertain data on energy consumption at 30 sites | Ascertained energy consumption at 30 sites | ○ | Ascertain data at 32 sites and draft goals and countermeasures |
| Eliminate wasted material | Eliminated waste in parts of the production processes for linear guides and EPS | ○ | Eliminate wasted material |
| Continue to maintain zero emissions | Achieved zero emissions with a landfill disposal rate of 0.8% | ○ | Continue to maintain zero emissions |
| Maintain waste recycling rate of 98% or more | Achieved a waste recycling rate of 98.8% | ○ | Maintain waste recycling rate of 98% or more |
| Reduce purchase of wood pallets by 30% (base year: FY2004) | • Reduced purchase of wood pallets by 34% (base year: FY2004)<br>• Started using returnable containers for shipments between Japan and China | ○ | Reduce purchase of wood pallets by 35% (base year: FY2004) |
| Ascertain data on amount of waste material at 30 sites | Ascertained amount of waste material at 30 sites | ○ | Ascertain data at 32 sites and draft goals and countermeasures |
| Gather 100% data on products for automobiles and electrical equipment | Obtained 100% data on products for automobiles and electrical equipment for main customers | ○ | Ascertain actual condition status of nine substances to be reduced |
| • Expand operation of green procurement management system. Enhance data of chemical composition<br>• Make the fifth revision of *NSK Group Green Procurement Standards*<br>• Implement green procurement for secondary materials | • Started using green procurement management system in all development and design departments. Enhanced data of chemical composition<br>• Made the fifth revision of *NSK Group Green Procurement Standards*<br>• Held green procurement seminars for 680 suppliers<br>• Started trial run of green procurement for secondary materials | ○ | • Expand operation of green procurement management system. Enhance data of chemical composition<br>• Conduct on-site audits at suppliers that are important to manage<br>• Revise *List of NSK Environmentally Harmful Substances* |
| Maintain the applicable green product purchasing rate of 90% or more | Achieved the applicable green product purchasing rate of 91% | ○ | Maintain the applicable green product purchasing rate of 90% or more |
| Reduce purchased number of PRTR-designated products by 69% (base year: FY2000) | Reduced purchased number of PRTR-designated products by 69% (base year: FY2000) | ○ | Reduce purchased number of PRTR-designated products by 70% (base year: FY2000) |
| Reduce purchased number of machining fluids with chlorine-based additives by 79% (base year: FY2000) | Reduced purchased number of machining fluids with chlorine-based additives by 91% | ○ | Reduce purchased number of machining fluids with chlorine-based additives by 94% (base year: FY2000) |
| • Introduce global version of green procurement management system<br>• Hold green procurement seminars (China and ASEAN) | • Introduced English version of the green procurement management system<br>• Completed English and Chinese versions of *NSK Group Green Procurement Standards*<br>• Held seminars on revised *NSK Group Green Procurement Standards* at all plants in China | △ | Start operation of green procurement management system (two plants in ASEAN) |
| Reduce purchased number of machining fluids with chlorine-based additives by 20% (base year: FY2006) | Reduced purchased number of machining fluids with chlorine-based additives by 20% (base year: FY2006) | ○ | Reduce purchased number of machining fluids with chlorine-based additives by 47% (base year: FY2006) |

*2: REACH is the new Regulation of the European Union (EU) on Registration, Evaluation, Authorization and Restriction of Chemicals. It came into force on June 1, 2007. See page 44 for details.
*3: Groundwater contamination was identified near the site boundary of the Shiga Works of Amatsuji Steel Ball Mfg. Co., Ltd., and countermeasures were taken. See page 47 for details.
*4: Complies with the calculation standards of the Nippon Keidanren (Japan Business Federation) Voluntary Action Plan on the Environment.

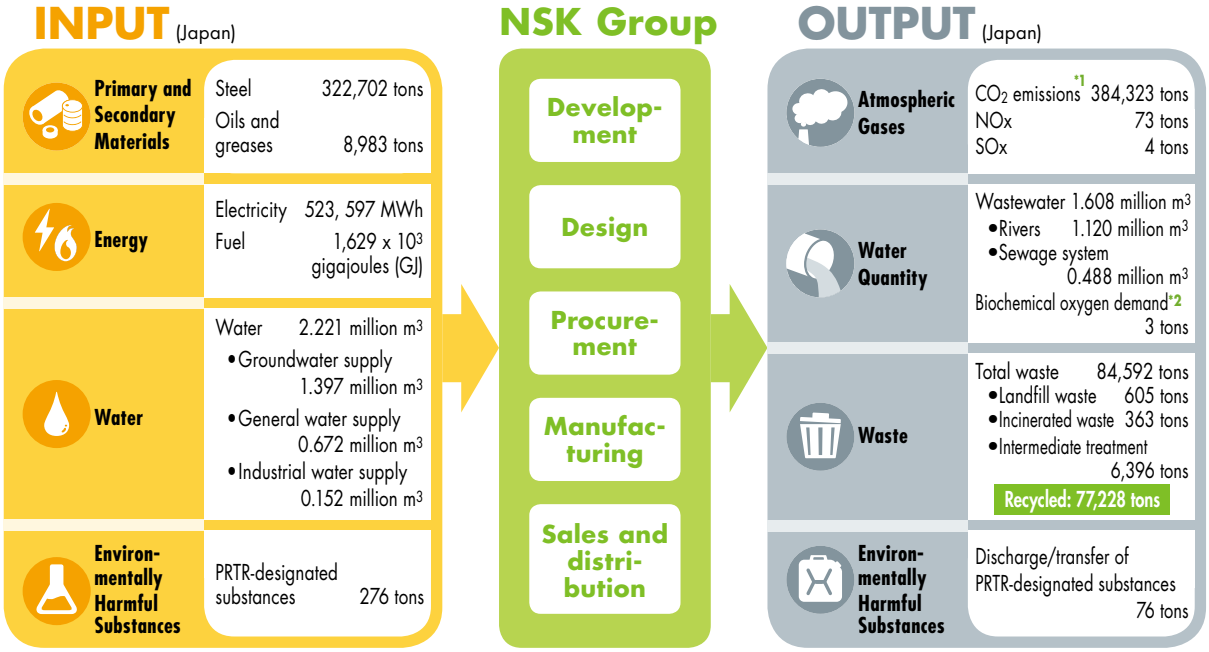
## NSK Group Environmental Structure

The Global Environment Protection Committee, which is the NSK Group's highest decision-making body for environmental issues and comprises NSK directors, administers the NSK Group's environmental management system. Actual environmental management duties are carried out chiefly by the Global Environment Department and several subcommittees. At each site, plant managers and officers at affiliates and subsidiaries advance environmental management, serving as general managers of environmental management and product chemical management.




## Input and Output of Business Activities

The NSK Group quantitatively monitors its input of resources and energy into business activities and its output of $CO_2$ emissions and waste in order to continuously reduce its environmental impact and contribute to the protection of the global environment.




*1: Amount of $CO_2$ emissions is calculated according to the Law Concerning the Promotion of Measures to Cope with Global Warming.
*2: River discharge.

## Compliance and Environmental Risk Control

### Environmental Risk Auditing

Each site undergoes internal auditing based on ISO 14001—the international standard for environmental management systems—and external auditing by external certification organizations. Furthermore, the Global Environment Department carries out regular environmental risk audits and attempts to reduce environmental risks by taking necessary countermeasures.

In fiscal 2008, NSK revised its Environmental Risk Auditing Check Sheet. The entire NSK Group is striving to reduce risks by conducting detailed audits based on this check sheet.

### Checking Oil Leak Prevention Measures

Tanks and pipes buried underground cannot be seen directly to make sure there are no leaks. Accordingly, regular air-tightness testing is performed to prevent accidents: a leak immediately contaminates the soil and groundwater with oil. No problems were detected at the 57 facilities tested in fiscal 2008. In an effort to eliminate underground tanks and buried pipes, the use of three such facilities was discontinued in fiscal 2008. Tanks that are difficult to move into basements or above ground are being upgraded, one by one, to tanks with a double hull structure.

Photo 1: Upgrade to a double hull structure for an underground tank

## Environmental Education

In order to further strengthen environmental protection initiatives and increase their effectiveness, the most important tasks are raising the awareness of every single employee and implementing measures based on sound knowledge.

The NSK Group undertakes awareness-raising activities by providing information on its environmental initiatives on the NSK website and in newsletters for employees and their families.

The Group also provides environmental training at every rank of the organization, from new employees to management executives (Table 2). The goal is to provide employees and directors with environment-related information and to equip them with the knowledge and skills they need for their individual positions and roles.

Table 2: **Number of Environmental Education Courses and Participants in Fiscal 2008**

| Training course type | Number of participants | Number of sessions |
|---|---|---|
| Compliance with environmental laws and regulations | 864 | 60 |
| Raising environmental awareness | 16,218 | 177 |
| Acquisition of environmental qualifications | 123 | 38 |
| Environmentally friendly design, green purchasing and procurement | 937 | 27 |

**NSK Action**

### Environmental Risk Reduced by Eliminating All Underground Tanks

The Maebashi Plant of NSK Precision Co., Ltd., decided to gradually eliminate five underground tanks as a countermeasure to prevent leaks. First, we switched the buried pipes to above-ground piping to enable visual inspections. Next, we eliminated the underground tanks by switching from kerosene to municipal gas. In future, we will continue to steadily make improvements that reduce risks and make the plant more environmentally friendly.

**Eisuke Yanagida**
Risk Management Team, Maebashi Plant, NSK Precision Co., Ltd.

*Please see the following web page for information about the status of ISO 14001 certification, environmental accounting, and the results of measurements of air and water pollutants at each plant: http://www.nsk.com/sustainability/reports.html

# Global Warming Countermeasures

The NSK Group is determined to help slow the pace of global warming by advancing the efficient use of energy and conversion to low-$CO_2$-emission clean energy*1.

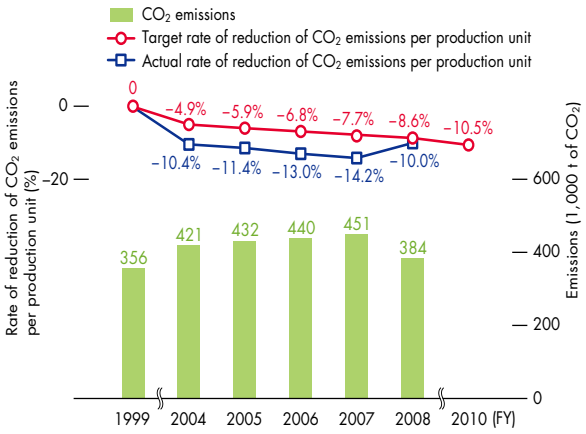
## Initiatives at Plants

In the past, the NSK Group set goals for reducing $CO_2$ emissions per production unit.*2 However, since fiscal 2008, the Group's goal has been to reduce gross $CO_2$ emissions. It set the target of reducing $CO_2$ emissions for fiscal 2012 to no more than the level in fiscal 2006,*3 and began stepping up its efforts. For example, in March 2008 the Group launched working groups consisting of members from each plant in Japan to consider countermeasures for important energy-use issues shared by these plants.

### Results in Fiscal 2008

At plants in Japan, $CO_2$ emissions for fiscal 2008 fell by 67,000 tons from the level in fiscal 2007 to 384,000 tons. However, production also decreased due to the economic downturn. Even so, this drop was on a scale exceeding the forecast production output, and so $CO_2$ emissions per production unit ended up increasing. Specifically, $CO_2$ emissions per production unit increased by 4.2 points to –10.0 percent compared to fiscal 1999, but the overall target of an 8.6 percent reduction was still met (Figure 1).

**Figure 1: $CO_2$ Emissions per Production Unit and Total in Japan**




*1: See pages 30-33 for information about products' energy-saving measures.
*2: $CO_2$ emissions per production unit are defined as the amount of $CO_2$ emissions per value-added production unit. $CO_2$ emissions are estimated based on the coefficients provided by the Japanese Ministry of the Environment.
*3: $CO_2$ emissions conform to the baseline indicated in the Nippon Keidanren's (Japan Business Federation) Voluntary Action Plan on the Environment.

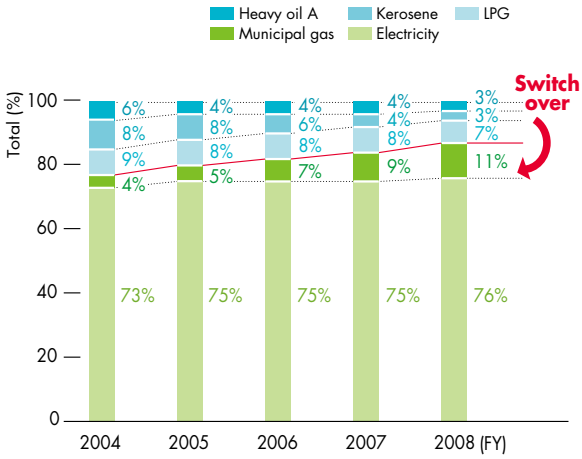
At plants outside Japan, $CO_2$ emissions were 370,000 tons, a decrease of 42,000 tons from fiscal 2007.

The aim of the Group's working group activities was to save energy and lower costs by first assessing the progress of initiatives at each plant, and then upgrading machinery and revising management methods. As described below, the five working groups launched in fiscal 2008 produced excellent results.

In fiscal 2009, the working groups will review the current issues, address new issues, and continue their activities.

Conversion to clean energy is another important step for reducing $CO_2$ emissions. Accordingly, the NSK Group is switching its energy sources from heavy oil and kerosene to electricity and municipal gas.

**Figure 2: Switch over to Clean Energy in Japan**




Note: The share by type of energy source is calculated based on the energy input (calorific value). In fiscal 2008, the gross energy input was 6,739 TJ.

### Working Group Activity for Compressors

The compressors that supply compressed air*4 to the manufacturing process account for a large portion of the NSK Group's electrical power consumption—some 10–30 percent. The Compressors Working Group is therefore trying to reduce power consumption by making waste-less, efficient compressor systems. This includes installing devices to automatically control the number of running compressors according to the usage of compressed air, which changes with the production situation. The Group is introducing compressors with attached inverters that can control the supply of compressed air without waste. It is also

*4: High-pressure compressed air is used mainly as energy to run machinery.





*Please see the following web page for data on $CO_2$ emissions: http://www.nsk.com/sustainability/dataco2.html

trying to cut energy consumption by reducing pressure loss in the pipes between the compressors and the machine tools, and by lowering the pressure setting of the outgoing compressed air.

Photo 1: Compressor Working Group in the field

## Working Group Activity for Air-Conditioning Systems

The goal of the Air-Conditioning Systems Working Group is to reduce energy use by selecting better systems when replacing plant air-conditioning systems, and running them efficiently. The working group has identified the items that should be assessed when selecting air-conditioning systems in order to obtain the most appropriate equipment. Specifically, it is now possible to select superior equipment by theoretically estimating the required heating and cooling capacity, and then comparing and evaluating a variety of systems. In the future, the NSK Group will form councils consisting of specialists from each plant to evaluate new systems when upgrading.

Photo 2: High-efficiency heat pump chiller unit installed through the efforts of the Air-Conditioning Systems Working Group

## Working Group Activity for Water Supply Pumps and Ventilation Fans

The goal of the Water Supply Pumps and Ventilation Fans Working Group is to reduce the power consumption of the ventilation fans and pumps that send cooling water to plants.

First, the working group identified the location and ascertained the operating conditions of water supply pumps and ventilation fans at all NSK Group plants. Next, it determined the feasibility of restraining their rotation frequency based on their use and operating conditions and calculated the energy-saving effect of doing so. The Group drafted plans for each plant to install inverters that control the rotation of motors and in the process prepared the *NSK Guidelines of Inverter Installation for Water Pumps and Fans*. These guidelines clarify the criteria for installing inverters.

Photo 3: Water Supply Pumps and Ventilation Fans Working Group in the field

**NSK Action**

### Shooting for Greater Energy Savings by Constantly Monitoring Power Use

Electrical power accounts for approximately 85 percent of $CO_2$ emissions at the Ohtsu Plant. Therefore, the plant must reduce its electrical power consumption in order to reduce $CO_2$ emissions. One measure we are taking is the use of a continuous power monitoring system, installed in 2008. By measuring power consumption at the plant in real time, we can take steps to reduce unnecessary power use, which in turn reduces $CO_2$ emissions.

**Yoshikazu Nakagawa**
Production Engineering Department, Ohtsu Plant

## Working Group Activity for Hydraulic Oil Power Units

The goal of the Hydraulic Oil Power Units Working Group is to reduce electrical power consumption by replacing the hydraulic oil power units needed to run machine tools with energy-saving models.

Significant energy savings can be realized by using hydraulic oil powered units equipped with an inverter, which enables the motor's rotation to be controlled in step with the running of the machine. The working group has thus far surveyed each plant and identified which pieces of equipment can be replaced with an energy-saving model. The switchovers will be made systematically, while ensuring that there are no ill-effects on product quality and processing efficiency.

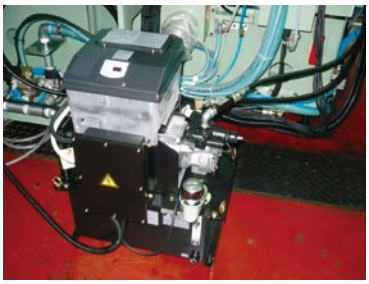


Photo 4: An energy-saving hydraulic oil power unit installed through the working group's efforts

## Working Group Activity for Lighting

The goal of the Lighting Working Group is to reduce electrical power consumption by improving the efficiency of lighting devices and reconsidering the brightness levels inside plants.

The efficiency of lighting devices can be improved by replacing bulbs with Hf fluorescent lights, which cut energy use by 20 percent, while producing the same brightness as standard bulbs. A survey of plants found that the existing models and suppliers of lighting devices were different for each plant. From now on, the NSK Group will select efficient models and systematically replace old ones.

In the past, only a minimum brightness level was established for building interiors; wasteful power consumption can be reduced by adding a maximum brightness standard, and reconsidering the settings for appropriate brightness. In the future, the NSK Group will make further its energy savings by reflecting maximum and minimum standards in its internal rules.

Before upgrade → After upgrade

Photo 5: Thinned out ceiling area lighting

## Energy-saving Efforts at the Kunshan Plant

Kunshan NSK Co., Ltd., in China is working to reduce electrical power consumption in a number of ways, including installing compressors that can control power output with inverters and improving the efficiency of lighting devices. As a result, the company reduced its fiscal 2008 $CO_2$ emissions by 910 tons compared to fiscal 2007.

Photo 6: Compressor at Kunshan NSK

## Energy-saving Efforts at NSK Precision America

NSK Precision America, Inc. has reduced the energy use of its boiler. The plant must control the interior temperature in order to manufacture precision products. It reduced its use of natural gas by converting its air-conditioning boiler and optimizing the boiler's combustion efficiency. In fiscal 2008, it reduced its $CO_2$ emissions by 40 tons compared to fiscal 2007.

Before upgrade → After upgrade

Photo 7: Converted air-conditioning boiler at NSK Precision America

## Initiatives in Distribution

The NSK Group is changing its modes of transportation and improving transportation efficiency in an effort to reduce the environmental impact of its logistics.

In cooperation with NSK Logistics Co., Ltd., which oversees the Group's logistics, the NSK Group is striving to reduce $CO_2$ emissions by improving transportation and load efficiency of parts and products transported within and outside Japan, and by switching to modes of transportation that have a lower impact on the environment. These initiatives resulted in $CO_2$ emissions falling to 17,000 tons in fiscal 2008, and a 3 percent reduction in the energy consumed per production unit compared to fiscal 2006.

### Shifting to Efficient Modes of Transportation

The NSK Group is implementing a modal shift—i.e., a shift away from trucks, to trains and ships, which generate fewer $CO_2$ emissions (Figure 3)—while adjusting for transportation lead times and costs.

In fiscal 2007, NSK began transporting products to customers in Kyushu, Japan, by car ferry, rather than by truck. In fiscal 2008, it expanded this effort and switched more shipments over to car ferries. To do so, it opened warehouses in Kyushu in order to make effective use of the limited service on car ferries. As a result, the Group reduced its annual $CO_2$ emissions by 425 tons.

The NSK Group also revised the configuration of the pallets used for transporting products. Increasing the carrying capacity of a pallet from 15 to 35 products reduced annual $CO_2$ emissions by 220 tons.

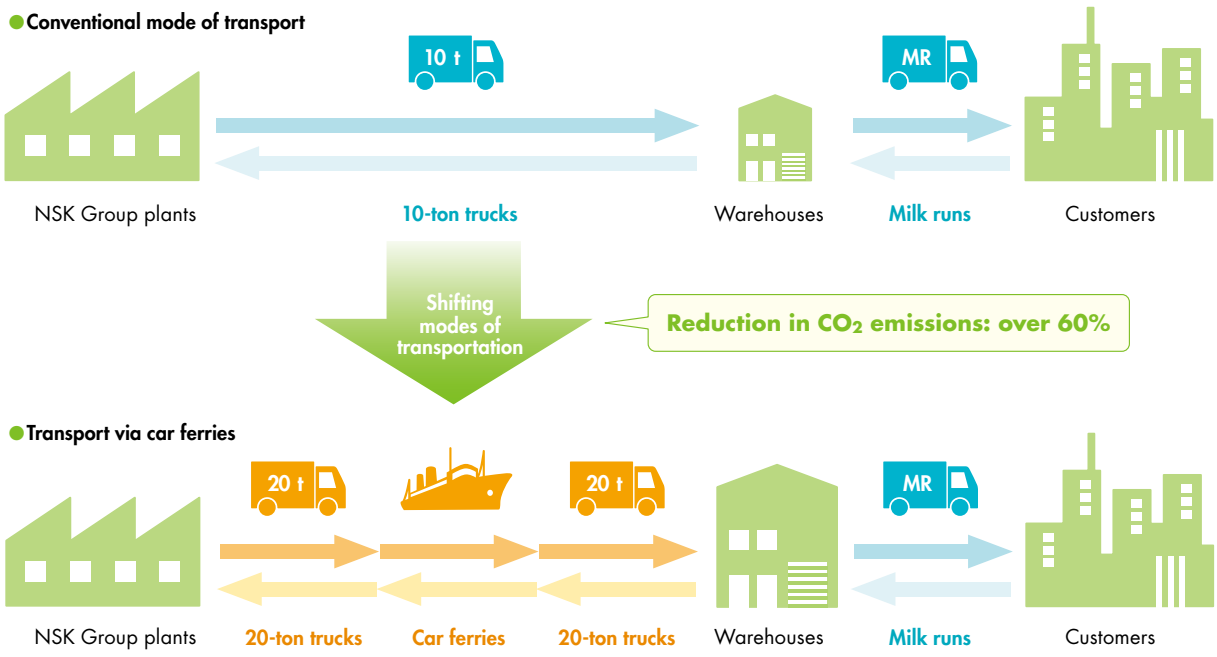
### Promotion of Joint Transportation

The NSK Group is contributing to the reduction of $CO_2$ emissions by improving logistical efficiency through "joint transportation": combining the transport of products and parts on one trip. The Group is introducing "milk runs"*5 making rounds to pick up cargo from several suppliers in a particular region. It also makes efficient use of vehicles on the return journey after delivering products to customers, making more intensive use of vehicles and carrying loads more efficiently.

By fiscal 2008, about 30 percent (178 companies) of Group-wide suppliers were part of the joint transportation system.

*5: A transportation method that resembles a milk-delivery and bottle collection route. A transport vehicle operates a circular delivery route, including multiple destinations, bringing procured items back to the company. This reduces driving distances and the number of runs.

Figure 3: **Reducing $CO_2$ Emissions by Shifting Modes of Transportation**



# Measures for Resource Conservation and Recycling

The NSK Group is working on reducing, reusing, and recycling (the 3Rs), aiming to achieve "zero emissions," which means reducing its landfill disposal to as close to zero as possible. Since November 2007, the newly launched Resource Conservation Subcommittee has taken the lead in strengthening the Group's efforts toward more resource-efficient manufacturing. This is achieved by enhancing cooperation between the plants and the technology development divisions.

## Initiatives at Plants

### Fiscal 2008 Results

The NSK Group defines zero emissions as having a "landfill disposal rate of no more than one percent" and is working aggressively toward maintaining this goal level.

In fiscal 2008, the NSK Group again maintained zero emissions at plants in Japan, with a landfill disposal rate of 0.8 percent. Total waste generated by its plants in Japan was 84,592 tons. With a recycling rate of 98.8 percent, the Group also achieved its recycling rate target*1 of at least 98 percent (Figures 1 and 2). Plants outside Japan emitted a total of 56,366 tons of waste and achieved a recycling rate of 89.0 percent.

Since fiscal 2008, the NSK Group has used the following equation to calculate its recycling rate and landfill disposal rate. Wastewater that is treated is subtracted from the total amount of wastewater generated. The wastewater is treated by environmentally friendly methods that meet environmental criteria from water treatment facilities of business partners to which the NSK Group commissions. This method of calculation yields an index with a clearer link between the NSK Group's recycling initiatives and its performance. This formula was also applied to the Group's past performance, as shown in Figure 1.

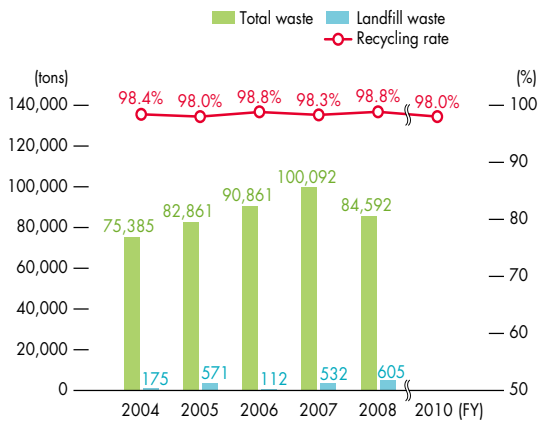
**Recycling rate =**

$$\frac{\text{Recycled amount}}{\text{(Total waste – reduction by water treatment)}} \times 100$$

**Landfill disposal rate =**

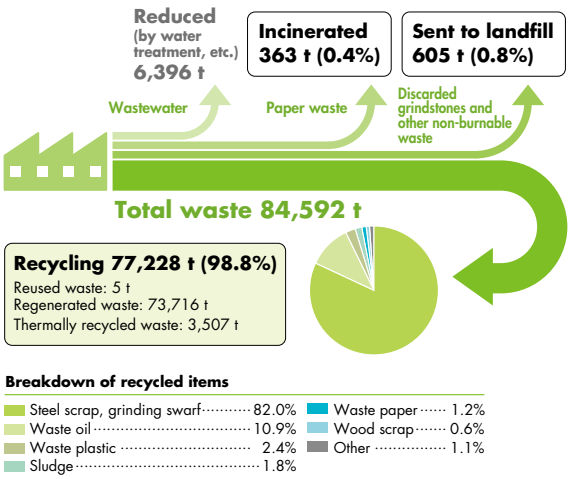
$$\frac{\text{Landfill disposal amount}}{\text{(Total waste – reduction by water treatment)}} \times 100$$

**Figure 1: Volume of Landfill Waste and Recycling Rates in Japan**




*1: Due to the change in the formula for calculating the recycling rate, the target for fiscal 2010 was changed from *achieving* a recycling rate of at least 98 percent to *maintaining* a recycling rate of at least 98 percent.

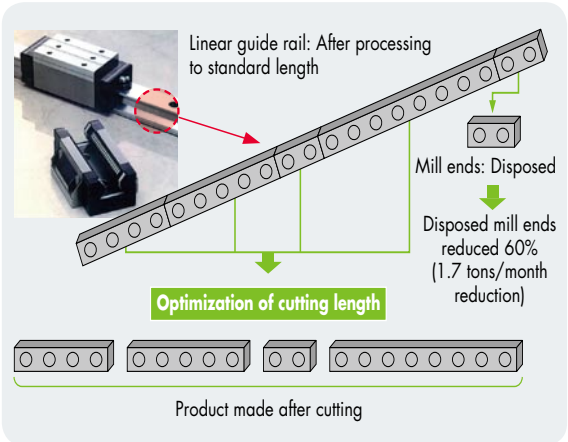
**Figure 2: Waste Treatment Flow in Japan**




### Reducing Waste from Linear Guide Rails

Before assembly and shipment of linear guides used in machine tools, long linear guide rails are cut to the sizes specified by the customer. NSK has

**Figure 3: Reduced Steel Waste from Linear Guides**

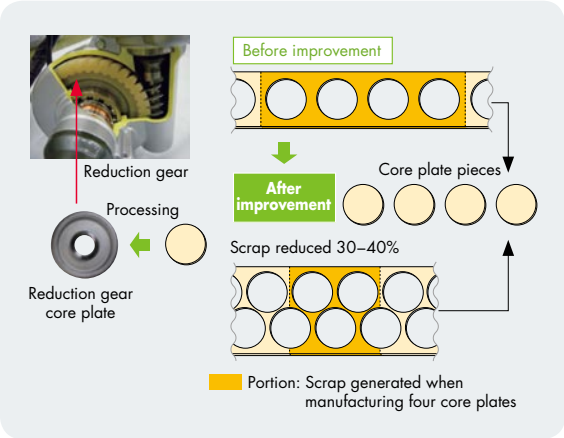


optimized the calculation software that determines the combination of lengths to be cut in order to avoid generating mill ends—i.e., scrap left after cutting. Through this effort, NSK reduced the amount of disposed mill ends by 60 percent (Figure 3).

## Reducing Waste from Materials for Electric Power Steering Parts

A part called a core plate is incorporated into the plastic gear used in the reduction gear in electric power steering (EPS) to strengthen the section that fixes the central shaft in place. The core plate is produced using a press to punch out round pieces from sheet steel. Previously, the round pieces of metal were punched out from the steel material in a single line. By changing this to a double line, NSK reduced the waste portion by 30–40 percent.

**Figure 4: Reduced Steel Waste from Electric Power Steering Parts**




## Better Cooperation with Partners

In addition to efforts undertaken at plants within the NSK Group, it is important that both the Group and partners that undertake waste treatment cooperate more closely so that all parties strengthen their management initiatives.

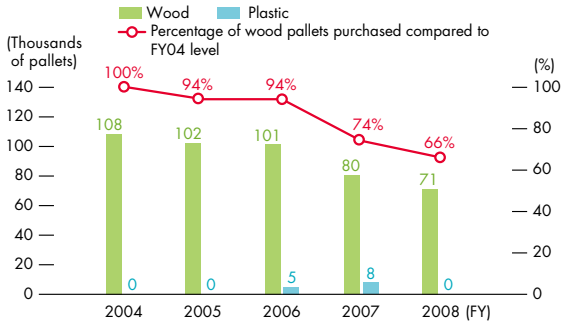
The NSK Group has been introducing training on waste treatment management systems since fiscal 2006. In fiscal 2007, the Group compiled a manual for check points when inspecting partners' initiatives on-site and held study sessions to ensure that all persons in charge can make assessments on the same basis. In fiscal 2008, NSK started using the manual and has been providing feedback from the results to partners so that they can make improvements.

Photo 1: On-site inspection at Kashima Senko Co., Ltd.

## Initiatives in Distribution

The NSK Group previously used cardboard boxes for international transportation between Japan and China. The Group reduced the amount of cardboard used by switching to plastic boxes that can be used repeatedly. It has also reduced its purchase of wood pallets on which boxes are loaded for shipping by switching to highly durable plastic pallets, achieving a reduction of 34 percent in fiscal 2008 compared to fiscal 2004.

**Figure 5: Changes in the Number of Pallets Purchased**




**NSK Action**

### Working Fast to Address Waste Management Problems

I have been involved in waste management for 18 years. Early on, incineration and landfill were commonplace and the recycling rate was low. We had a difficult time coordinating with reliable treatment companies to promote recycling. Waste management is complex, and new problems become apparent almost every year. I will continue studying every day and address these issues promptly so that we do not fall behind the curve.

**Mitsuru Katou**
Administration Section, Soja Plant, NSK Steering Systems, Co., Ltd.

*Please see the following web page for data on waste for different plants: http://www.nsk.com/sustainability/datadust.html

# Reducing Use of Environmentally Harmful Substances

## Strengthening Management of Environmentally Harmful Substances

The NSK Group is working to minimize the impact that chemical substances it uses have on the environment. At the same time, it is striving to create products that use no environmentally harmful substances, in order to conform to laws and regulations in and outside Japan, as well as to its customers' voluntary standards.

For this reason, it is important that the NSK Group shares information Group-wide, both in and outside Japan, and works to step up its initiatives. Accordingly, the Chemical Substance Management Office's staff visit each region and hold seminars for the relevant personnel in charge. In fiscal 2008, the staff held a seminar for members at plants in China.

### Complying with the REACH Regulation*1

In June 2007, the REACH Regulation came into effect in the European Union (EU), strengthening the regulation of chemical substances. The REACH Regulation requires companies manufacturing or importing chemical substances into the EU in quantities of one ton or more per year to register these substances with the European Chemicals Agency and to conduct assessments to ensure the safety of people and ecosystems. The period from June to December 2008 was specified as a pre-registration*2 application period.

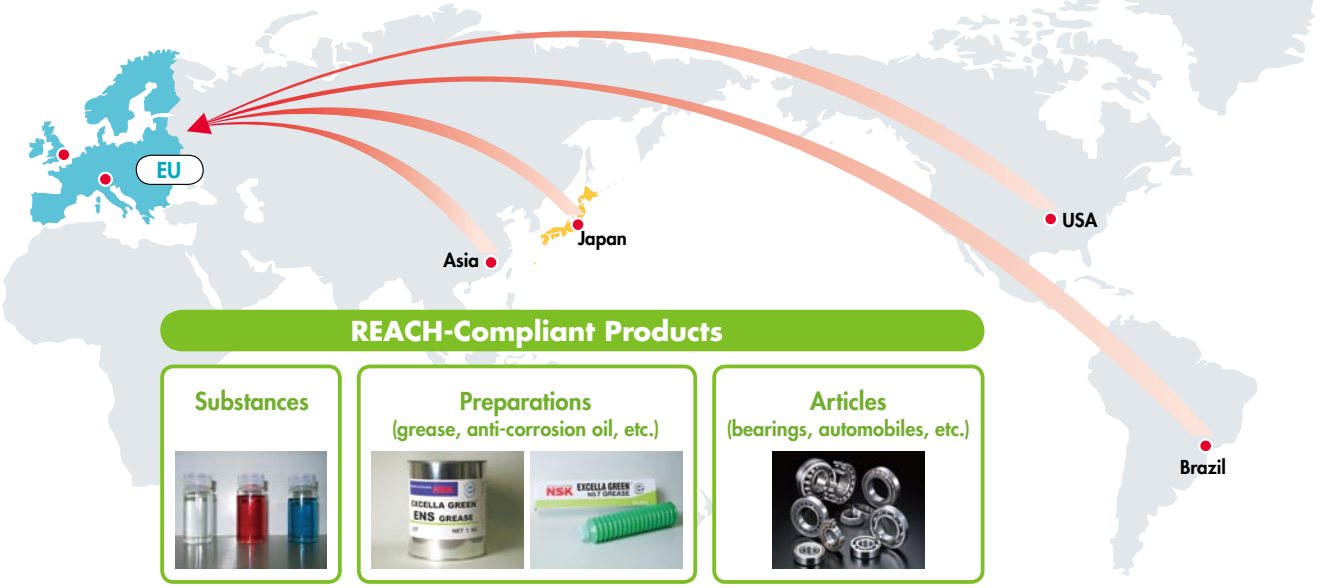
In order to conform to this regulation, the NSK Group identified greases, anti-corrosion oils, and other chemical substances that it imports to production sites within the EU. It then requested that producers of chemical substances that the Group imports in quantities of 500 kg or more per year pre-register, and followed up by confirming that registrations had been completed.

## Chemical Substances Management System

The NSK Group has had a Chemical Substances Management System in place since fiscal 2006 to ensure reliable management of chemical substances. The system allows the relevant personnel in charge in each department to check at any time information such as whether or not environmentally harmful substances are included in NSK's products, which substances, and in what amounts.

NSK started by introducing the system in Japan, and is now expanding its scope to include products

Figure 1: The NSK Group's Manufacturing Sites and REACH-Compliant Products




*1: Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) Regulation: A newly promulgated system regarding the registration, evaluation, authorization, and restriction of chemicals in the EU.

*2: Pre-registration: Companies manufacturing or importing chemical substances into the EU in quantities of one ton or more per year must register information about these substances with an EU public agency. A certain extension until registration must be completed is granted by pre-registering.

manufactured at plants outside Japan. Accordingly, in fiscal 2008 the system was localized in English and data from two plants—one each in Thailand and Indonesia—were registered in the system.

The NSK Group will continue expanding the scope of the system and develop it into a Group-wide global chemical substances management system.

## Initiatives in Development and Design

The NSK Group appropriately manages approximately 3,000 chemical substances by assigning each one a control rank from among the Group's own ranking of environmentally harmful substances (prohibited substances, reduced substances, and observation substances). Specifically, prohibited substances are not used in products. When reduced substances must be used in a product due to necessity, the designers formulate and implement a reduction plan. When observation substances are used, designers are required to consider switching to alternative substances. In fiscal 2008, the Chemical Substance Management Office held seminars for development and design divisions to ensure chemical substances are managed reliably.

## Initiatives in Procurement

In addition to efforts within the NSK Group to manage environmentally harmful substances, cooperation with suppliers is essential to comply with laws and regulations relating to chemical substances. The NSK Group requires suppliers to comply with the *NSK Group Green Procurement Standards*.

Moreover, before the NSK Group enters into a trade agreement with a new supplier, it evaluates the supplier's environmental initiatives and the environmental friendliness of supplied products, and judges the propriety of dealing with that supplier.

### Requirements to suppliers

(1) No products which contain or come attached with NSK prohibited substances shall be supplied.
(2) A set of documents shall be submitted without delay (letters of consent, etc.).
(3) An environmental management system (EMS) shall be established.
(4) An assurance program for managing environmentally harmful substances shall be established.
(5) Suppliers shall be registered with and use the NSK Green Procurement System.

### Revised *Green Procurement Standards*

In fiscal 2008, NSK revised and prepared the fifth editions of the *NSK Group Green Procurement Standards* and the *List of NSK Environmentally Harmful Substances* in order to comply with customers' requests and chemical substance regulations in and outside Japan. In addition to the Japanese edition, English and Chinese editions of the *NSK Group Green Procurement Standards* have been prepared for suppliers outside Japan. The Group plans to make Thai and Polish editions next.

### Green Procurement Seminars

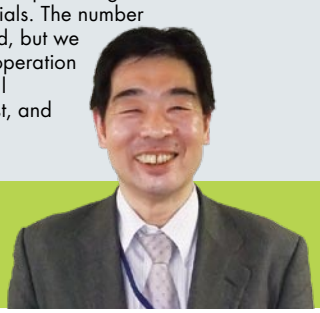
The NSK Group holds seminars to give suppliers a deeper understanding of the NSK Group's green procurement activities. In fiscal 2008, 680 suppliers attended six seminars held at five venues in Japan. The Group plans to give a round of seminars at plants in China and ASEAN.

Photo 1: Green Procurement Seminar

**NSK Action 1**

### Green Procurement Aimed at Zero Environmental Impact from Products and Manufacturing

I'm working on the management of the entire green procurement effort. Environmentally harmful substances are contained in ancillary materials used in the manufacturing process besides product materials. In fiscal 2008, we expanded green procurement to include these ancillary materials. The number of suppliers attending seminars has increased, but we are still only halfway there. By furthering cooperation with suppliers, we will improve environmental friendliness and achieve a QCD (quality, cost, and delivery standard) that satisfies customers.



**Toru Kumagai**
Chemical Substance Management Office,
Global Environment Department, NSK Ltd.

*Please see the following web page for information on the *NSK Group Green Procurement Standards*:
http://www.nsk.com/sustainability/greenps.html

## Initiatives in Plants

Besides prohibiting certain environmentally harmful substances from being contained in or included with products, the NSK Group has established voluntary rules for reducing environmentally harmful substances handled in the manufacturing process.

These rules designate chlorine additives (medium- and long-chain chlorinated paraffins) in machining fluid used when processing metal parts as substances to be reduced. Each site is taking action toward the goal of completely discontinuing their use by December 2011. The NSK Group is also striving to discontinue use of anti-corrosive oils and cleaning agents containing 2-aminoethanol, 1,3,5-trimethylbenzene, and other PRTR-designated substances*3 by replacing them with alternatives.

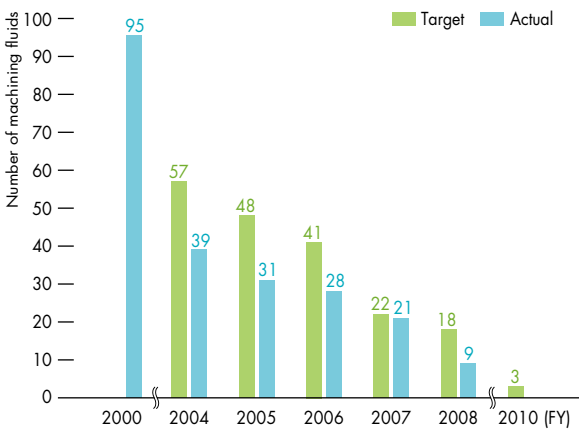
*3: The Pollutant Release and Transfer Register Law, a law to facilitate improved environmental management by determining the amount of chemical substances emitted into the environment.

### Reducing Machining Fluids Containing Chlorine Additives

It has been pointed out that machining fluids containing chlorine additives may release dioxins if these fluids are incinerated after use. For this reason, the NSK Group is working to completely discontinue their use.

Finding alternative substitutes for the machining fluids used in press work for automobile parts and other processes with harsh machining conditions has been difficult. In response, the NSK Group established a working group in fiscal 2007 that has collaborated with the Manufacturing Engineering Center and the Group's plants to strengthen initiatives in this area. Led by members from plants, the working group selected alternatives with the cooperation of machining fluid manufacturers. Meanwhile, the Manufacturing Engineering Center made a computer analysis of the metallic molds used in press work and reconsidered their configurations. These efforts resulted in the discontinuation of 12 varieties, or 60 percent, of the subject machining fluids. This leaves nine varieties that are technologically difficult to replace with alternatives. NSK will continue strengthening its efforts in order to completely discontinue the use of these remaining machining fluids by December 2011 (Figure 2).

**Figure 2: Change in the Number of Machining Fluids Containing Chlorine Additives in Japan**




### Reducing Emissions of Volatile Organic Compounds (VOCs)

The Clarinda Plant in the United States used to use a low viscosity mineral oil to clean bearings. However, the VOCs contained in the oil were a potential source of air pollution if they evaporated. Accordingly, the plant worked with a washing fluid manufacturer from 2005 to systematically replace the oil with an alternative cleaning agent. The changeover was completed in March 2009. As a result, the concentration of VOCs contained in gas emitted from the plant cleared the standards established by state law even without using treatment equipment.

### Reducing Air and Water Pollutants

The NSK Group thoroughly complies with environmental laws as well as local regulations in force where its plants are located. Furthermore, the NSK Group has set its own voluntary environmental standards that are even stricter than government laws and regulations. The Group is also striving to reduce air and water pollutants by continuously maintaining good conditions through the monitoring and regular maintenance of boilers and wastewater treatment facilities.

### Reducing the Number of Oils Containing PRTR-Designated Substances

In fiscal 2008, xylene and toluene accounted for most (64 percent) of the PRTR-designated substances used by the NSK Group. Much of this use was due to these two chemical substances being contained in the kerosene used as fuel for air-conditioning and in the gasoline used to fuel forklifts. Accordingly, the Group is systematically switching to electric powered forklifts and switching from kerosene to natural gas when updating air-conditioning equipment. These initiatives also help to reduce $CO_2$ emissions as well as PRTR-designated substances.

In addition, the NSK Group has switched over to anti-corrosion oils that do not contain

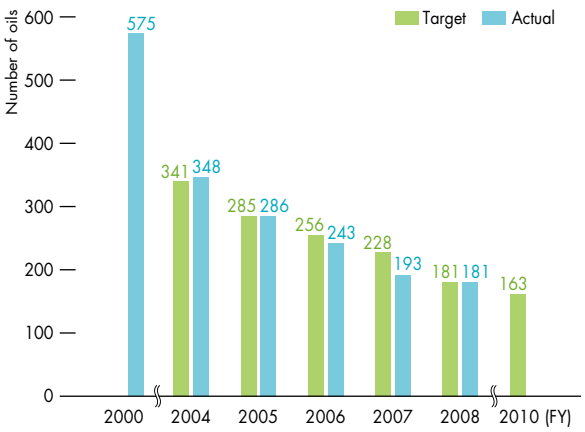
1,3,5-trimethylbenzene. As a result, the number of oils containing PRTR-designated substances has been reduced by 69 percent (base year: fiscal 2000).

**Table 1: Emissions of PRTR-Designated Substances in Japan (Fiscal 2008)**

| Substance name | Volume handled | Released into atmosphere | Released into water | Transferred as waste | Consumed | Recycled |
|---|---|---|---|---|---|---|
| 2-aminoethanol | 2,443 | 0 | 977 | 1,466 | 0 | 0 |
| Ethylbenzene | 2,849 | 219 | 0 | 105 | 2,525 | 0 |
| Xylene | 93,711 | 18,768 | 0 | 794 | 68,412 | 5,737 |
| Cresol | 1,981 | 1,823 | 0 | 129 | 29 | 0 |
| 1,1-Dichloro-1-fluoroethane | 1,034 | 1,018 | 0 | 16 | 0 | 0 |
| Dichloropentafluoro propane | 5,101 | 5,025 | 0 | 76 | 0 | 0 |
| 1,3,5-trimethylbenzene | 1,135 | 748 | 0 | 0 | 387 | 0 |
| Toluene | 71,036 | 33,582 | 0 | 2,795 | 34,659 | 0 |
| Barium | 1,885 | 0 | 0 | 1,885 | 0 | 0 |
| Phenol | 90,470 | 1,809 | 0 | 5,881 | 82,780 | 0 |
| Benzene | 4,194 | 0 | 0 | 0 | 4,194 | 0 |

(kg/year)

**Figure 3: Change in the Number of Oils Containing PRTR-Designated Substances in Japan**




## Clean-up of Pollution Caused by Chlorinated Organic Solvents

Chlorinated organic solvents were used widely in the past, for cleaning metallic products, etc. However, such solvents are a source of ozone layer depletion if they evaporate, and of soil and groundwater contamination if they permeate into the ground. For this reason, as of fiscal 2003 the NSK Group discontinued use of chlorinated organic solvents, and today they are designated as prohibited substances (see page 45). Internal testing conducted since 1997 confirmed soil and groundwater contamination on the sites of seven plants that used chlorinated organic solvents in the past. The Group notified local authorities and began undertaking steps to clean up the affected areas.

Testing began again in May 2007 at the Shiga Works of Amatsuji Steel Ball Mfg. Co., Ltd., where cleanup work had already started. In October 2008, groundwater contamination exceeding environmental standards was newly confirmed near the property boundary. In response, the company notified the local authorities and residents living in the vicinity of the plant and started taking additional cleanup measures. The discovered contamination was in groundwater at a depth of approximately 15 meters and estimated to be within a limited scope of diffusion. No wells in the neighborhood are used for drinking water.

In addition, at present, remediation has been completed at one site and is ongoing at five sites. Although considerable progress has been made cleaning up the groundwater at these five sites, it is estimated that several more years will be needed until the remediation is complete.

The NSK Group is also examining soil contamination and other remediation expenses expected to become necessary in the future. The Group will disclose these results as they become available.



**NSK Action 2**

### Zero Chlorine Additives: The Switch to New Press Oil

NSK Needle Bearing Ltd. is switching to new press oil in order to completely discontinue the use of press oils containing chlorine additives. Previously, chlorine additives were essential to improve press performance. In order to overcome the issues of product quality, processing efficiency, and increasing cost associated with replacing press oils, we worked with a press oil manufacturer to adjust the components and carried out long-run testing over a year and a half. As a result, we were able to replace our most abundantly used press oil. From here on, I want to steadily replace the remaining press oils with non-chlorine-based alternatives.

**Yuusuke Tomita**
Plastic Forming Section, NSK Needle Bearing Ltd.

*Please see the following web page for data on PRTR-designated substances in each plant: http://www.nsk.com/sustainability/dataprtr.html

# Third-Party Opinion

As last year, NSK asked Mr. Eiichiro Adachi of the Japan Research Institute Limited to provide a third-party opinion of this Report.


**Eiichiro Adachi**
Research Chief,
Japan Research Institute Limited


**Profile**
After graduating from Hitotsubashi University's Department of Economics, Mr. Adachi joined the Japan Research Institute. He worked in the Management Consulting Division and the Technology Research Division, and is currently the head of the ESG Research Center. His main responsibilities are conducting research regarding various industries and assessing companies in terms of their corporate social responsibility (CSR). He has also written a book entitled *Businesses that Prosper in the Age of Global Warming* (published by Toyo Keizai Inc.).

**Responses to Mr. Adachi's main opinions of the *NSK CSR Report 2008***

| Opinion | NSK's response | Page |
|---|---|---|
| Report annually on results of technical innovation | Started using eco-efficiency indicators to evaluate developed products. Will continue PR about the indicators. | p. 30 |
| CSR initiatives for employees outside Japan | Revised the NSK Code of Corporate Ethics, clarifying commitment to human rights and labor, which are high risk areas outside Japan. Started informing employees of initiatives. | p. 17 |
| Risk management (export, chemicals, soil/groundwater contamination) | Strengthened internal rules and established a global management structure to improve export management. | p. 17 |
| | Complied with the EU's REACH regulations and expanded the chemical substance management system to sites outside Japan to improve chemicals management. | p. 44 |
| | Promptly took measures against newly identified soil/groundwater contamination. Started calculating future remediation expenses. | p. 47 |

As I have given financial institutions information on companies so that they can make socially responsible investments, I am providing a third-party opinion of the NSK Group's CSR activities, based on the understanding I have gained from this Report.

It is commendable that the NSK Group achieved nearly all of the environmental goals set in its fiscal 2008 report, as described on pages 6–7, despite an austere economic environment that saw the Group's revenue and profit decline in the year ended March 2009.

Last year, I asked for enhanced disclosure on matters relating to the technological innovation of products, matters relating to employees outside Japan, and matters relating to responses to important areas of risk management such as in export management, chemical substances management, and soil and groundwater contamination. I am pleased to see that these issues were addressed to a certain degree.

Of particular note, I highly commend NSK's introduction of eco-efficiency indicators. This system frames the way in which the Group will translate its conception that "the NSK Group's social responsibility is to reduce energy consumption worldwide through its business" into a tangible form. However, the definition of the indicators gave me the impression that a clear distinction is not necessarily drawn between the environmental impact generated within the NSK Group, and environmental impact generated when products incorporating NSK's bearings and other products are used. I would like to see continual enhancement of these indicators. I would also very much like next year's Report to mention products for wind power generation and railway vehicles.

NSK has increased its target for reducing its $CO_2$ emissions in fiscal 2012 to no more than the level in fiscal 2006. I praise the fact that NSK has established a target for total emissions reduction, but am interested to learn what percent the level of emissions in fiscal 2006 was compared to the level in 1990. Japan's medium-term goal is to reduce emissions in 2020 by 8 percent compared to fiscal 1990. I hope that the NSK Group will set a reduction target with a medium-term outlook, such as 2020, and establish and disclose an implementation scenario for achieving that target.

Half of NSK's sales to external customers are to customers outside Japan. I also believe many of the Group's products are used in developing countries. Page 4 of this report describes the creation of a "poverty-free society" and a "conflict-free society" as pressing societal issues. Accordingly, I hope that the NSK Group will reinforce its efforts to help solve the problems of poverty and conflict in developing countries.

These comments do not offer any conclusion as to whether the data in this Report was accurately ascertained and calculated in accordance with generally recognized criteria for preparing environmental reports, or whether all important issues have been addressed without omission.

## Response to Mr. Adachi's Third-Party Opinion


**Yoshio Saito**
Senior Vice President
Head of Finance Division
Headquarter, Responsible for IR & CSR Office


Thank you for your valuable opinion again this year.

First, we indicated in the table above the actions taken by the NSK Group in response to the opinions we received from you last year. I expect that the eco-efficiency indicators you evaluated highly will help increase product appeal outside the Company, in addition to improving product development capabilities within the Company.

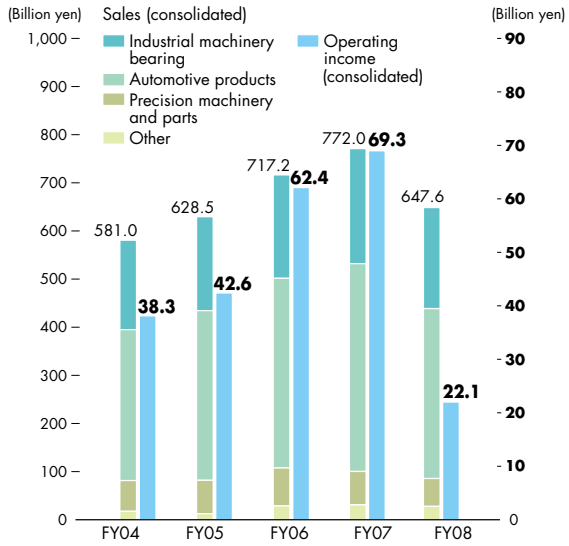
We will consider including a few examples in next year's Report of the ways products made with NSK's products reduce environmental impact during use, including reporting estimates of the effect on $CO_2$ reduction. We will also take your other opinions seriously and try to reflect them in the content of next year's Report. We will make sure to cover social issues, as well as provide a contrast of the level of $CO_2$ emissions in fiscal 2006—which we set as the base year for the NSK Group's $CO_2$ emissions reduction target—and the level in fiscal 1990, which was set as the base year of the Kyoto Protocol.

# Corporate Information

## Corporate Overview (as of 31 March, 2009)

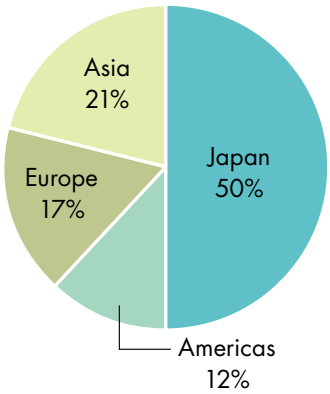
| | |
|---|---|
| **Company name** | NSK Ltd. |
| **Head office** | Nissei Bldg., 1-6-3 Ohsaki, Shinagawa-ku, Tokyo, 141-8560, Japan |
| **Established** | November 8, 1916 |
| **Capital** | 67.1 billion yen |
| **Net sales** | Consolidated: 647.6 billion yen<br>Non-consolidated: 404.4 billion yen |
| **Employees** | Consolidated: 24,050<br>Non-consolidated: 5,274 |
| **Group companies** | Within Japan: 23<br>Outside Japan: 64 |
| **Shareholders** | 27,947 |

## Sales/Operating Income



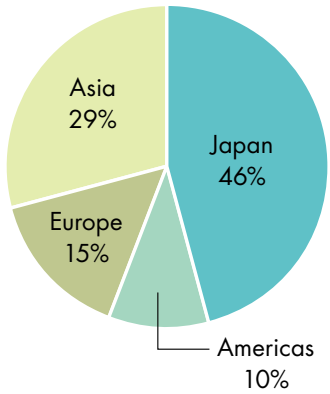

## Breakdown of Net Sales by Region (Consolidated)

Based on location of customers (Year ended March 31, 2009)



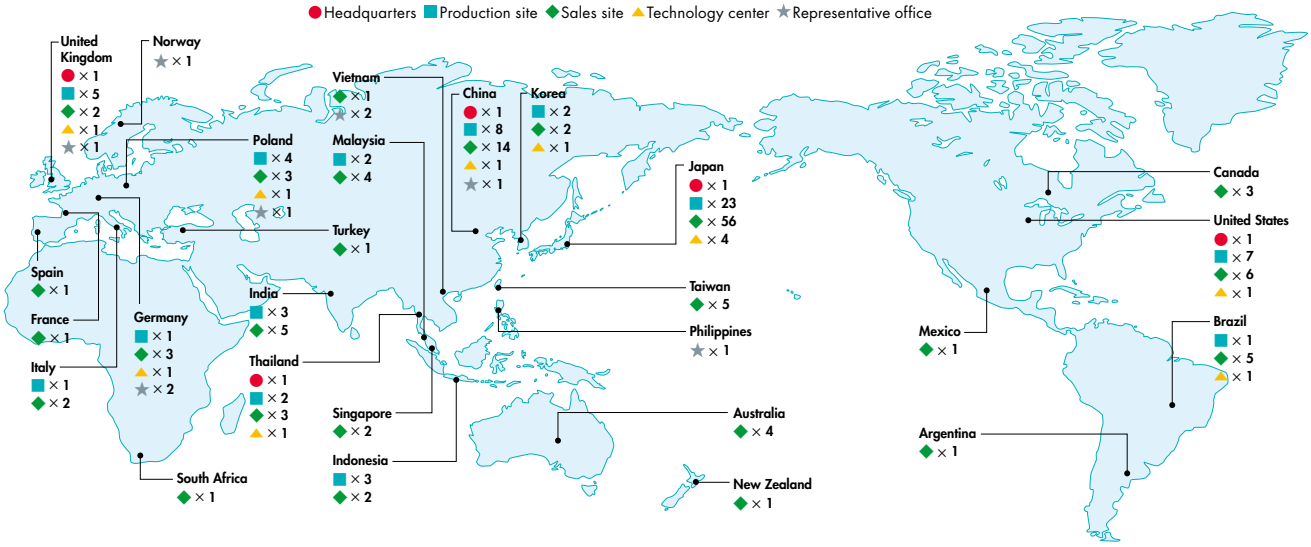

## Breakdown of Employees by Region (Consolidated)

Excluding temporary employees (As of March 31, 2009)




## NSK Group Sites Worldwide (as of 31 March, 2009)

62 production sites in 13 countries, 129 sales sites in 25 countries, 12 technology centers in 9 countries



# Our CSR is……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NSK


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