

# CSR Communication Report 2015

# CSR × 31,088



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## What Is CSR?

CSR is an abbreviation of "corporate social responsibility." The NSK Group takes CSR to mean "ensuring that all of its corporate activities meet the expectations of its diverse stakeholders and, in so doing, ensure the sustainable development of both society and NSK."

### About the Cover

## CSR × 31,088



The cover of this report shows a typical scene in modern life. The NSK Group's products help to keep this kind of society running smoothly and safely, as well as reducing its environmental impact. As of March 31, 2015, there were 31,088 people working at the NSK Group. The sum total of the daily efforts of each and every one of those people is what enables the NSK Group to fulfill its overall social responsibilities.

### About this Report

As of fiscal 2015, NSK has decided to publish both this *CSR Communication Report 2015* and the *CSR Report 2015*.

The aim of this *CSR Communication Report 2015* is to introduce the NSK Group's initiatives in a more accessible manner, focusing on the efforts of individual employees to reach a wider reader base. In the comprehensive *CSR Report 2015*, meanwhile, we seek to present in greater detail than ever before the governance, social and environmental initiatives being implemented by the NSK Group. For the *CSR Report 2015*, please see NSK's website.

[www.nsk.com](http://www.nsk.com) > Sustainability > CSR Reports

### Period of Coverage

April 2014 to March 2015.  
Activities conducted outside this period are indicated with the inclusion of a date.

### Referenced Guidelines

*G4 Sustainability Reporting Guidelines* by the Global Reporting Initiative (GRI)

ISO 26000:2010 Guidance on Social Responsibility by the International Organization for Standardization (ISO)

*Environmental Reporting Guidelines* (2012 edition) by the Ministry of the Environment of Japan

### Scope of Coverage

The report covers all NSK Group sites and plants, both in and outside Japan. For data and information that differs from the scope of coverage above, the scope is separately defined.

### Company name

NSK Ltd.

### Established

November 8, 1916

### Capital

67.2 billion yen\*

### Group companies

Within Japan: 21\* Outside Japan: 72\*

### Head office

Nissei Bldg., 1-6-3 Ohsaki, Shinagawa-ku, Tokyo 141-8560, Japan

### Number of employees (consolidated)

31,088\*

### Net sales (consolidated)

974.9 billion yen (fiscal year ended March 31, 2015)

\* As of March 31, 2015

## NSK Group Sites Worldwide (as of March 31, 2015)

**Headquarters** 6 in 6 countries

**Sales sites** 123 in 29 countries

**Representative offices** 6 in 5 countries

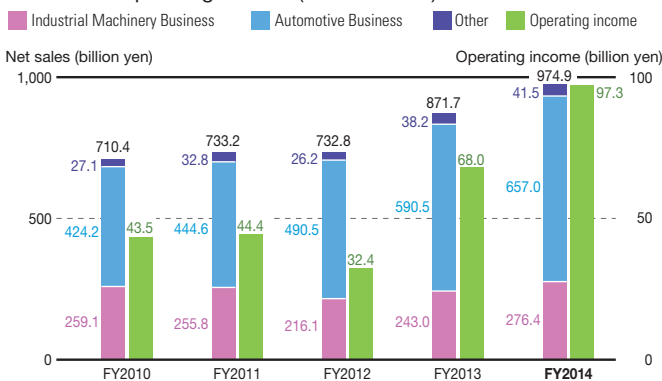
**Production sites** 65 in 13 countries

**R&D centers** 14 in 9 countries

Reference data is available on NSK's website. [www.nsk.com](http://www.nsk.com) > Company > Global Network

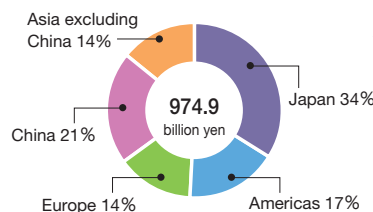
## Financial Data

### Net Sales / Operating Income (Consolidated)



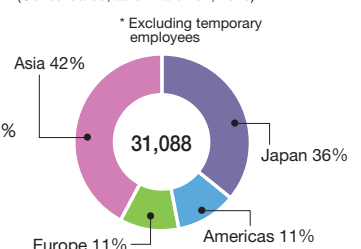
### Breakdown of Net Sales, by Region

(Based on customer location; fiscal year ended March 31, 2015)



### Breakdown of Employees, by Region

(Consolidated, as of March 31, 2015)



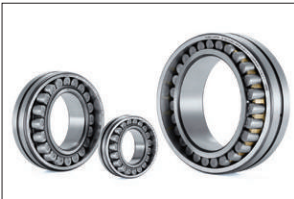
Reference data is available on NSK's website. [www.nsk.com](http://www.nsk.com) > Investors

# NSK Group Businesses

## Industrial Machinery Business

### Industrial Machinery Bearings

Bearings reduce friction in the rotating parts of machinery and enable smooth rotation. NSK's bearings are used in a range of products and machines, including home appliances such as vacuum cleaners, railway vehicles such as bullet trains, steelmaking equipment, wind turbines for power generation, large industrial machinery, airplanes, and satellites.



NSKHPS™ Spherical Roller Bearings



Low-Torque, Long-Lasting Grease-Sealed Bearing for Motor Applications

### Precision Machinery and Parts

The NSK Group's precision machinery and parts are the core components in the machine tools and industrial robots used to manufacture automobiles, personal computers, and other products. They are also found in equipment used to produce semiconductors and in injection molding machines. The NSK Group's precision machinery and parts play a crucial role on the front-line of manufacturing.



HMS Series Ball Screws for High-Speed Machine Tools



Megatorque Motor™ PB Series

## Automotive Business

### Automotive Bearings

Some 100 to 150 bearings are incorporated into a single automobile. The NSK Group provides numerous products that support the diverse automotive needs of society, including various bearings used in the engine, transmission, and electrical components as well as the hub unit bearings that support the axle.



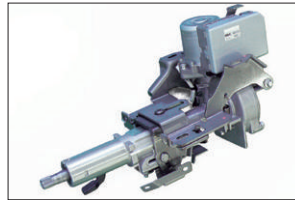
Hub Unit Bearing with High-Reliability Seal



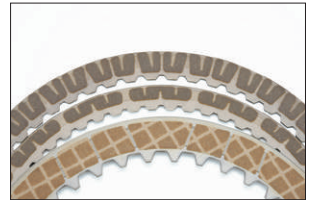
Super Long-Life Planetary Shaft and Cage and Roller

### Automotive Parts

The NSK Group's automotive parts include many important components that control forward motion, turning, and stopping in automobiles, such as steering systems that transmit the driver's movement of the steering wheel to the vehicle's wheels, and clutches that are used in automatic transmissions. The Group's products also contribute to automobile safety, comfort, and environmental performance.



Advanced Electric Power Steering for Modular Units



Friction Plates for transmission aiming to increase automobile fuel efficiency

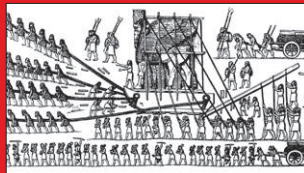
# NSK's Four Core Technologies

## NSK's Research and Development

For nearly a century since its founding in 1916, NSK has focused efforts on R&D, developing new technologies and raising product quality. Having grown into a leading company in the fields of bearings, automotive products, and precision machinery and parts, NSK's technological capabilities are based on four core technologies: tribology, material engineering, analysis technology, and mechatronics.

### Tribology

Tribology is a technology that controls friction and wear of sliding surfaces in relative motion. This is a key technology for bearings that support rotational or linear motion applications. The principle of bearings traces its origin to ancient Mesopotamia, where gigantic stones were transported with relative ease by placing logs underneath them.



### Material Engineering

Materials play a key role as technologies that affect the performance of products. Optimal compositions and heat treatment processes under optimal conditions for metal and high polymeric materials, as well as the utilization of ceramics technologies, are key contributors to increasing the durability, reliability, and performance of bearings.



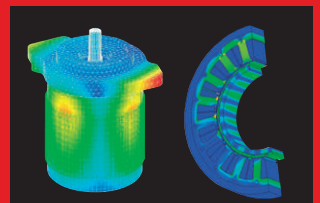
### Analysis Technology

NSK uses computer simulations to test and assess the performance of bearings in virtual environments. Taking advantage of advanced analysis technology enables the Company to assess performance in extreme conditions, under which testing in actual machinery is difficult. This helps to speed up the creation of optimal designs and product development for bearings.



### Mechatronics

NSK has honed proprietary mechatronics technologies that fuse control technologies with mechanical technologies—which the Company has fostered through product development and at production sites—and motor, sensor, and circuit technologies. Mechatronics contribute to the development of new products by giving NSK's products movement, and creating new functions and performance.



# The NSK Group's CSR

## Corporate Philosophy

### 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 Message

**Responsive and Creative  
MOTION & CONTROL™**

### Corporate Slogan

**Beyond Limits, Beyond Today**

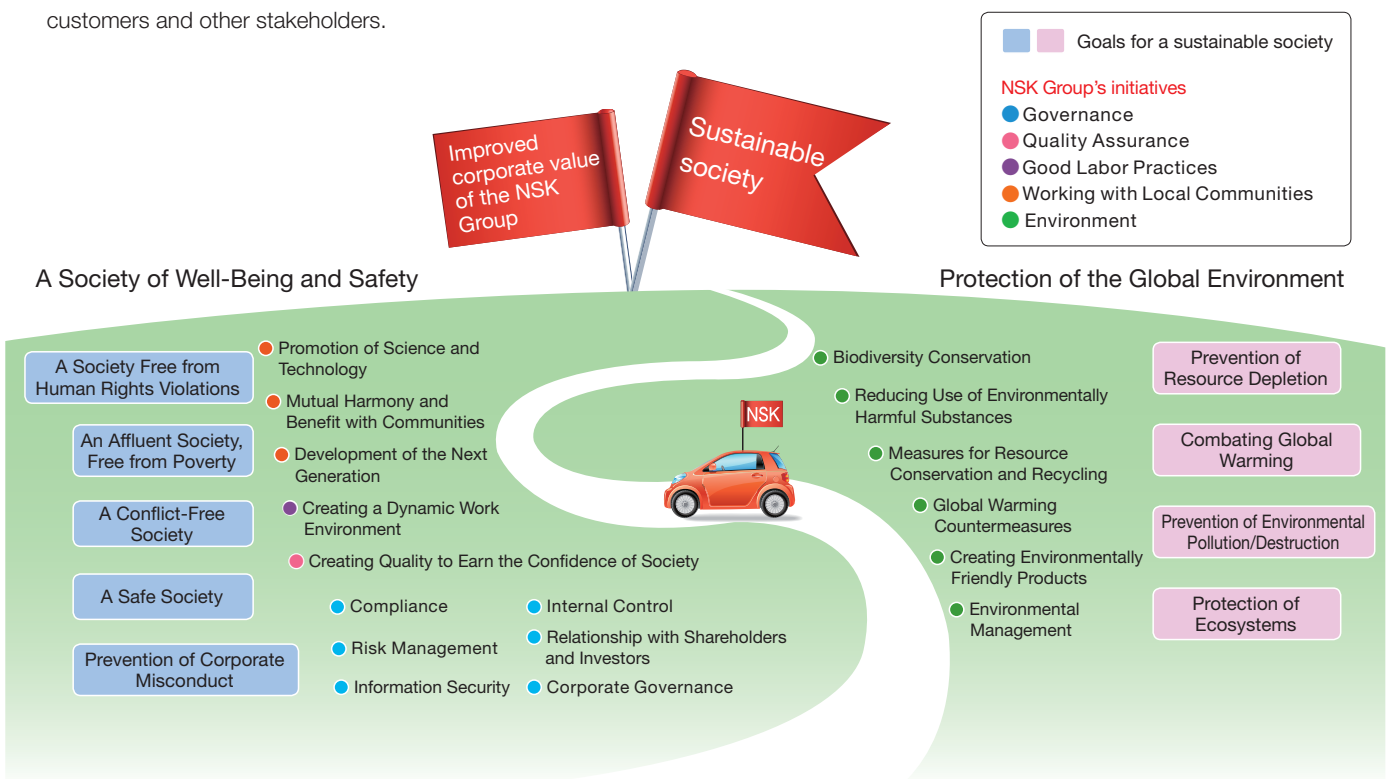
### Sub Slogans

Beyond Frontiers  
Beyond Individuals  
Beyond Imagination  
Beyond Perceptions  
Challenging the Future

## The NSK Group's View of CSR

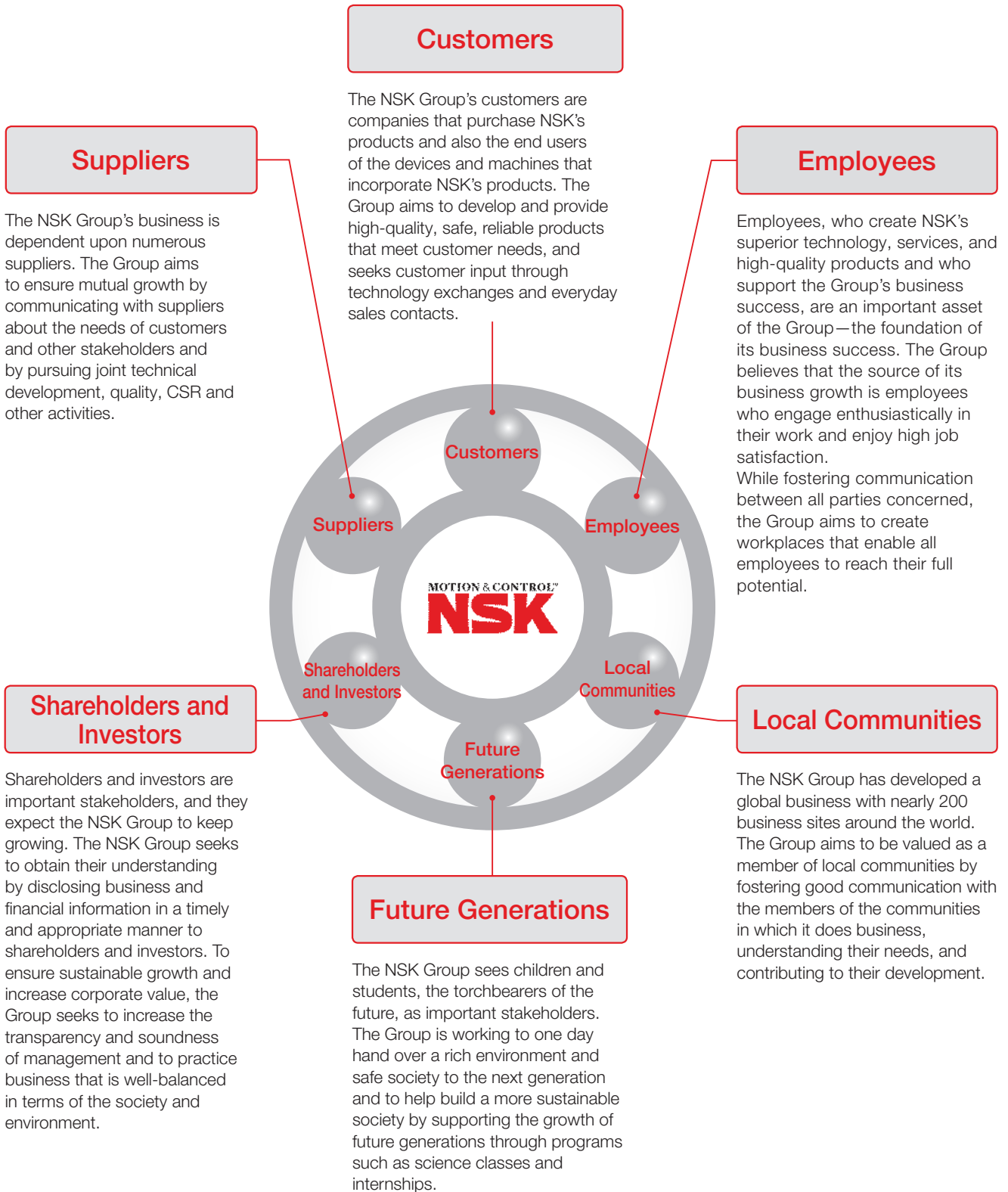
NSK's Mission Statement makes clear the Group's commitment to contributing to the development of society and to the protection of the global environment, and NSK's Management Principles set the course to realizing these goals.

The NSK Group's products have the special characteristic of aiding the smooth functioning of a wide range of machinery, and they support the reliability, safety, and energy efficiency of the machines into which they are incorporated. The NSK Group regards its fundamental corporate activity as contributing to smoothly running, safe societies, protection of the global environment, and the realization of sustainable societies through the supply of those products—that is, through the Group's main business. The NSK Group aims to achieve greater corporate value and sustainable growth by ensuring that all directors and employees are firmly committed to the Group's purpose and by making sincere efforts to contribute to business growth and society by taking the perspective of customers and other stakeholders.



# The NSK Group's Stakeholders

The NSK Group's business is built on the trust of a variety of stakeholders. The NSK Group believes that active communication is the key to building better relationships with its stakeholders. The Group is also striving to build a corporate culture in which each site, each department, and each and every officer and employee recognizes the needs of stakeholders and the broader society and can reflect those needs in their own everyday work.



# Leveraging the Art of Manufacturing to Achieve Greater Growth

## Building a Stronger Business Foundation

### The Final Year of Our Fourth Mid-term Management Plan

In fiscal 2014, the intermediate year of our Fourth Mid-term Management Plan, we achieved record highs for net sales and operating income, surpassing the numerical targets of the plan a full year ahead of schedule. This strong performance was attributable to growth in our electric power steering business and effective cost reduction measures, as well as a boost from external factors such as demand growth driven by the gradual economic recovery, and the weak yen.

Fiscal 2015 is the third and final year of our current mid-term management plan. As an even more important goal than our numerical targets, we will press ahead with measures to increase our fundamental capabilities in sales, technology, production, and management, all of which underlie our success in sales and income.

Going forward, we will step up our efforts to realize the plan's overarching vision of "establishing corporate fundamentals appropriate for a company with net sales of ¥1 trillion."

## Contributing to the Well-Being and Safety of Society and Protecting the Global Environment

### Environmentally Responsible Prosperity

The abnormal weather occurring across the world in recent years, including devastating typhoons, unprecedented torrential rainfall, droughts and subsequent crop damage, large-scale forest fires, and record-breaking cold and heat waves, indicates that climate change due to global warming presents real risks. Meanwhile, the human pursuit of materially abundant lifestyles is growing stronger, economic activity

is increasing, and emissions of carbon dioxide and other greenhouse gases continue to rise. It is becoming more important than ever for companies to help preserve a healthy global environment as they work to sustain social development.

It is in this context that we see worldwide upgrades to social infrastructure and new technology development taking place—all efforts to secure social progress and ensure environmental protection. For instance, many of the world's countries are developing environmentally friendly transportation infrastructure, including urban railway networks such as subways and elevated railroads as well as the construction of high-speed railways connecting major cities. Additionally, self-driving vehicle technology developed by automakers and IT companies has reached the pilot stage. What's more, a fuel-cell car that converts the energy of hydrogen into electricity through a chemical reaction that does not emit carbon dioxide while driving was commercially released in Japan in December 2014.

Developments like these lead to the creation of things that never existed before, through greater sophistication and integration of materials as well as mechanical, electronic, and information technologies. They suggest the growing potential to bring innovation to people's lives, local communities, and global society.

### Leveraging the Art of Manufacturing to Achieve Greater Growth

NSK has declared in its corporate philosophy a commitment to fostering social progress by aiming to contribute to the well-being and safety of society and protect the global environment through business operations based on innovative technology integrating MOTION & CONTROL™. Accordingly, NSK has steadily carried out initiatives

befitting a quality-driven manufacturer.

For example, NSK has provided high-performance railway axle bearings since the Shinkansen bullet train first went into operation in 1964. These bearings had to provide outstanding reliability and the ability to perform at high speeds, while, over time, getting smaller and lighter. In recognition of superior performance in these areas, NSK bearings were adopted for the Hokuriku Shinkansen, which went into service in March 2015.

Responding to the needs of automakers, we have repeatedly made improvements to the features, quality, and costs of our various products, including bearings, parts for automatic transmissions, and steering systems. Meanwhile, on our manufacturing floors, we have achieved virtually all of the goals set out in our Environmental Voluntary Action Plan, making steady progress with improvements to equipment, processes, and methods, as well as saving energy and recycling.

The NSK Group aims to leverage the art of manufacturing to achieve even greater growth. We are determined to stay on the path of constant development by delivering new technologies, products and services. Toward that end, we will first of all make sure that NSK's existing product lines meet the needs of customers and the market. We will pay close attention to the applications, machinery, equipment and systems in which our products are used and work proactively to develop and market functions that provide increased value. In doing so, we hope to exceed the expectations of customers and to bring to the world new technologies and products that best fit latent end-user needs. Ultimately, our goal is to help realize a safe, convenient and comfortable society while reducing



**Toshihiro Uchiyama**  
President and Chief Executive Officer,  
NSK Ltd.

environmental impact.

First and foremost, I want to ensure that NSK stays true to the Company's essence over the last century—namely an unwavering commitment to the art of manufacturing, to quality, to our people, to our customers, and to the needs of all stakeholders. Looking ahead, these commitments will continue to drive our future business development.

**NSK Vision 2026, Our New Roadmap Beyond Our 100th Anniversary in 2016**

NSK will celebrate its 100th anniversary in November 2016. Since its foundation as Japan's first bearing manufacturer in November 1916, the Company has contributed to the development of society by providing machine components such as automotive components and precision machinery and parts, with a primary focus on bearings.

As we celebrate this significant milestone, we will look back on the path that we have traveled, while casting an eye to the century that lies ahead. By

doing so, we will endeavor to meet the expectations of all stakeholders and to secure further growth. With this in mind, NSK has created NSK Vision 2026 as its overarching roadmap to the future. The vision encapsulates the aspirations of each and every officer and employee to set the future in motion—not only for the Company but also for people's lifestyles and society as a whole.

In line with the NSK Vision 2026, the entire NSK Group will work as one to create even greater value than in the past, thereby contributing to the development of our customers and society, and securing the sustainable

growth of the NSK Group. Looking to the future, I would like to express my sincere appreciation for the continuing support of all of our stakeholders.

**Conclusion**

In the *CSR Communication Report 2015*, we have striven to make our social and environmental initiatives as accessible to readers as possible. I hope that this report helps to foster even better communication with our stakeholders. We welcome your candid feedback on this report and on the activities of the NSK Group.

NSK Vision 2026

**SETTING THE FUTURE IN MOTION**

**We bring motion to life, to enrich lifestyles,  
and to build a brighter future.**

**Dedicated to uncovering society's needs, we set ideas  
in motion to deliver solutions beyond imagination.**

**We're NSK.**

**And, we're setting the future in motion.**



# For more than half a century, our unwavering goal has been to make high-speed rail travel safe.

Since the very first generation of Shinkansen bullet trains, NSK has constantly worked to improve its technology for high-speed rail bearings.

All employees of the NSK Group firmly recognize the importance of their respective roles in society. By moving forward proactively as a united team across all day-to-day operations, the NSK Group will continue to support a society of well-being and safety.



Courtesy of Central Japan Railway Company

Shinkansen N700 Series has a top speed of 300 km/h

## Increasing Societal Need for High-Speed Rail Networks

Japan's Shinkansen bullet trains have supported the economic growth of Japan by transporting countless passengers at high speeds. Most recently, the new Hokuriku Shinkansen line went into operation in March 2015. Work has also been progressing on the Hokkaido Shinkansen line, scheduled to open in 2016. Expectations are rising that these new rail networks will hold the key to revitalization of regional communities.

In recent years, the demand for high-speed rail has been steadily increasing around the world. In Europe, high-speed rail is recognized as a low-carbon mode of transport compared to airplanes and automobiles. In line with this trend,

new rail cars that are faster, more comfortable, and friendlier to the environment have been developed. Meanwhile, in emerging markets such as high-growth Asian countries, there is an urgent need for improved transportation infrastructure, including rail networks, to support surging economic development. In these countries, new high-speed railways are being constructed to connect major cities.

There is an increasing focus on ensuring railway safety and making travel quicker and more comfortable. This is why NSK continually seeks to improve its bearings for use in rail cars. To achieve this goal, NSK's development, manufacturing and quality assurance divisions are unified in their tireless pursuit of technological achievement and strict quality control.





Courtesy of Central Japan Railway Company

Shinkansen 0 Series debuts in 1964

## Origin and Evolution of the Shinkansen

The first Shinkansen train began operation on October 1, 1964, just nine days before the first Tokyo Olympics began. Christened the Shinkansen 0 Series, the original trains began commercial operation at speeds exceeding 200 km/h—a world first. The journey between Tokyo and Shin-Osaka, which had previously taken six hours, was shortened to just four. In 1965, the journey was further reduced to three hours and ten minutes. After subsequent advancements in technology, the 300 Series appeared in 1992, posting a record top speed for commercial operation at 270 km/h. With a trip between Tokyo and Shin-Osaka now taking just two and a half hours, the Shinkansen was able to compete with air service between the two cities.

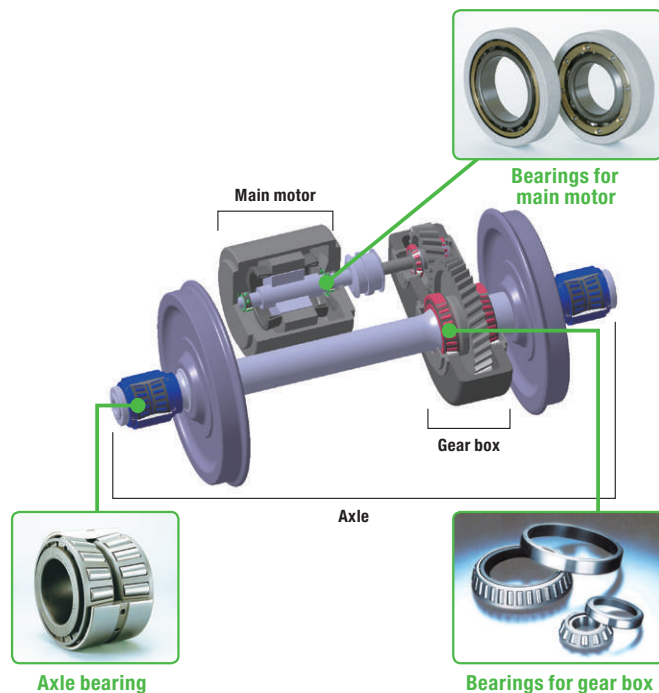
After the dawn of the 21st century, the N700 Series came into service in 2007, reaching a maximum speed of 300 km/h. These new trains are able to take curves at higher speeds without affecting passenger comfort, thereby further reducing journey times.

## Providing Bearings to Support Safe and Comfortable Rail Service

Numerous rotating components are used in rail cars, including motors, gear boxes and wheels. Bearings support the smooth rotation of these parts, and contribute to safe, comfortable, and punctual railway service. With a major presence in this market, NSK holds the top sales share for rail car bearings in Japan (NSK survey). For over 50 years, NSK bearings have been used to support Shinkansen rail cars, starting with the original 0 Series.

## Contributing to Shinkansen Evolution

The Shinkansen bullet train continues to evolve. While maintaining safety as the top priority, technological development



has enabled faster speeds and improved environmental performance.

To ensure that higher speeds do not result in increased noise and vibration along the railway lines, thorough measures have been taken to reduce the weight of Shinkansen cars. It is particularly important to minimize the weight of axle bearings, which have a strong influence on noise and vibration. To keep pace with the increasing speed of the Shinkansen, NSK improved the bearings—making them even faster, lighter, more compact, and more durable.

## Improving Existing Technologies and Taking on the Challenges of the Future

Here is an overview of the history of Shinkansen bearings, using axle bearings as an example.

For the 0 Series, the axle bearings consisted of roller and ball bearings. The radial load, including the weight of the rail car, was supported by two rows of cylindrical roller bearings, while the lateral loads, including axial forces generated in curves, were supported by one ball bearing. This was the optimal method at the time. However, as the axle bearings weighed 81 kilograms, their weight needed to be reduced before greater speed could be achieved.

For the 300 Series, cylindrical roller bearings with ribs were adopted. By housing the rollers in ribs, the bearings were now able to support both radial and axial loads. NSK developed the optimal materials and processing precision through a process of repeated investigation and experimentation. NSK made improvements so that only roller bearings can withstand the loads, without ball bearings. Thanks to this, the axle bearing itself became substantially smaller and lighter, weighing in at only 31 kilograms.



## 0 Series

Debut 1964

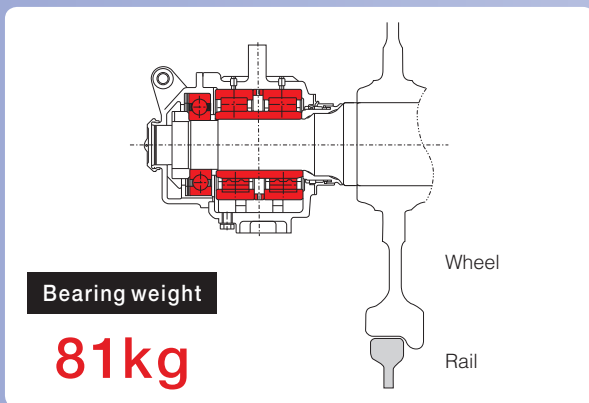
Maximum speed 210km/h

Requirements for bearings

### Reliability

NSK bearings supplied

Combination of cylindrical roller bearings and ball bearings



## 300 Series

Debut 1992

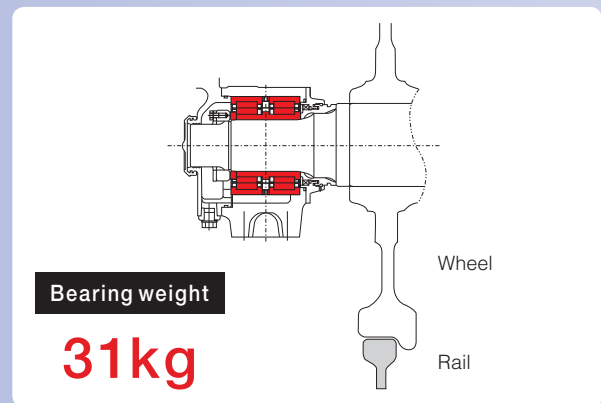
Maximum speed 270km/h

Requirements for bearings

### Higher speed and lighter weight

NSK bearings supplied

Cylindrical bearings with ribs



With the current N700 Series, tapered roller bearings are used instead of the cylindrical roller bearings. By arranging the rollers on an angle in two rows, the axle bearing can now support the radial and axial loads with even more stability, contributing to ride comfort for passengers. Further size reduction has also resulted in a weight of just 23 kilograms.

### Stringent Quality Management

No matter how compact and light bearings become, they cannot be used on the Shinkansen unless they ensure safety. Bearings are vital components that support rail cars, and so naturally they require strict quality control.

NSK capitalizes on the material engineering it has developed over many years to improve safety performance. NSK works to improve durability from the material selection phase, choosing the optimal steel for Shinkansen bearings. A serial number is marked on each bearing, enabling NSK to trace important information, such as when it was manufactured and what materials were used.

Bearing performance requirements are continually increasing along with the need for greater rail car performance.

Utilizing the analysis technology it has developed over several decades, NSK designs and develops its bearings to withstand harsh conditions. When conducting testing at its research sites, NSK reproduces the various conditions that bearings are exposed to during Shinkansen operation, and collects the resulting data. These constant efforts have helped to produce bearings that deliver high reliability and quality.

### Transitioning from Time-Based to Condition-Based Maintenance

Since rail cars are used over a long lifespan of several decades, maintenance is critical. NSK has developed the first system in Japan for detecting bearing abnormalities. It has been adopted for conventional railway lines and is helping to improve maintenance efficiency.

The system involves mounting sensors on the bearings, and monitoring factors such as bearing rotation speed, vibration, and temperature. By comparing the data gathered to the vast amounts of reference data NSK has already collected, the system can detect warning signs of anomaly, including damage.

Courtesy of Central Japan Railway Company



## N700 Series

Debut **2007**

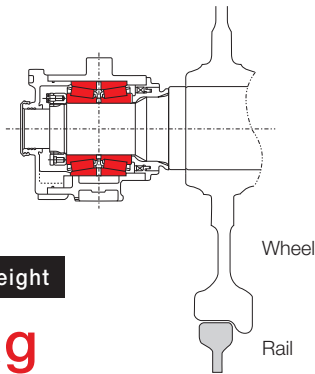
Maximum speed **300km/h**

Requirements for bearings

### Higher speed and comfort

NSK bearings supplied

### Tapered roller bearings



Bearing weight

## 23kg

This represents a shift in approach from time-based maintenance, where bearings are replaced at regular intervals whether they have an abnormality or not, to condition-based maintenance, where parts are replaced only when necessary. By detecting anomalies and predicting trouble before it happens, the system improves the safety of rail cars and lengthens maintenance intervals. NSK hopes that the system will be adopted for various types of rail cars, due to the cost savings that result from longer intervals between maintenance.

### Applying Technologies Developed for the Shinkansen in Other Industries and Countries

NSK bearings offer technology and quality that have been refined along with the evolution of the Shinkansen. Today, NSK bearings are selected by high-speed rail operators around the world. In fiscal 2014, about 50% of NSK's railway bearing sales took place in markets outside Japan. Aiming to make an even greater contribution to railway infrastructure worldwide, the Company is working to raise this figure to 80% by fiscal 2026.

NSK has also applied technology developed for the Shinkansen in many other fields, such as bearings for wind turbines, industrial machinery motors, and hydraulic pumps.

NSK offers technical capabilities and reliability that began with the Shinkansen 0 Series and have been continually refined for over 50 years. Leveraging these assets as a driving force, NSK will continue to support a society of well-being and safety.

### Utilizing Decades of Expertise to Support Railway Infrastructure Worldwide

**Takanori Yamada** Manager, Railroad & Aerospace Bearing Technology Department, Industrial Machinery Bearing Technology Center, NSK Ltd.

As rail car manufacturers and railway operators, our customers expect NSK to maintain the highest quality standards. In order to meet their requirements, the development and manufacturing departments have joined forces to implement initiatives to constantly improve quality. These include making the design intent well known at the manufacturing site and studying and adopting optimal processing methods. NSK's expertise has been developed in a tough environment that forgives no defects, giving us a competitive advantage when growing our business outside Japan. We hope to utilize NSK's comprehensive strengths to contribute to the construction of safe, high-speed rail infrastructure around the world.





# NSK contributes to the fight against climate change in two major ways.

The international community has set challenging targets to reduce emissions of greenhouse gases such as CO<sub>2</sub>, and companies are also being urged to take active measures to help prevent climate change. As a manufacturer, the NSK Group is promoting a range of initiatives spanning energy and water saving through the day-to-day efforts of each employee, to the development of products with better environmental performance.

As part of these efforts, NSK places particular focus on the following two initiatives: reducing energy used in production processes, and developing and promoting environmentally friendly products. Through these initiatives, the NSK Group aims to reduce the CO<sub>2</sub> emissions attributed to its final products, including emissions from automobiles equipped with NSK products. Here are some examples of NSK's initiatives in these two main fields, along with the results achieved.



## 1. Reducing Energy Used in Production Processes

### Investing in extra machinery is not the only way to achieve increased output.

In 2011, the NSK Saitama Plant needed to boost production of bearings for automobile transmissions. The easiest way to do this would have been to invest in more equipment. However, conventional production line expansion also increases energy consumption compared to production volume. While working to increase production, the Saitama Plant promoted energy-saving activities that involved multiple departments. By improving the grinding process, which had used large amounts of compressed air, the plant was able to increase production without adding a single new compressor.

#### Changing the Spindle Lubrication Method Was the Key

Bearings are composed of rolling elements such as balls or rollers as well as machined inner and outer rings that have been heat-treated and ground. They also have a retainer that keeps the rolling elements evenly spaced. Many grinding machines incorporating spindles are used to perform the grinding of inner and outer rings. To operate spindles requires compressed air generated by compressors that consume a large amount of electricity. To ensure smooth rotation of bearings inside the grinding machine spindles, a mist of atomized oil is continuously applied using compressed air.

The oil mist method is widely used for spindle lubrication, due to its benefits for bearing life and maintenance. Spraying bearings with oil mist cools the bearings and prevents them reaching high temperatures that could damage the products. It also prevents grinding fluid from penetrating inside the spindle and causing malfunction. However, in the interest of energy saving, the Saitama Plant began studying switching over to a grease lubricating system. With this method, only a small amount of compressed air is needed to prevent the intrusion of grinding fluid.

Significant energy savings could not have been achieved without this changeover. The team decided to switch to the grease lubricating system, and several hundred grinding machine spindles in the factory were converted.

### Conversion Performed with the Cooperation of the Planning, Maintenance, and Production Division, United as One Team

The spindle unit consists of three spindles: (1) the main spindle that rotates while supporting the inner and outer rings that need to be ground; (2) the grinding wheel spindle that rotates to perform the grinding; and (3) the dress spindle that rotates a dresser to maintain the shape and cutting ability of the grinding wheel. The Saitama Plant decided to first convert the main and grinding wheel spindles, which have a relatively low rotation speed (e.g., main spindles with a speed of several hundred revolutions per minute). After investigating usage conditions and past performance, it was determined that these could be operated using grease lubrication without any problems.

It was necessary to shut down the equipment in order to change the spindle lubrication method. That meant shutting down the production line, requiring the support of the administrative and manufacturing engineering divisions. With their cooperation, the manufacturing division staff determined the equipment to be stopped based on the production plan for the following month. With a schedule in place, they continued to modify the equipment and perform lubrication method switchovers at a rate of one per week.

### New Spindles Being Introduced Across the Entire NSK Group with the Cooperation of the Development Department

Next, the team members decided to change the lubricating method of the grinding wheel dresser spindles, which rotate at several thousand times per minute. Most of the spindles used in the NSK Group were designed by NSK's machinery development division. The team requested the development division to come up with a design change idea, based on knowledge obtained about main spindle modification and the specifications of the bearing being used, which worked well for the switch to grease lubrication. As a result, a grinding wheel dresser with a grease lubrication method was developed, which is now being deployed not only in the Saitama Plant, but across the NSK Group.



### Aiming for Even Greater Energy Savings

So far, spindles on over 150 grinding machines in the Saitama Plant have been converted to grease lubrication. The future challenge will be to convert the grinding wheel spindles, which rotate at even higher speeds. This task has a higher degree of difficulty.

There are various advantages to grease lubrication. Not only does it require less compressed air; it also reduces consumption of lubricating oil. Moreover, since there is no diffusion of atomized oil into the air, the work environment also benefits. Thanks to efforts made so far, this initiative has reduced the plant's annual CO<sub>2</sub> emissions by about 500 tons.

This energy-saving effect also reduces costs by about 10 million yen per year, and has enabled increased production without the need for investment in new compressors.

The Saitama Plant is now aiming for even greater energy savings, and will continue to steadily increase the performance of this initiative.

#### Team Members

- From left
- Yasuhiro Amada, Production Engineering Section
- Tatsuya Sakuma, Maintenance Group, Production Engineering Section
- Kenro Shimizu, Maintenance Group, Production Engineering Section
- Minoru Ogino, Maintenance Group, Production Engineering Section
- Kazuo Ichikawa, First Production Section
- Tai Ozaki, Assistant to the Plant Manager
- Masayuki Saito, First Production Section





## 2. Developing and Promoting Environmentally Friendly Products

**Advancements in our products and manufacturing are helping realize greater comfort and energy-saving for society.**

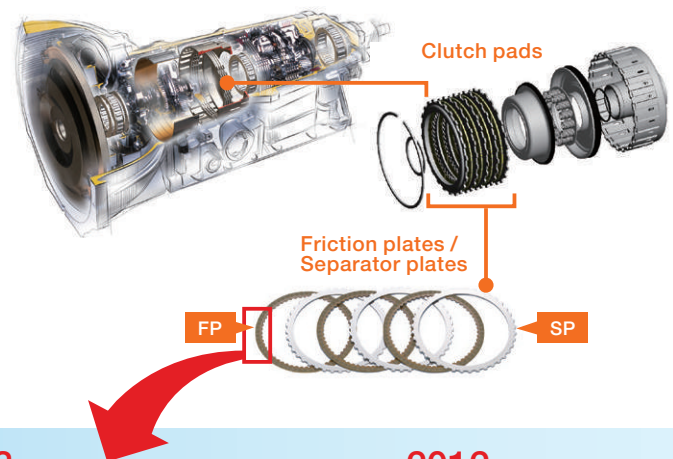
The Friction Plate Nv (nu) Multi-Segment was developed by NSK-Warner, and is used in automatic transmissions for automobiles. Friction plates are used for disengaging and engaging the power of the engine to enable gear shifting. With ever more stringent automobile environmental regulations worldwide, even small parts like this, measuring as little as 15 centimeters in diameter, must be designed for energy efficiency. The Nv (nu) Multi-Segment helps to improve fuel efficiency by approximately 1% compared to its precursor, and was created by thinking outside the box.

### A New Era Offering Both Comfort and Environmental Protection

Automatic transmissions make driving easy for all and first gained popularity in Japan in the 1970s. In those days, manual transmissions usually provided better fuel economy, forcing drivers to choose between convenience and environmental performance. To ensure a comfortable ride, the aim of friction plates at that time was to provide smooth gear shifting by disengaging and engaging the power of the engine without any jerking.

Then, from around 1990, more steps have been added to automatic transmissions to improve fuel economy by providing more efficient shifting from lower to higher gears, enabling vehicles to travel within a more efficient range of engine rpm. As part of this requirement for better fuel economy, friction plates also needed to reduce energy loss.

#### Automatic Transmission



#### Around 1990

Requirement for friction plates

**Reduction of abrupt gear shifting**

NSK friction plate used

General friction plate



Drag torque (compared to 1990)

**100**

#### 1998

Requirement for friction plates

**Better fuel efficiency**

NSK friction plate used

Radial Dead End Multi



Drag torque (compared to 1990)

**50 or less**

#### 2012

Requirement for friction plates

**Even better fuel efficiency**

NSK friction plate used

Nv (nu) Multi-Segment



Drag torque (compared to 1990)

**Less than 5**

Whenever a friction plate is released, drag torque occurs due to plate contact and transmission fluid viscosity, resulting in energy loss. In 1998, a new technology was developed that allowed transmission fluid to easily flow in and out from between the friction and separator plates through centrifugal force. This made it easier to separate the plates at the time of engine power disengagement, and reduced the amount of transmission fluid remaining between the plates. The new technology reduced the drag torque by about 50% compared to 1990, and with further improvements, it was reduced by 90% or more by 2010.

According to data from the Ministry of Land, Infrastructure, Transport and Tourism, the average fuel efficiency of gasoline passenger cars produced in Japan improved from 13.2 km/l in fiscal 2000 to 17.8 km/l in fiscal 2010. The friction plates produced by NSK-Warner contributed to this efficiency improvement. Today, the fuel efficiencies of manual and automatic transmission vehicles are nearly equivalent. Automatic transmissions are found in 95% of passenger vehicles in Japan, and in 50% of vehicles worldwide.

### **Nv (nu) Multi-Segment Resulted from Thinking Outside the Box in the Never-Ending Quest for Better Fuel Efficiency**

However, the ideal friction plate had still not been achieved. To improve fuel economy even more, a new technology was needed.

Starting with the concept of allowing transmission fluid to flow along grooves in the plate, NSK-Warner then added the idea of bringing in air. While allowing transmission fluid to easily flow outwards using centrifugal force and bringing in air

between the friction and separator plates, drag torque would be dramatically reduced. The Nv (nu) Multi-Segment was developed in 2012 based on this technology.

### **High Environmental Performance and a Rapid Start to Mass Production**

The Nv (nu) Multi-Segment reduced drag torque by 82% compared to a conventional friction plate, and was lauded by automatic transmission and automobile manufacturers alike. Nevertheless, a new challenge arose. Although the Nv (nu) Multi-Segment had been developed for next-generation automatic transmissions, manufacturers also wanted to install it in their existing products.

Therefore, NSK-Warner came up with a way to build a production line that would meet customer needs in a short period of time, utilizing its existing production equipment as much as possible. It also established systems to provide the necessary quality assurance.

### **A Big Challenge with Big Expectations**

NSK-Warner knew that friction plates would continue to play an important role in making automatic-transmission vehicles even more fuel efficient. Now that both small and large vehicles were being equipped with a function to shut off the engine during idling, the burden placed on friction plates was even higher. To meet this new challenge, NSK-Warner aimed to develop a product that would meet customer expectations and reduce impact on the environment.

## **Leaving Behind a Clear Development Record**

Yosuke Ikeda (left) Engineering Group No.1, Product Engineering Dept., NSK-Warner K.K.

Computer-aided engineering was one of the factors that enabled NSK-Warner to develop the Nv (nu) Multi-Segment and make a convincing proposal to customers. The computer simulation results matched with results from actual experiments, which increased confidence, while computers were also used to optimize the design of the product. In the future, NSK-Warner aspires to create a new standard where this kind of analysis data is recorded and a clear record of the development process is kept. This will lead not only to the development of new friction plates, but also to accelerated development of other environmentally friendly products.

## **Importance of Teamwork to Achieve the Ultimate Goal**

Masanori Okada (right) Engineering Group No.1, Product Engineering Dept., NSK-Warner K.K.

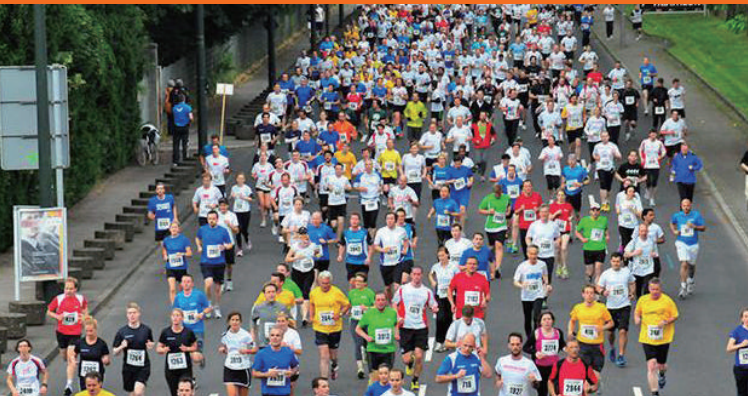
The ultimate goal of our Motion & Control technology is to reduce energy loss to zero. To achieve this, we need to improve our evaluation and manufacturing technologies. We were able to quickly establish a quality assurance system for the Nv (nu) Multi-Segment, thanks to the united efforts of members of working groups for design, manufacturing, and quality assurance. I believe that teamwork is becoming ever more important as we work to achieve the ultimate goal.





# At the heart of NSK's mission is the aspiration to engage fully with the local communities in which it operates to achieve shared growth.

NSK operates a global business with sites around the world. At all of those sites, each of our employees strives to live and grow together with the local community. This year's report highlights initiatives conducted at sites in India and Japan. It also gives examples of activities at other NSK sites around the world.



Participated in a corporate charity run. The collected donations go to benefit children and young adults suffering from cancer, to support education and alleviate hunger in Cambodia, etc. (NSK Deutschland GmbH)



Beach cleanup on Pangkor Island, Malaysia. A total of 100 people participated, with the cooperation of the local government. (NSK Micro Precision (M) Sdn. Bhd.)

The active engagement of companies is seen as crucial for resolving various social challenges and building a more sustainable world. Circumstances differ by country and region, and each is facing different problems. The NSK Group's business sites focus their social contribution efforts in the following three priority areas, based on the needs of their respective countries and regions: (1) promotion of science and technology (e.g., providing aid to research institutions); (2) development of the next generation (e.g., providing scholarships, offering students work experience opportunities, and holding classes about bearings); and (3) mutual harmony

and benefit with communities (e.g., cooperating in community events and welfare programs). The Group also values communication with community members and strives to build better relationships so that it can accurately assess and respond to community needs.

Additionally, by compiling social contribution activities undertaken at each site and sharing them group-wide in the form of the NSK Group Social Action Program, NSK aims to foster a corporate culture in which each and every employee is aware of and can engage in community development.

## Priority Areas for NSK's Social Contribution Initiatives

### 1. Promoting science and technology that supports the prosperity of society

#### Promotion of science and technology

The NSK Group contributes to the development of industry, not only through its technology and products, but also through a broad range of unique initiatives that support the promotion of science and technology.



### 2. Fostering the development of the next generation

#### Development of the next generation

The NSK Group is committed to supporting the education of children and young adults long into the future.



### 3. Engaging in activities designed to build mutual harmony and benefit with communities

#### Mutual harmony and benefit with communities

The NSK Group values communication with local communities in the countries and regions where it does business, and aims to ensure mutual prosperity as an upstanding corporate citizen.







## Spain

NSK Spain S.A.



Participated in a program to donate milk to socially vulnerable families, donating more than 150 liters.



## China

NSK (China) Investment Co., Ltd.



Established the Sino-Japanese Cooperation: NSK Mechanical Engineering Dissertation Awards at Tsinghua University with the aim of nurturing talent that can shoulder the future of mechanical engineering. Held the 12th awards ceremony in fiscal 2014.



## South Korea

NSK Korea Co., Ltd.



Continued to offer donations to orphanages and nursing homes.



## Mexico

NSK Rodamientos Mexicana, S.A. DE C.V.



Supported a Formula SAE racing team, offering students an opportunity to build a real racecar.



## Indonesia

Pt. NSK Bearings Manufacturing Indonesia



Offered students from a vocational training school work experience opportunities as interns.



## Australia

NSK Australia Pty. Ltd.



Continued to participate in the Relay for Life event to support cancer treatment.

# **RNSS** Aiming to Bring Smiles to Children

NSK is helping to resolve social challenges through initiatives such as providing learning environments for children, supporting community health initiatives, and participating in social welfare programs.

**R. Vasudevan** Manager, Human Resources, Rane NSK Steering Systems Private Limited

Rane NSK Steering Systems Private Limited (RNSS) is committed to contributing towards its societal responsibilities beyond statutory obligations. In accordance with RNSS's CSR vision to be a socially and environmentally responsible corporate citizen focused on education, we have supported infrastructure facilities in one of the Government's schools at Bhawdi in Haryana.

There are around 90 primary students who are studying in this school. The infrastructure facilities are poor. The students sit on the ground to study during their day to day classes. In winter, it becomes difficult for the students to

concentrate on their studies due to the cold ground. In light of this situation, we donated a Dual Desk Cum Table to all 90 students studying at this school. When we donated the Dual Desk Cum Tables, the happiness we saw in the faces of the students and teachers cannot be described in words. At RNSS, we are happy and proud to be supporting this cause.

Seeing the children smile makes us happy, too.



In order to deliver safe water to children, RNSS donated reverse osmosis filtration devices and tanks for storing the filtered water. Since installation of these devices, RNSS staff have visited regularly to confirm they are working properly.



**After** Bhawdi elementary school



**Before**



**Thailavaram elementary school**



## Other Activities at RNSS

### Initiatives for Access to Medical Care



Health checkups were provided in a village where it is not easy to receive adequate medical services. Eye exams were conducted, and reading glasses given to the elderly. Blood pressure and blood glucose levels were also measured, and necessary medication provided for free.

### Participating in "Joy of Giving Week"



All employees participated in the "Joy of Giving Week," which was held from October 17–22, 2014. Articles required by children attending school, including secondhand clothing, shoes, and school supplies, were collected at the company. Four large cardboard boxes filled with donations were given to an NGO.



# Fukushima Plant Supporting the Students Who Will Forge the Future

The Fukushima Plant carries out a range of activities to support the education of children and young adults, including hosting field trips and interns, and strives to establish good relationships with the community.

**Naohiro Matsumoto** General Affairs and Personnel Department, Fukushima Plant, NSK Ltd.

The Fukushima Plant is surrounded by the rich natural environment of the Abukuma mountain range and the countryside. The grey-headed lapwing (*Vanellus cinereus*), a wild bird species on the verge of extinction in Fukushima Prefecture, lives on the grounds of the plant. We are working to protect local natural assets such as this bird species and also engaging actively in activities to support the education of the children who will become the next generation of leaders. We also participate actively in local community events so that more people can learn about our efforts.



The summertime experiential studies program for elementary school students is one of those activities. Organized by the Board of Education in the town of Tanagura, where the Fukushima Plant is located, this is a career education program aimed at fostering a zest for living and working in elementary school students. Under the title of "A Peek at Japan's Cutting-edge Technology," we explained bearings to students, gave them a tour of the plant, and held a round-table talk about work. The event was held three times (on August 1, 4, and 5, 2014) with 35 students in total participating. I was truly glad to receive letters of appreciation after the event and to receive comments such as, "It was really fun," and "It made me want to work at NSK."



**Letters of appreciation from the children encourage us.**



## Other Activities at the Fukushima Plant

### Internships for High School Students



Every year the plant hosts about 10 students from three schools. The students undergo practical training over a whole week, working on the same schedule as employees. Any questions that arise during training are answered through discussion with employees. The plant hopes that these internships will serve as a good opportunity for the students to learn about themselves and discover work that interests them.

### Southern Fukushima Corporate Exhibition and Networking Event



The Fukushima Plant participated in a corporate exhibition for local junior high, high school, and university students. The purpose of the event is to facilitate hiring in Fukushima's southern Kennan district by giving students the opportunity to learn about local companies and think about work. At the NSK booth, employees interacted with students by introducing the company and showing how bearings work.

# CSR Initiatives

## Highlights

The NSK Group engages in CSR activities in a wide variety of areas in addition to the initiatives covered in this report. Brief highlights of those activities are presented here. Please see the *CSR Report 2015* and supplementary information available on NSK's website for more detailed information. (<http://www.nsk.com/sustainability/csrReport/>)

## Governance

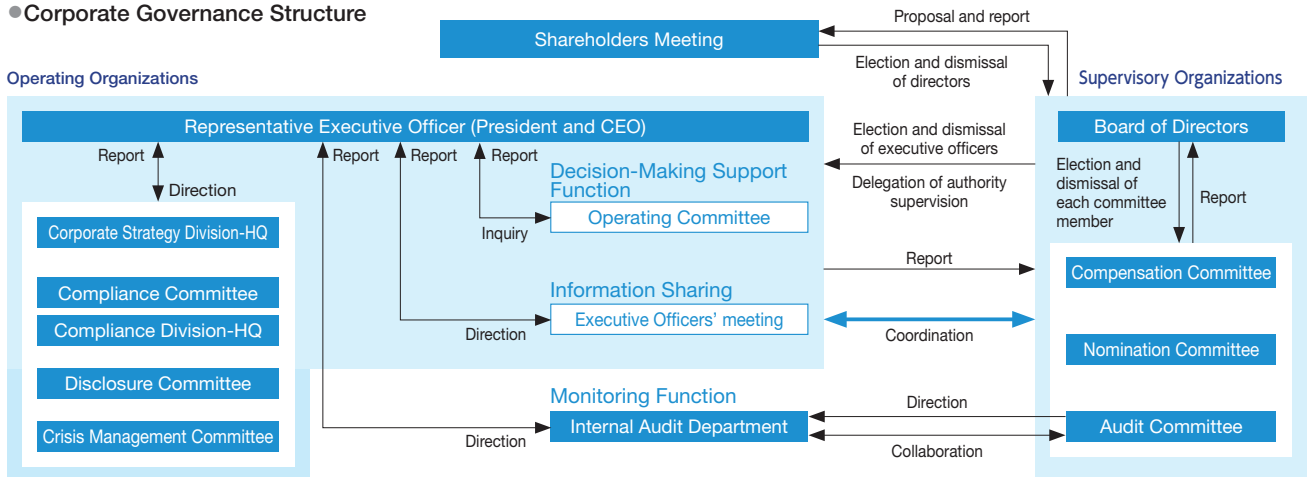
[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p10-22.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p10-22.pdf)

### ● Corporate Governance

NSK regards corporate governance as a structure that enables the operational organizations to realize efficient and fair management under the supervision of the Board of Directors. The Corporate Governance Rules, which are part of NSK's in-house regulations, articulate the basic approach to and framework of corporate governance at the NSK Group.

FY2014 targets	Performance in FY2014	FY2015 targets
Strengthen corporate governance <ul style="list-style-type: none"> <li>Continue to enhance and accelerate dissemination of NSK Group rules</li> <li>Respond to anticipated evolution of society's expectations</li> </ul>	<ul style="list-style-type: none"> <li>Strengthened corporate governance in response to the Japan's Corporate Governance Code</li> <li>Enhanced and accelerated dissemination of NSK Group rules corresponding to social demand and changes in internal management systems</li> </ul>	Strengthen corporate governance <ul style="list-style-type: none"> <li>Strengthen corporate governance structures to ensure fair and transparent decision-making by considering stakeholders' positions</li> </ul>

### ● Corporate Governance Structure



### ● Risk Management

With the global expansion of its business, the NSK Group recognizes the great importance of initiatives to minimize risk. Accordingly, it is taking steps to ensure that various risks are properly identified and managed.

### ● Verification of Risk Management Systems

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Conduct internal audits of finance, purchasing and compliance based on regional risk assessment in the Americas, Europe, China, and ASEAN</li> <li>Visit all global sites to conduct compliance audits</li> <li>Establish the group internal audit standards</li> </ul>	<ul style="list-style-type: none"> <li>Conducted internal audits of finance, purchasing and compliance based on regional risk assessment in the Americas, Europe, China, and ASEAN</li> <li>Visited all global sites to conduct compliance audits</li> <li>Continued to develop the group internal audit standards (June 2015)</li> <li>Held the 2nd global internal audit conference (June 2015)</li> </ul>	<ul style="list-style-type: none"> <li>Conduct internal audits of finance, purchasing and compliance based on regional risk assessment in the Americas, Europe, China, and ASEAN</li> <li>Conduct audits on group governance systems of regional headquarters</li> <li>Visit all global sites to conduct compliance audits</li> <li>Issue and distribute group internal audit standards</li> </ul>

### ● Development of Group Crisis Management Systems

FY2014 targets	Performance in FY2014	FY2015 targets
Develop crisis management systems, based on the Group crisis management standards, focusing on organizational structure	Started to develop crisis management systems, based on the Group crisis management standards, focusing on organizational structure	Materialize crisis management systems and clarify management cycles, based on the Group crisis management standards

## ● Measures for Disasters

FY2014 targets	Performance in FY2014	FY2015 targets
(Measures to deal with the risk of large-scale earthquakes in Japan) <ul style="list-style-type: none"> <li>Implement measures to deal with issues to ensure BCP* (head office and business sites)</li> <li>Verify and revise BCP effectiveness through training (continual production phase mainly at the head office, initial response phase at business sites)</li> </ul>	(Measures to deal with the risk of large-scale earthquakes in Japan) <ul style="list-style-type: none"> <li>Implemented measures to deal with issues to ensure BCP (head office and business sites)</li> <li>Verified and revised BCP effectiveness through training (continual production phase mainly at the head office, initial response phase at business sites)</li> </ul>	(Measures to deal with the risk of large-scale earthquakes in Japan) <ul style="list-style-type: none"> <li>Implement measures to deal with issues to ensure BCP (head office and business sites)</li> <li>Verify and revise BCP effectiveness through training (Expansion of scopes of continual production phase at production sites and initial response phase at business sites)</li> </ul> (Risks associated with disasters at outside Japan sites) <ul style="list-style-type: none"> <li>Identify group-wide severe disaster risks</li> <li>Implement measures to minimize damages from severe disaster risks</li> </ul>

## ● Measures against Risks Associated with Procurement

BCP: business continuity plan

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Continued to develop replacements for parts</li> <li>Update data on supply chain risk items</li> <li>Promote establishment of BCP of suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Continued to develop replacements for parts</li> <li>Update data on supply chain risk items</li> <li>Expand BCP measures to suppliers (guidance for BCP creation)</li> </ul>	<ul style="list-style-type: none"> <li>Continued to develop replacements for parts</li> <li>Visualize global supply chain data</li> <li>Develop supply chain disaster response system</li> <li>Continue to expand BCP measures to suppliers</li> </ul>

## ● Compliance

### Acting with the Highest Ethical Standards and Striving to Maintain the Trust of Society

The NSK Group specifies the common standards of conduct that all officers and employees should adhere to in the NSK Code of Corporate Ethics. The Group aims to continue growing as a company that earns the trust of the international and local communities by following relevant laws and regulations in all of its corporate activities and acting with high ethical standards as a good corporate citizen.

### ● Internal Reporting System (Internal Whistle Blowing System)

The NSK Group operates a whistle blower "Hotline" system, available to all employees, to quickly identify and correct acts that may violate compliance-related rules. One hotline is in-house at the Compliance Division Headquarters and another is staffed by an outside lawyer. The system allows users to remain anonymous and ensures they suffer no unreasonable loss from using the Hotline.

### ● Compliance Education

FY2014 targets	Performance in FY2014	FY2015 targets
Continue to provide rank-based training on compliance	<ul style="list-style-type: none"> <li>Held trainings in the form of discussion mainly for employees of sales department. The trainings were held 76 times for Japanese employees and 32 times for non-Japanese employees, and 932 employees and 629 employees participated, respectively</li> <li>Provided e-learning to officers and employees</li> </ul>	<ul style="list-style-type: none"> <li>In/outside Japan: Expand categories of who receives compliance training and enhance training content</li> <li>Reflect the results of compliance awareness survey in the content of training programs</li> </ul>

### ● CSR Procurement

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Continue to make the NSK Supplier CSR Guidelines widely known to gain understanding of suppliers</li> <li>Distribute the revised NSK Supplier CSR Guidelines in China and ASEAN, and implement surveys using the Self-Assessment Check-Sheets</li> <li>Conduct supplier surveys concerning conflict minerals and respond to customer surveys</li> </ul>	<ul style="list-style-type: none"> <li>Continued to make the NSK Supplier CSR Guidelines widely known to gain understanding of suppliers</li> <li>Distributed the revised NSK Supplier CSR Guidelines in China and ASEAN, and implemented surveys using the Self-Assessment Check-Sheets</li> <li>Conducted supplier surveys concerning conflict minerals and respond to customer surveys</li> </ul>	<ul style="list-style-type: none"> <li>Distribute the "NSK Supplier CSR Guidelines" in Occidental countries</li> <li>Improve activities using the "NSK Supplier CSR Guidelines" and the "Self-Assessment Check-Sheets"</li> <li>Continue to conduct and respond to conflict minerals surveys (supply chain surveys, response to customer's surveys)</li> </ul>

### ● Security Export Control Initiatives

FY2014 targets	Performance in FY2014	FY2015 targets
Strengthen cooperation between relevant departments to improve operation quality for international trade in general, and set up a website for general trade operations	Launched a website on security export control	Improve technical intelligence management systems for production plants

### ● Building a Robust Information Security Governance System

In June 2003, the NSK Group issued the NSK Basic Policy on Information Security as well as Rules of NSK Information Management. Subsequently, it has provided education on security measures for IT devices to officers and employees and taken other steps to strengthen security from both hardware/software and human perspectives.

Meanwhile, there have been several recent scandals worldwide involving leakage of personal information and corporate secrets. This is sparking calls for more rigorous laws and regulations on information security. In response, the NSK Group is developing a global approach to strengthening its information security measures in order to make them more comprehensive and ensure that they cover all business operations. In April 2015, the Company established a new Information Security Enhancement Office under the Corporate Strategy Division Headquarters. The Information Security Enhancement Office will cooperate with the Security Management Committees in each region to strengthen measures.

## ● Relationship with Shareholders and Investors

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Enhance dialogue with investors and analysts concerning the Fourth Mid-term Plan, business environment, governance and non-financial topics</li> <li>Strengthen IR initiatives for individual investors</li> </ul>	<ul style="list-style-type: none"> <li>365 individual meetings, three investors conferences, 38 small meetings with the President &amp; CEO, and 47 overseas IR tours were held to enhance dialogue with investors</li> <li>Expanded ESG information in the Annual Report</li> <li>A total of 480 investors participated in five briefing sessions for individual investors</li> </ul>	<ul style="list-style-type: none"> <li>Continue to enhance dialogue with institutional investors, analysts and individual investors</li> <li>Disclosure based on the Japan's Corporate Governance Code</li> <li>Establishment of the next Mid-term Plan, and revision and disclosure of the public announcement</li> </ul>

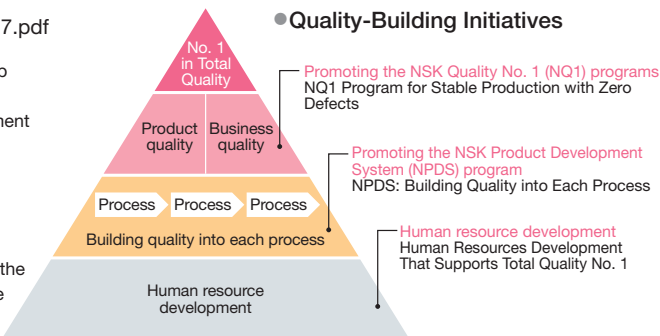
# Quality Assurance

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p23-27.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p23-27.pdf)

The NSK Group aims to become “No. 1 in Total Quality.” In other words, the Group is working to achieve the industry’s best quality in everything it delivers—not only products and services, but also information. The Group believes that this commitment to quality ensures that its products will satisfy customers all over the world.

## ● Initiatives to Achieve Higher Quality

The NSK Group develops, designs, manufactures, and markets products with a superior level of quality by meeting its own unique quality targets over and above the basic quality that customers have come to expect. This approach ensures that the Group contributes to its customers’ development while achieving its own growth.



FY2014 targets	Performance in FY2014	FY2015 targets
Improve the level of the self-audit system for heat treatment processes	Improved the level of the self-audit system for heat treatment processes	Start operating self-audit systems for special processes besides heat treatment

## ● Efforts to Increase Customer Satisfaction

In addition to providing products and services that satisfy customers, the NSK Group is always looking for ways to improve sales activities. It is determined to strengthen its relationships of trust with customers by developing staff who possess advanced knowledge and can deliver a higher level of service.

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Promote maintenance service provision and operation standardization</li> <li>Enhance e-learning training and expand training support tools</li> </ul>	<ul style="list-style-type: none"> <li>Standardized operating processes in safety, quality and improvement, and operated stably at maintenance sites</li> <li>Conducted e-learning trainings with a focus on ASEAN countries and China</li> </ul>	<ul style="list-style-type: none"> <li>Improve maintenance quality and enhance customer value by focusing on development of human resources</li> <li>Enhance education systems for technical support staff</li> </ul>

# Good Labor Practices

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p28-36.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p28-36.pdf)

The NSK Group’s Management Principles clearly state that the Group seeks “to provide challenges and opportunities to our employees, channeling their skills and fostering their creativity and individuality.” The Group sees human resources as the foundation of its business. This is why the Group strives to create work environments where employees can work enthusiastically and enjoy ever-increasing job satisfaction. The Group also works constantly to globally develop human resources who will lead the Group in the future.

## ● Respect of Fundamental Rights at Work

### ● Prohibiting Discrimination and Respecting Fundamental Rights at Work

As specified in the Group’s Management Principles, the NSK Group has committed itself to providing “challenges and opportunities to our employees, channeling their skills and fostering their creativity and individuality.” Moreover, the NSK Code of Corporate Ethics clearly states that the NSK Group prohibits discrimination and respects fundamental rights at work. Accordingly, the Group steadily promotes measures to enhance employee awareness of these points. It prohibits discrimination on the basis of race, appearance, belief, gender, religion, lineage, ethnicity, nationality, age or physical ability. It also prohibits harassment, forced labor, and child labor. In this way it creates workplaces where diverse human resources can work enthusiastically. The Group also strives for equal opportunity employment in the areas of hiring, assignment, and appraisal.

★ Making the most of diverse human resources

- Respecting diversity
- Facilitating work-life balance

### Dynamic workplaces

★ Creating environments where employees can work with vitality

- Respect of fundamental rights at work
- Creating safe and healthy workplaces

★ Providing opportunities and workplaces that foster the growth of self-motivated employees

- Providing opportunities for growth
- Providing workplaces that foster self-development

FY2014 targets	Performance in FY2014	FY2015 targets
Enhance human rights training	Continued providing human rights training through e-learning	Provide human rights training

## ● Creating Safe and Healthy Workplaces

In order to protect the safety and health of each and every employee, NSK undertakes initiatives with the following basic philosophy: “Safety is the first and foremost priority. Workplaces should ensure employees can work safely, no matter the level of output demand.”

It is important to raise the awareness of each and every employee in order to ensure safety in the workplace. This is why NSK is fostering a culture of safety awareness where employees watch out for each other and never overlook an unsafe action or condition.

FY2014 targets	Performance in FY2014	FY2015 targets
Continue to develop further risk assessment	Started Safety Assessor trainings to strengthen risk assessment from designing phase	Strengthen health and safety initiatives global

## ● Developing Human Resources with a Global Mindset

The NSK Group believes that as the globalization of business advances, it is vital that employees can show their abilities in a workplace environment where they can recognize and solve common challenges, spanning national borders and cultural barriers.

FY2014 targets	Performance in FY2014	FY2015 targets
Continue holding the Global Management College	Held the 4th Global Management College	Strengthen development of regional management personnel and global human resources

# Environment

NSK adheres to the principle that global environmental protection, as outlined in the Group's mission statement, must be an ever-present concern in all its business activities. Accordingly, the Group states in its Environmental Policy that environmental management forms the basis of its existence and pursuits. While raising the awareness of each of its employees, NSK works to implement global warming countermeasures, enact measures to promote resource conservation and recycling, create environmentally friendly products, and reduce use of environmentally harmful substances.

## ● System for Promoting Environmental Protection Initiatives

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p39-42.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p39-42.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
<ul style="list-style-type: none"> <li>Maintain ISO14001 certification at all subject sites</li> <li>Obtain certification within three years of starting full-scale operations</li> <li>Zero instances in which emissions standards are exceeded</li> <li>Zero instances of oil and other leakage-related environmental accidents</li> </ul>	<ul style="list-style-type: none"> <li>Maintained certification at all 63 subject sites</li> <li>Three sites obtained certification</li> <li>Number of instances in which emissions standards exceeded; Japan: 1 (oil), EU: 2 (VOC)</li> <li>Zero instances of oil and other leakage-related environmental accidents</li> </ul>	<ul style="list-style-type: none"> <li>Maintain ISO14001 certification at all subject sites</li> <li>Obtain ISO14001 certification within three years of starting full-scale operations at a site</li> <li>Zero instances in which emissions standards are exceeded</li> <li>Zero instances of oil and other leakage-related environmental accidents</li> </ul>

## ● Environmentally Friendly Products and Services

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p43-45.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p43-45.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
Create environmentally friendly products and technologies	Created 12 environmentally friendly products	Create environmentally friendly products and technologies

## ● Initiatives for Saving Energy and Controlling CO<sub>2</sub> Emissions

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p46-49.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p46-49.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In/outside Japan: Reduce CO<sub>2</sub> emissions per production unit by 3% (base year: FY2011)</li> <li>In Japan: Reduce CO<sub>2</sub> emissions to no more than FY2011 level</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce CO<sub>2</sub> emissions per ton-kilometer by 3% (base year: FY2011)</li> </ul>	<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduced CO<sub>2</sub> emissions per production unit by 10.2% (base year: FY2011)</li> <li>Outside Japan: Reduced CO<sub>2</sub> emissions per production unit by 28.3% (base year: FY2011)</li> <li>In Japan: Reduced CO<sub>2</sub> emissions by 3.1% (base year: FY2011)</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>In Japan: CO<sub>2</sub> emissions per ton-kilometer increased by 1.9% (base year: FY2011)</li> </ul>	<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In/outside Japan: Reduce CO<sub>2</sub> emissions per production unit by 4% (base year: FY2011)</li> <li>In Japan: Reduce CO<sub>2</sub> emissions to no more than FY2011 level</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce CO<sub>2</sub> emissions per ton-kilometer by 4% (base year: FY2011)</li> </ul>

## ● Initiatives for Optimal Use of Resources

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p50-52.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p50-52.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
<p><b>Development/Design/Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Continue to reduce waste of resources by changing machining processes</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Maintain zero emissions (landfill disposal rate no more than 0.01%)</li> <li>In Japan: Achieve a waste recycling rate of 99.99% or more</li> <li>Outside Japan: Achieve a waste recycling rate 97.7% or more</li> <li>In Japan: Reduce industrial waste emissions per production unit by 20% or more (base year: FY2011)</li> <li>In/outside Japan: Reduce water withdrawal per production unit by 3% (base year: FY2011)</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce packaging material waste per production unit by 7% (base year: FY2007)</li> </ul>	<p><b>Development/Design/Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduced waste of resources by changing machining processes</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>Maintained zero emissions (landfill disposal rate was 0.001%)</li> <li>In Japan: Recycling rate was 99.999%</li> <li>Outside Japan: Recycling rate was 94.5%</li> <li>In Japan: Reduced industrial waste emissions per production unit by 29.8% (base year: FY2011)</li> <li>In Japan: Reduced water withdrawal per production unit by 25.2% (base year: FY2011)</li> <li>Outside Japan: Reduced water withdrawal per production unit by 23.2% (base year: FY2011)</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>Reduced packaging material waste per production unit by 16.1% (base year: FY2007)</li> </ul>	<p><b>Development/Design/Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Continue to reduce waste of resources by changing machining processes</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Maintain zero emissions (landfill disposal rate no more than 0.01%)</li> <li>In Japan: Achieve a waste recycling rate of 99.99% or more</li> <li>Outside Japan: Achieve a waste recycling rate 99.0% or more</li> <li>Japan: Reduce industrial waste emissions per production unit by 32% or more (base year: FY2011)</li> <li>In/outside Japan: Reduce water withdrawal per production unit by 4% (base year: FY2011)</li> </ul> <p><b>Distribution</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce packaging material waste per production unit by 8% (base year: FY2007)</li> </ul>

## ● System for Optimal Management of Environmentally Harmful Substances

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p53-55.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p53-55.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
<p><b>Procurement</b></p> <ul style="list-style-type: none"> <li>Conduct on-site audits at key suppliers</li> <li>Investigate status of NSK List of Environmentally Harmful Substances at suppliers</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce handling of PRTR-designated substances per production unit by 19% from FY2011</li> <li>In/outside Japan: Completely phase out use of machining fluids containing chlorine additives</li> </ul>	<p><b>Procurement</b></p> <ul style="list-style-type: none"> <li>In Japan: Conducted on-site audits at 44 key suppliers</li> <li>Investigated status of NSK List of Environmentally Harmful Substances at 322 suppliers</li> </ul> <p>Outside Japan: Conducted on-site audits at 12 key suppliers</p> <p>Investigated status of NSK List of Environmentally Harmful Substances at 209 key suppliers</p> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduced handling of PRTR-designated substances per production unit by 24.4% from FY2011</li> <li>Two types of oil solution (Japan: 1, Outside Japan: 1) have not been phased out yet</li> </ul>	<p><b>Procurement</b></p> <ul style="list-style-type: none"> <li>Conduct on-site audits at key suppliers</li> <li>Investigate status of NSK List of Environmentally Harmful Substances at suppliers</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>In Japan: Reduce handling of PRTR-designated substances per production unit by 25% from FY2011</li> <li>In/outside Japan: Completely phase out use of machining fluids containing chlorine additives</li> </ul>

## ● Biodiversity Preservation

[http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e\\_p56-57.pdf](http://www.nsk.com/sustainability/pdf/2015/NSKcsr2015e_p56-57.pdf)

FY2014 targets	Performance in FY2014	FY2015 targets
<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>Perform impact assessment and determine issues to address</li> <li>Develop initiatives for preserving biodiversity through social contribution activities</li> </ul>	<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>Japan: Completed at all plants</li> <li>Initiatives: two sites planned, one site implemented</li> </ul>	<p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>Develop initiatives for preserving biodiversity through social contribution activities</li> </ul>



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