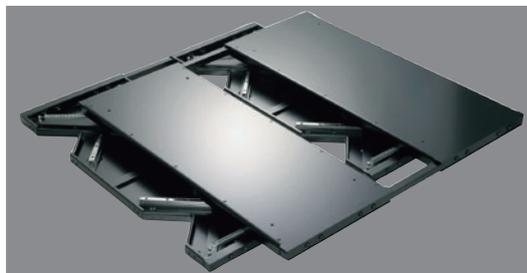


# THK CSR Report 2016/2017



## About This CSR Report

From the day the THK Group (THK) was founded, we have been mindful of the importance of conducting business activities that contribute to society as a whole.

This year's CSR Report is the publication's tenth issue, and it comes at an important time for our company, having just celebrated our 45<sup>th</sup> anniversary in April 2016. In this report, we cover three primary areas in which our company is fulfilling its social responsibilities: robot, renewable energy, and seismic isolation technology. For each, we introduce THK customers who speak about their experiences using our products. The report begins with *robot technology* and a discussion of the extent to which robots can be employed to take over simple, repetitive tasks traditionally done by people. This is followed by a discussion of *renewable energy technology*, where we introduce developments in wind turbines aimed at preventing global warming. Finally, we look at testimonials from our customers about how they are using our *seismic isolation technology* to protect their lives and property from unforeseen earthquakes.

The section entitled "Management Structure" includes a discussion of risk management efforts, while "Involvement in Society" focuses on THK's relationships with its various stakeholders. "Harmony with the Environment" offers a look at our environmental initiatives and the quantitative results from 2015.

The THK CSR Report is an essential tool for communication with everyone who is connected in any way to THK and its activities. Please take the time to fill out the enclosed questionnaire—your comments and feedback are greatly appreciated.



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#### Reporting Period

This report focuses mainly on the period from April 1, 2015, through March 31, 2016, although developments occurring shortly before and after this period are also discussed.

#### Scope

This report is based on information provided by THK CO., LTD. and its consolidated subsidiaries and affiliates. The full scope of the data reported in the section entitled "Harmony with the Environment," apart from that presented in the subsections "Environmental Impact Overview" and "Environmental Conservation Costs," encompasses THK's five manufacturing plants in Japan, YAMAGATA, KOFU, GIFU, MIE, and YAMAGUCHI; THK NIIGATA CO., LTD.; and two manufacturing plants owned by THK INTECHS CO., LTD., SENDAI and MISHIMA.

#### Target Audience

This report is aimed at a broad range of stakeholders, including government administrators, community residents, and THK's customers, shareholders, investors, business partners (including subcontractors and suppliers), and employees.

#### References

Reference material used in the preparation of this report was taken from the Global Reporting Initiative "G4 Sustainability Reporting Guidelines" (2013) and the Ministry of the Environment's "Environmental Reporting Guidelines" (2012).

#### Please direct inquiries to:

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# Committed to the further study of technology to contribute to the creation of an affluent society.



Akihiro Teramachi

THK CO., LTD. CEO

寺町 彰 博

## ● To the victims of the Kumamoto Earthquakes:

Many lives were lost during the Kumamoto Earthquakes which occurred in April of this year. I would like to express my heartfelt sympathy for those who lost their lives and for the families of those individuals. My thoughts are also with those who are still living in emergency accommodations.

Just as I was at the time of the Great East Japan Earthquake, I was moved by the composure of those who maintained order and prioritized helping those in need, despite having suffered greatly themselves. I was also struck by the devotion shown by those who came to volunteer from many different locations. I greatly respect people who have the compassion to think of others, even in a situation like this. I am confident that the area affected by this disaster will recover and see even greater growth in the future.

## ● Reflecting on the 2015 fiscal year

In the fiscal year 2015, China and other emerging countries showed blunted economic growth, while developed nations, primarily in Europe and North America, were driving forces in leading the world economy in a trend of slow but steady recovery. Although Japan also showed such recovery, the trends seen in exports and production were weak.

Within such an environment, our company has promoted expansion of our business through growth strategies, the pillars of which are *full-scale globalization*, in which we aim to geographically expand our range of business, and *development of new business areas*, in which we aim to expand the range of applications of our products.

For *full-scale globalization*, we have striven to grow our sales network to match with the expansion of FA (Factory Automation) in both developed and emerging nations, such as China.

For *development of new business areas*, we have been developing products in order to break into and extend our reach within new markets, such as seismic isolation/damping devices, renewable energy, aerospace, medical equipment, and robotics. As part of that strategy, this April, we

opened the THK Chubu Technical Support Center at the TOYOTA Branch, newly constructed with a seismic isolation device, where a two-armed NEXTAGE® robot is on permanent display. Here, we are able to sell robots and machine components, as well as offer technical support, at a single location.

In response to our customers' need for *the right product at the right price, in the right quantity, and at the right time and place*, our company is actively working to create a *unified production and sales system in areas of demand*, producing and selling locally in Japan, Europe, Asia, and the Americas. Sales has endeavored to expand its networks into areas like China, India, and the ASEAN region, where there have been forecasts for increased mid-term demand. Production has been working to increase efficiency by advancing automation and installing robots in each region. China has aimed for greater Ball Screw production capability by moving and expanding the DALIAN THK Plant.

Furthermore, in an effort to expand our automotive and transportation business, we acquired the European and North American divisions of the L&S (Linkage and Suspension) business from the American automotive parts company TRW Automotive Inc. (now a ZF Friedrichshafen AG group enterprise), and in doing so, added six new plants to our group in four different countries: the US, Canada, Germany, and the Czech Republic.

## Surpassing 45 years

On April 10th of this year, our company celebrated its 45th year anniversary. For this, I would like to express my utmost gratitude to the customers who give us their patronage, to the suppliers who support us, to our shareholders, and to our employees, who show unwavering efforts day in and day out. Based on our corporate philosophy of *providing innovative products to the world and generating new trends to contribute to the creation of an affluent society*, we aim to increase our corporate value as a company focused on creativity and development by developing unique products and one-of-a-kind production technologies. An example of

this is our introduction of unprecedented linear motion products, the Ball Spline and the LM Guide, to the market. Today, these products are used in fields such as robotics, medical equipment, seismic isolation/damping devices, and renewable energy. We provide appropriate solutions to our customers, for needs of which they may not even be aware, by perceiving the areas they are struggling in, reading the demands of the current market environment, and applying customer feedback. This strategy allows us to grow with our customers.

Towards this end, in addition to the two growth strategies I have already mentioned, we have added a new growth strategy, *change in business style*, in which we will expand our use of technologies such as the IoT. By making full use of the IoT, cloud technology, AI, and robotics, we will change the way we do business and reform our systems in terms of where, what, for whom, and how we sell and produce, and, in doing so, we plan to further expand our range of business.

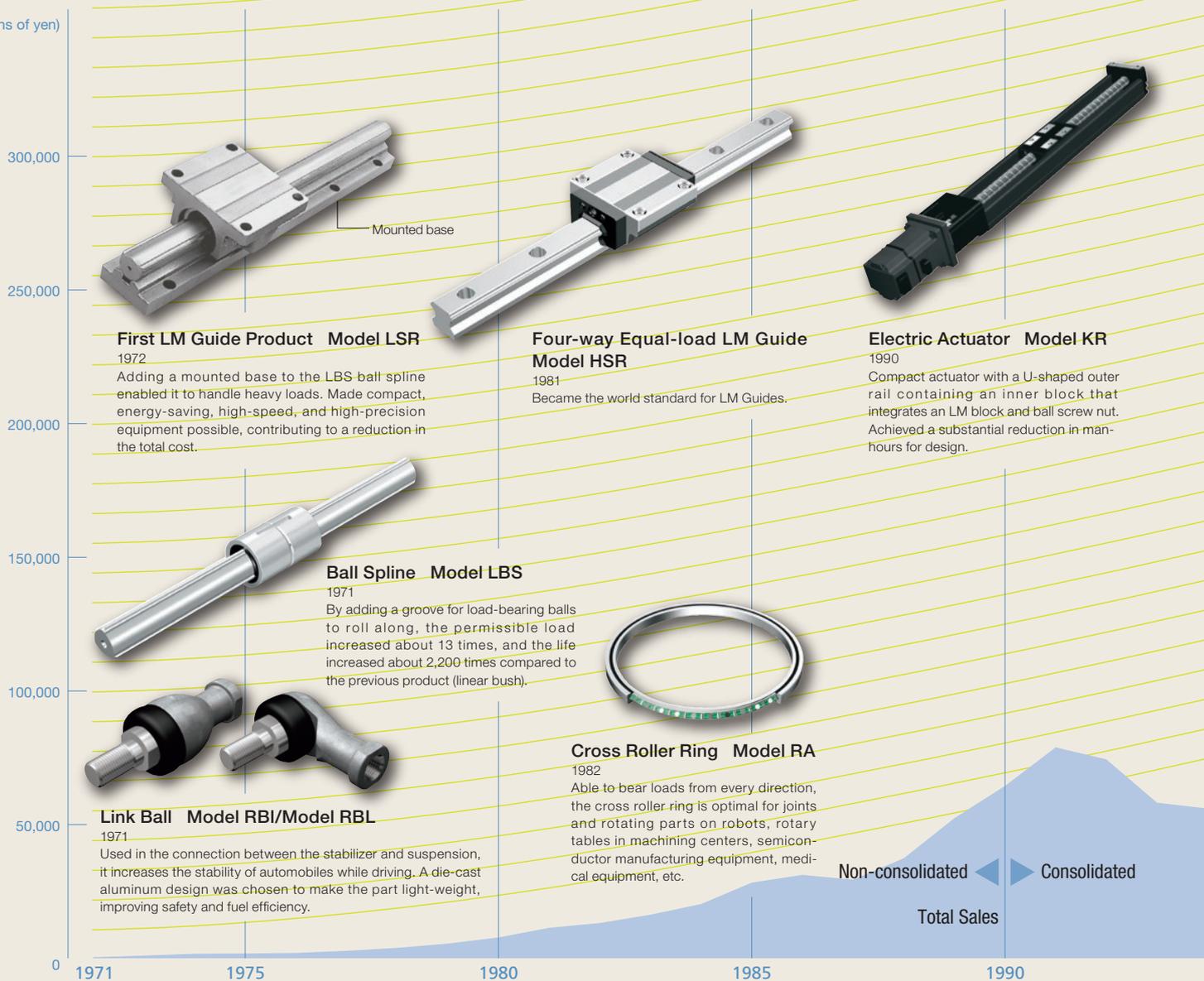
In an effort to grow to be counted among the top ten machine component manufacturers in the 21st century, and to then maintain that position, our company has put forth a major goal: *Global 10 21*. To accomplish this, we will soundly enact our three growth strategies while never wavering in our commitment to creating an affluent society.

In this CSR Report, we present numerous examples of ways in which we contribute to society. THK is a company dedicated to creativity and development, and this CSR report also contains examples of how we are developing new business areas in this regard. Thank you for taking the time to read this report.

# Looking at 45 Years of History and into the Future

THK devoted itself to the task of applying rolling motion to the linear motion units of machines, which was long said to be impossible, and used its original technology to introduce Linear Motion Guide (LM Guide) products to the world for the first time in 1972. This achievement led to high-precision, high-speed, energy-saving manufacturing equipment, which dramatically improved machine performance. THK is now broadening its applications to the fields of seismic isolation/damping devices, robotics, transportation and medical equipment, and renewable energy. THK is striving to further improve its technology to leave a beautiful environment for the next generation and contribute to the creation of an affluent society.

(Sales: millions of yen)



Before 1979

1980s

1990s



Foundation  
(Near Aburamen Park in Meguro,  
Tokyo. Includes TOKYO Branch.)  
April 10, 1971



KOFU Plant completed (First domestic plant)  
1977



THK America established  
(First international sales branch)  
1981



Debuted on the over-the-counter  
stock market  
1989

Full-scale globalization

Development of new business areas

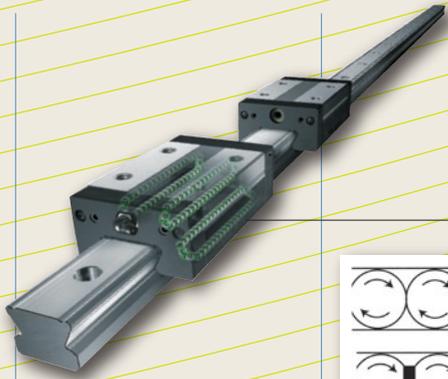
Change in business style

3 core strategies

Industrial machinery

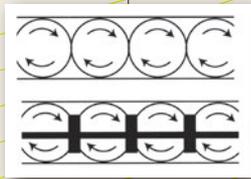
Automotive & transportation

2 areas of business



**Caged Ball LM Guide Model SSR**

1996  
The ball cage prevents balls from colliding with each other, reducing noise and allowing for a longer maintenance-free period than previous products.



**Wind Power Generation**

2010  
Developed a low-torque unit that will rotate even in a light breeze. Plays a role in preventing global warming.



**Seismic Isolation Table Model TSD**

2007  
Protects lives and property from earthquakes.



**Robot Hand Model TRX**

2015  
Using a miniature ball screw allowed for a compact design and increased gripping power.

1995

2000

2005

2010

2016

(Year ends on 3/31)

2000s

2010s



DALIAN THK (First international production facility) 1996



Listed on First Section of Tokyo Stock Exchange 2001



Technology Center established 2005



China R&D Center established 2010

## Development of new business areas

In the development of new business areas, we are accelerating our expansion into areas closely related to consumers, like automotive parts, seismic isolation/damping devices, medical equipment, aerospace, robotics, and renewable energy. To bring about great demand in the field of consumer goods, we will continue to polish our core linear motion technology and accumulated know-how to further accelerate our development into new business areas.

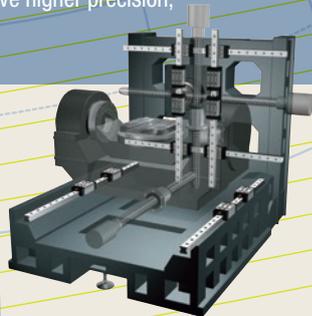
## Change in business style

Up to this point, we have been developing our business around two main strategies, full-scale globalization and development of new business areas, but we have added a new strategy around which to focus—change in business style, in which we adapt to developments in technology like the IoT. By making full use of the IoT, cloud technology, AI, and robotics, we will change the way we do business and reform our systems in terms of for whom, what, where, and how we sell and produce, and in doing so, further expand our range of business.

## Industrial machinery

### Machine Tools & Semiconductor Manufacturing Equipment

By using linear motion guide products such as the LM Guide and ball screw, machinery can achieve higher precision, greater speed, and longer life.



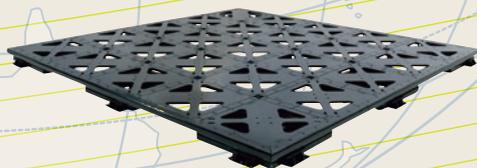
### Robotics

Not just used in industry, but also in a wide range of other fields, including nursing, social services, medicine, etc.



### Seismic Isolation/Damping Devices

Protect lives and property—private homes and other buildings, servers or other IT equipment, and works of art—from earthquake damage.



### Renewable Energy

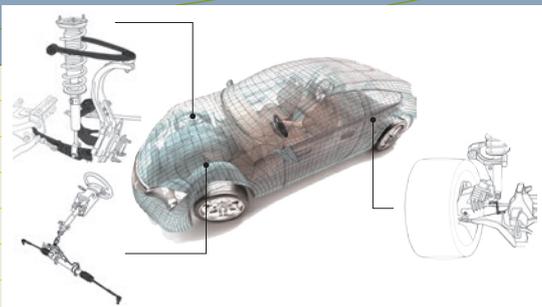
Aids in the prevention of climate change through wind and water power generation.



## Automotive & transportation

### Automotive

Making vehicles increasingly safe and lightweight to contribute to greater stability during operation.



## Full-scale globalization

We are building a unified system of sales and production in four areas of demand: Japan, Europe, Asia, and the Americas. In recent years, we have been working to expand our sales networks and production capabilities in expectation of mid-to-long term demand increases forecasted for China and other emerging nations. We will also be growing our sales networks to ensure we secure the demand of the widening customer base in developed nations.

### Europe



#### Sales offices

**12** locations  
Germany, UK, Italy, Sweden, Austria, the Netherlands, Spain, France, Russia, Czech Republic, Turkey

#### Production facilities

**4** locations  
Ireland, France, Czech Republic, Germany

#### Development facilities

**1** location  
Germany

#### Net sales

**30.4** billion yen

#### Number of employees

**1,772**

### Asia



#### Sales offices

**56** locations  
China, Taiwan, South Korea, Singapore, India, Thailand

#### Production facilities

**12** locations  
China, Taiwan, South Korea, Singapore, India, Thailand

#### Development facilities

**1** location  
China

#### Net sales

**49.2** billion yen

#### Number of employees

**3,263**

### Japan



#### Sales offices

**46** locations

#### Production facilities

**12** locations

#### Development facilities

**1** location

#### Net sales

**110.4** billion yen

#### Number of employees

**4,833**

### The Americas



#### Sales offices

**9** locations  
US, Canada, Brazil

#### Production facilities

**7** locations  
US, Canada, Mexico

#### Net sales

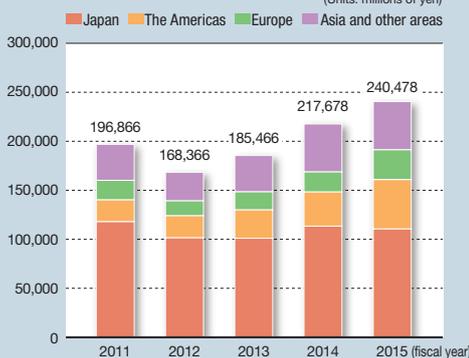
**50.3** billion yen

#### Number of employees

**1,886**

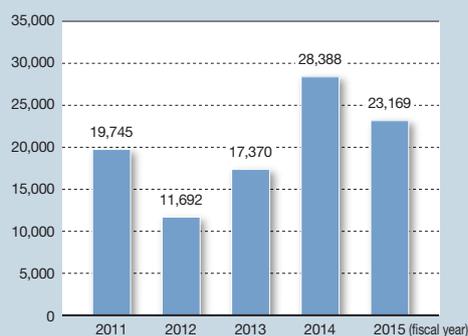
### Consolidated Net Sales

(Units: millions of yen)



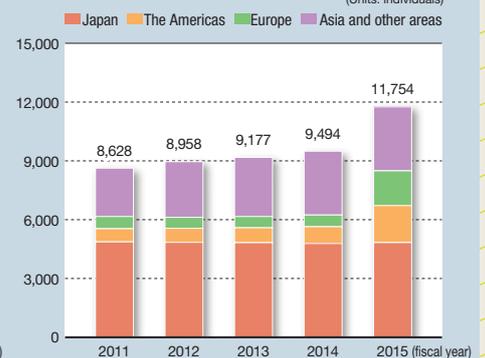
### Consolidated Operating Income

(Units: millions of yen)

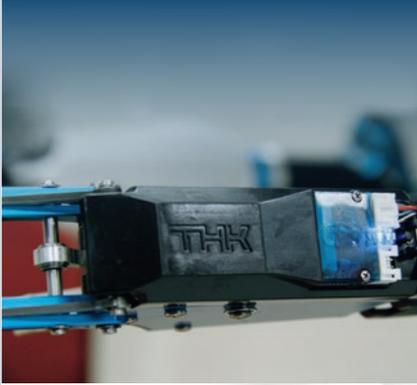


### Consolidated Number of Employees

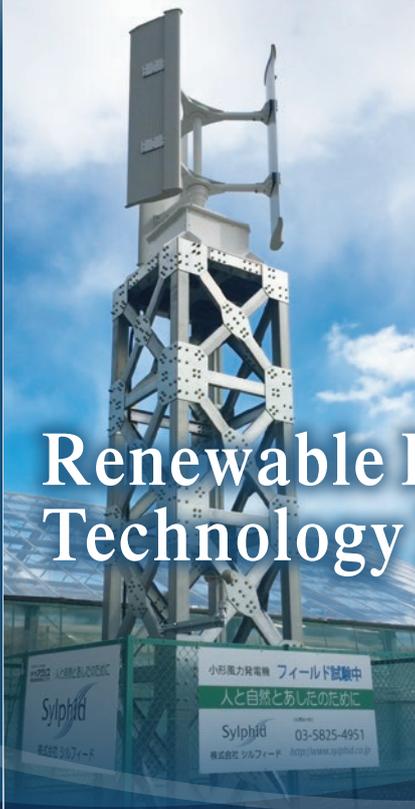
(Units: individuals)



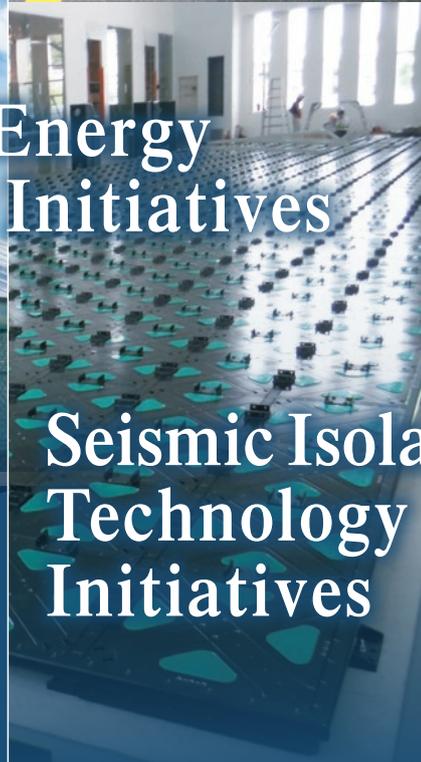
# THK's Ability to Create Value



Robot  
Technology  
Initiatives



Renewable Energy  
Technology Initiatives



Seismic Isolation  
Technology  
Initiatives

## THK INTECHS

## Providing the Optimal Robotics Engineering for Our Customers' Needs

The THK INTECHS homepage states, “We provide the optimal robotics engineering for our customers' needs.” We say this because, as the birth rate declines and the population ages in Japan, it is expected that labor shortages in production facilities will continue to worsen. In order to maintain our production capacity and improve our productivity under these circumstances, we believe one answer is to have robots perform simple, repetitive, and/or hazardous work, and have people engage in tasks that have a high added value (process management, kaizen activities, craftsmanship, etc.).

Robot development has centered around the automotive industry. Robots are already performing tasks that humans cannot. However, human labor has certainly not gone away. The reason is that there has been a need for features that robots until now have not possessed. There is also demand for robots that are *simple, fast, inexpensive, and safe*. The NEXTAGE® robots we have been developing with Kawada Robotics Corporation have the following features:

1. The robots can be set up without an enclosure.
2. The heads are equipped with two “eyes” (cameras) that can check the condition of the robots' surroundings and automatically make corrections.
3. With their *humanoid* design, the robots' movements can be planned out by intuitively imitating the work of humans.

These features differentiate them from previous industrial robots, removing the need for fixing the robots in one location, and allowing them to move around freely. We also develop standard optional parts, such as hands and mobile carriages, that can be installed on the robot. These are the parts equivalent to human hands and feet. Naturally, our customers have many different challenges and requests for their production processes, so it is our role and our function as engineers to provide optimal solutions that best utilize the special features of these robots. Toward this end, we also develop peripheral equipment. By introducing robots to processes while utilizing the current human work envi-



NEXTAGE® performing assembly work at the YAMAGATA Plant



**Takashi Teramachi**

Representative Director and  
President of THK INTECHS CO., LTD.

ronment as much as possible, we are striving to achieve LCA (Low Cost Automation). The number of examples of customers incorporating our robots has increased every year. For instance, our robots have been utilized for working overnight at work stations to perform tasks that humans do during the day, as well as for operating equipment and performing repetitive loading and unloading tasks that humans once did. From an IoT perspective, we also anticipate that using NEXTAGE® hand cameras to inspect parts and gather data will be useful for improving traceability and quality.

In April this year, the Chubu Technical Support Center was established at the THK TOYOTA Branch, which counts THK INTECHS employees among its staff. Because of this, we are now able to investigate product processes at a laboratory and immediately rush in if we are notified of an on-site issue. This year, we are striving to further strengthen our domestic support structure. In the future, we intend to use our business activities to try to become a company the local community thinks highly of.

\* NEXTAGE®: Two-armed industrial robot made by Kawada Robotics Corporation.

As a joint venture between the THK Group and Kawada Robotics Corporation, Kawada Robotics Corporation manufactures the robot body, while THK INTECHS handles sales and develops optional parts.

# High Expectations for the Widespread Use of Robots Made with THK's Globally Competitive Technology

In the past, robot software was developed separately by each university and manufacturer, creating a major hurdle for newcomers in the field. Then, a movement centered around the Ministry of Economy, Trade and Industry arose to construct a software environment with standardized specifications and make that software available so that it could be freely used to accelerate robot development. For instance, with machine components being standardized under JIS, parts can be replaced even with those from a different manufacturer. The same principle applies to software. We at JSK are pursuing robot research capable of interoperability between the Japanese RTM\*1 and American ROS\*2 software environments.

Our collaboration with THK began with the development of the robot hand when we were participating in the DRC\*3 emergency-response robot challenge in the US in June 2015. For the DRC, we needed sturdy hands that could not only grasp various objects, but could also be attached to four legs to walk on. However, we only had one year to prepare. That was when we requested the help of THK, who had experience in and knowledge regarding robot hand development. There were many people at THK who had polished their skills by participating independently in numerous robotics competitions in Japan, and we were amazed by how easily they created their design. They also had highly experienced staff with a deep understanding of how the product would be used. The world of robotics evolves at a rapid pace. Organizations cannot keep

up with the latest trends without people who can grasp the developments that come out every day. Their success depends on whether they have those people.

Even after the DRC, we have been doing joint research and development with THK, combining ROS and a large, life-sized robot constructed with **SEED Solutions**. The objective is to develop robots for research and education that can be



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**Hiroaki Yaguchi**

Lecturer, Ph.D.  
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used in experiments at university laboratories. There are many university laboratories in Japan that would like to use robots, but are not capable of making them. Because people unfamiliar with robots will be running experiments, it is crucial that the robots do not break easily. Operability is also important, as it enables robots to be brought to and used in many different locations. In the past, robots were largely unable to be disassembled, so it was very difficult to transport them. However, the robot with **SEED Solutions** has few wires and can be easily disassembled, so its transportability is a plus. The robot has actually fallen over and been treated somewhat roughly during experiments, but it never broke, and it has been easy to transport to competitions and exhibitions.

The creation and practical application of robots is difficult for a university laboratory to accomplish on its own, so we value our partnership with THK, which makes the actual products through our joint research. If other educational institutions see the fruits of our labor, they will definitely be asking for one of their own. We think it's very important for more young people to gain experience by actually touching and working with complex robots.



Grabbing an object and checking the color

\*1 RT-Middleware: Middleware for robots developed by the National Institute of Advanced Industrial Science and Technology.

\*2 Robot Operating System: Robot software development platform managed by the Open Source Robotics Foundation.

\*3 DARPA Robotics Challenge: Emergency-response robot competition held by the US Defense Advanced Research Projects Agency.

## Robot Technology Development

One could say the core principle of THK's technology is to create products that use little force to move heavy objects. THK is utilizing this technology to develop next-generation robot technology for the society of the future, which will face low birth rates, an aging population, and labor shortages.

A robot hand that our company developed has already been used for the extravehicular robot experiment (REX-J) on the International Space Station. In addition, the development and clinical study of a walking assist robot to support the rehabilitation of people who have undergone knee surgery has advanced through an industrial-academic collaboration between the University of Yamanashi, Kofu Municipal Hospital, and private industry. There are various **SEED Solutions** made by THK in this robot, which allow it to not only control the amount of assistance and measure walking training data, but also wirelessly communicate with an external terminal.

We will continue to pursue technological developments that anticipate societal needs.



REX-J hand used in the extravehicular robot experiment on the International Space Station



**SEED Solutions** built into the walking assist robot

## Sharing THK's Service Robot Technology with the World



**Yasuto Shiigi**

Industrial Machinery Company  
Engineering Division Business  
Development Department  
Nagatsuka Business Unit

Ever since I was a university student, I wanted to work at a robotics laboratory and be involved in space robotics. One of the deciding factors for me choosing to join THK came when I was visiting a former graduate of my university who worked at JAXA. There, I heard about the "robot hand launched to space," which was introduced in our CSR Report 2013/2014, and learned that THK's technology was useful for developing space robotics.

My wish was granted; I was assigned to the department

that handles robot development, and now I am in charge of joint research with the University of Tokyo. We are still at the research stage, but I am proud of our technological developments, which are necessary for THK's service robots to gain widespread use.

**SEED Solutions**, which are the core of THK's service robot technology, are a group of RT (Robot Technology) components that are compact, have few wires, and anyone can easily use. Through **SEED Solutions**, we hope that we can lower the hurdles for people who had given up on robot development, encourage new people to enter the field, and contribute to the development of the service robot industry. Additionally, with the joint research between THK and the University of Tokyo, we are striving not just to work with component parts, but to get involved in the development of platform robots for research and academia that can easily be used by anyone. I hope that the technology we have developed, with the University of Tokyo developing the system based on ROS (Robot Operating System) for the software environment and THK developing the service robot as the hardware environment, will be shared with the world.

As I gain a broad scope of knowledge through this work, I hope to become a robot engineer well versed in everything, from software, to hardware, to electronics.

## A Near-Perfect Shaft that Meets IEC61400\* Specifications



**Masaya Kubo**  
Corporate Planning Department  
Sylphid Inc.

Sylphid Inc. develops, sells, and constructs small wind generators (small wind turbines). At our company, in order to maximize the performance of our small wind turbines, we feel that *balance is the most important factor*. In light of Japan's wind conditions, which are considered an inconsistent, "off-road" environment of changing wind direction and speed, we have developed and employed Japan's first *vortex generators*.

Our present focus is on small autonomous turbines operated by independent power sources, which can be used when generators or power lines go down during a natural disaster. An example of what we have in mind is clean bathrooms at emergency evacuation sites and parks, with odor-eliminating functions powered by independent generators. Our company hopes to contribute to society and be of use to everyone by raising the quality of life through providing power generation even in regions lacking infrastructure.

Ease of rotation is a necessary feature of small wind turbines. However, while a certain degree of strong wind is needed to initialize movement, wind that is too strong can lead to accidents due to over-rotation, so it is necessary to stop the unit to prevent this. In general, Japan is a country with unsuitable wind conditions, but there are some regions with strong winds of speeds of 14 m/s. In such regions, turbines that stop every time there is a strong wind would be unable to function as independent power generators. On the other hand, turbines must be able to rotate even under low wind conditions of 3 m/s, or they become very limited in the uses they can serve. It is difficult to find a balance of ability and versatility for small wind turbines.

When we were developing new products, I attended a wind turbine conference in search of high-safety bearings

with excellent output potential and heard THK's presentation, which gave me a great sense of confidence in their shaft units. The biggest reason that our company started using THK's products in our wind turbines was the appeal of achieving such a high level of performance even with low torque. Furthermore, THK is the only company we are aware of whose products meet IEC61400 specifications. Even within our company, you hear people saying that if we weren't using THK products, we wouldn't have been able to complete our wind turbines. A turbine's vibration when taking on wind force is a critical factor in maintaining a safe system, and when a turbine is made up of numerous individual parts assembled together, it makes it difficult to identify problem areas. However, the THK product used in our wind turbines is designed to be a single unit. The result is that the usual vibration is absent even when running on test machines, and the number of devices we've had to develop has been greatly reduced. When using it in actual wind conditions, you can't help but wonder at how well it spins. An individual from Fukushima Strawberry Farm, where they use our products, insists, "All you need is wind, and they'll run forever." It is extremely important that small wind turbines run without pause if there is a noticeable amount of wind.

Through this project, we were able to build a very good relationship of trust with THK. I feel that those at THK who worked with us are just as important to the project as the developers of our product. To put it a different way, without partnership of this degree, I don't believe we would see good new products coming out of the new market of renewable energy. Our industry can expect much future growth in conserving the earth's environment, so we feel it is vital that we make wind turbines that meet our customers' needs, whether big or small. Rather than simply selling a turbine, we want to ensure that it remains as a regional and social resource. To accomplish this, I believe that THK products must also have the potential to evolve in response to varying circumstances. For the future of our planet, I would like to see the cultivation of THK's shaft unit into a product that could be called the backbone of the business.



Wind turbine installed at a strawberry farm

\* IEC61400: International specification for wind turbines

Aomori Cloud Base Corporation

Hirosaki, Aomori Prefecture

## Looking Forward to Further Advancements in Seismic Isolation

In December 2015, Aomori Cloud Base Corporation completed the first data center in the world which utilizes snow cooling and free-air cooling systems in Aomori Prefecture. By eliminating the need for compressor-based air conditioning, our data center is one of the most power efficient and environmentally friendly datacenters in Japan.

Because datacenters store customers' valuable data, measures to protect the facility and equipment from earthquakes are a prerequisite. Because datacenter customers have a high awareness on the datacenter's anti-earthquake measures, it was very important for us to have a system that can make our customers feel secure. This means that it must withstand the scale of large-scale earthquakes like the Great Hanshin-Awaji Earthquake, the Niigata Chuetsu Earthquake, and the Great East Japan Earthquake.

There are two kinds of seismic isolation devices—one where the entire server floor is isolated, and one where the individual racks are isolated. When we compared the two, while the performance was comparable, we chose THK's floor isolation system from an overall point of view including its cost advantage.

Our datacenter employs a unique modular construction design developed by Fuji Electric, where individual server building modules are built one at a time as they become necessary. At present, we have two server modules each with 80 racks, with a total of 160 racks. These modules were constructed using 2015 technology. If we were to build the third module in 2018, we can build it with 2018 technology. By that time, power, cooling as well as seismic isolation technology will have advanced from where it is today. Because our modular construction design allows us



**Hiroshi Miyamoto**

Managing Director  
Data Center Manager  
Aomori Cloud Base Corporation

to take advantage of the latest technology, we are looking forward to see constant advancements in THK's seismic isolation devices as well.



## Ensuring that *Monozukuri*\* Never Stops

Our company is partnered with Sumitomo Electric Industries. We develop, manufacture, and sell cutting tools, and we mass produce replacement tools with our product line, IGETALLOY. This is a line of cemented carbide cutting tools, used when machining steel or casted material on a lathe or milling machine. Mostly used by automotive, aerospace, and railroad component manufacturers, it has become something *monozukuri* cannot function without.

Our plant is Sumitomo Electric Industries's main facility for manufacturing replacement tools, so if some unexpected problem were to occur, their supply would come to a dead halt. As a result, the production lines of the machine component and automotive manufacturers we directly supply would also be in danger of stopping. In terms of a BCP (business continuity plan), while we have long been taking a number of steps to ensure our speedy recovery even in the event of a disaster, we feel that it is especially important that we take measures to protect our production control and order receiving systems from earthquakes.

Our company has installed backups so that our core system can be back up within a day after a disaster, running in the condition it was an hour before the disaster struck. This system is implemented throughout our facility. In revising our BCP after our experience with the Great East Japan Earthquake, we built an emergency shelter to ensure our employees' safety, installed seismic isolation devices into its floor, and relocated our backup system server there, as well.

While inland Hokkaido is a region with relatively few earthquakes, our company's headquarters is in Itami in Hyogo Prefecture and suffered great damage during the Great Hanshin-Awaji Earthquake. Having gone through this ourselves, we are acutely aware of the need to be ready for earthquakes. Furthermore, during the Great East Japan Earthquake, an earthquake between magnitude 3 and 4 was recorded in Hokkaido, so we cannot be sure that we are completely secure unless we take some measures.

We chose THK when installing the seismic isolation devices in our emergency shelter because of the mechanical strength of their product against pitching. They brought their Seismic Isolation Simulation Vehicle all the way to us, and we were able to feel for ourselves the reduction of seismic intensity this technology brings. Another factor that increased our trust in THK is that we use many of their products in our tool tip production equipment, which is designed and made in-house.

Our company works with many suppliers, but whereas

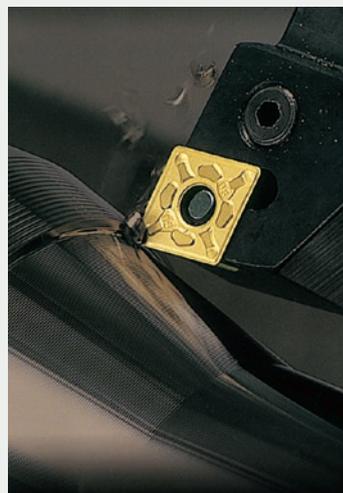


**Kazuhiro Takakuwa**  
Section Manager  
Plant Engineering & Maintenance  
Section  
Hokkaido Sumiden Precision Co., Ltd.

**Masuo Chuudo**  
President  
Hokkaido Sumiden Precision Co., Ltd.

many of these companies have a clear division between their sales and engineering groups, THK's sales representative followed up on the equipment installation, and even members of upper management came by several times, which reassured us that we were in good hands.

While we have implemented measures to protect our emergency shelter with seismic isolation devices, we have CNC and many other high-precision machines at our plant which are at risk from seismic activity. Vibrations, conveyed along the floor by pumps and compressors, can lead to less accurate output. We can't ship our products if they show even the slightest amount of error, so we plan to put efforts into reducing vibration to maintain a high level of precision. We look forward to seeing how THK further develops the seismic isolation device, which simultaneously conducts base isolation and reduces vibration at a high level of performance.



One of our company's replacement tools being used in a cutting process



Servers in our new emergency shelter, safeguarded by seismic isolation

\* *Monozukuri* is a Japanese word, often translated as "manufacturing," that suggests a high level of craftsmanship.

East Nippon Expressway Company Limited Kanto Regional Head Branch Saitama City, Saitama

## Seismic Isolation: an Indispensable Technology for Safe Highways



The Traffic Control Center of East Nippon Expressway Company Limited's Kanto Regional Head Branch is located in Iwatsuki, Saitama City, and monitors the traffic on the expressways of the seven prefectures in the Kanto region, spanning the approximately 1,300 km of expressways in the area (with the exception of the Shuto, Tomei, and Chuo Expressways).

Its main functions are to receive information and respond as needed to any traffic accidents or reports of debris on the roadways. If any problems are reported for roads in our jurisdiction, we deploy our yellow patrol cars to the scene, taking appropriate action when accidents occur and clearing the road of debris. In addition, we have positioned sensors every 2 kilometers along the expressways to measure traffic volume, and this real-time traffic information is automatically collected and sent to our center. Based on this data, we display information about traffic conditions on signs above the appropriate roadways.

For instance, imagine how cracks or bulges form on roadways during large earthquakes, making certain routes impassible. In such cases, if accurate information is not provided about which routes to avoid and which to take, drivers will have no basis on which to make their decisions, and most people would be unsure of whether to keep going or to turn around. This would cause a great deal of confusion, and is a risk that absolutely must be avoided.

When constructing our new control center, we aimed to build the most durable building we could because of our company's direct experience with the Great East Japan Earthquake in 2011. The result is a building 1.5 times more resistant to earthquakes than a typical building.

It defeats the purpose, though, if we just protect the building and not what is inside of it. The most important thing during a large earthquake is to first protect those working inside of our center, and then to protect the control systems. Therefore, we installed seismic isolation devices beneath the



**Toshifumi Hiraike**

Manager  
Kanto Regional Head Branch  
Traffic Control Center Improvement  
Team Operation Department  
East Nippon Expressway Company Limited

floor of the entire control room, as well as smaller seismic isolation devices beneath the servers that are the foundation of our system. We will do everything we can to protect both the operators who work here and our control system, and in the event of a major natural disaster, we will continue to provide the information needed. We feel this to be our center's duty to society.

We chose THK's seismic isolation devices because of the way their structure differed from that of other companies' devices. THK's seismic isolation devices excel at absorbing seismic waves, and objects placed on top of them will not topple over. In addition, even if an earthquake causes the devices to move, they are designed to return to their original position. When constructing ours, THK added a monitor which records the amount the seismic isolation devices move, and on top of tallying this data, there is also a video recorder which stays on at all times, allowing us to look back half a month to check on them. At this point, however, we don't have any recorded data or videos from these devices

being in operation, because there hasn't been an earthquake in the Kanto region since their installation. THK gave us an in-depth explanation when the devices were installed, but if there were a case where additional work needed to be done, we hope to receive assistance at that time.



Seismic isolation devices safeguarding our servers



Control room with seismic isolation devices in the floor

## Protecting the Systems that Protect Our Airways with Seismic Isolation

The Fukuoka Area Control Center is one of the Ministry of Land, Infrastructure, Transport and Tourism's four Area Control Centers nationwide. It monitors the aircraft flying in Japan's airspace. As opposed to control towers at airports, which manage departures and arrivals for each particular airport, Area Control Centers monitor the routes of every flight throughout Japan. The Fukuoka Area Control Center is located in western Japan and monitors the airspace from Kyushu to Osaka, including flights over the Pacific Ocean and the Sea of Japan.

When the control system goes down due to a natural disaster such as an earthquake, restrictions are put on planes flying in Japan's airspace. As a result, long delays for departures and arrivals occur at each airport, and in the worst cases, most of the planes flying between Kansai and Kyushu could get cancelled.

Furthermore, because these controls apply to any aircraft in Japanese airspace, this would also include flights flying to and from China or the American West Coast, as well as flights to Europe from the western part of the US. In other words, if something happens to our control system servers, its impact is not limited to Japan, but extends worldwide. Of course, in preparation for the unexpected, we make sure to have a backup system in at least two locations, such as the Air Traffic Management Center next door to our Area Control Center and the Tokyo Area Control Center, both of which have seismic isolation devices. The laws regarding seismic design criteria were revised in 1998 to mandate that information processing equipment located on the second floor of a building or higher must be on a floor with seismic isolation devices installed. In accordance with this, we equipped the floor of the server room at the Fukuoka Area Control Center with seismic isolation devices.

In these times of rapid IT integration throughout society, Area Control Center can no longer function without servers,



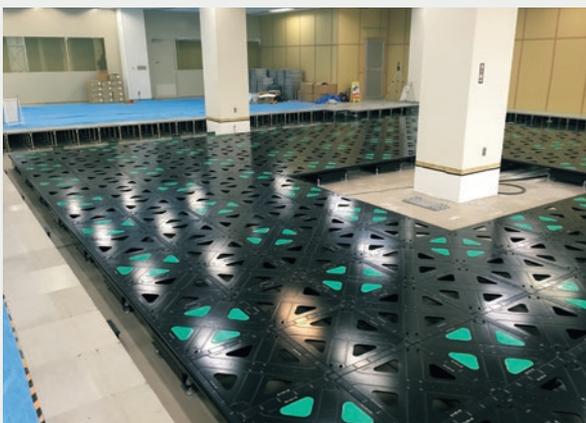
**Akihiko Matsumine**  
Chief Air Traffic Safety Electronics Personnel  
Fukuoka Area Control Center



**Masanori Sokei**  
Assistant Air Traffic Safety Electronics Personnel  
Fukuoka Area Control Center

which store systems and data. The air conditioning vent in the Fukuoka Area Control Center's server room is located on the floor, so we had to devise a way to prevent this vent from getting blocked after the installation of the seismic isolation devices. Because THK's seismic isolation devices can be customized to meet specific requests beyond the standards and conditions set by the Ministry of Land, Infrastructure, Transport and Tourism, which they already meet, we were able to get seismic isolation devices that were custom-designed to our desired dimensions.

In the Kumamoto Earthquakes this April, both of which had a magnitude of 7, Kumamoto Airport's control system servers made it through without incident thanks to their seismic isolation devices. Even in the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake, I heard no word that their servers broke. Seismic isolation devices are amazing things. Fukuoka is a region with a relatively low risk of earthquakes, but we never know when and how big the next major earthquake will be. If the worst were to happen, we expect that THK's seismic isolation devices will fulfill their purpose and contribute to keeping Japan's skies safe.



Server room equipped with custom-designed seismic isolation devices from THK



Fukuoka Area Control Center

## Protecting Works of Art and Cultural Heritage with Seismic Isolation Devices

As can be seen in how close Kumamoto Castle came to collapsing during the Kumamoto Earthquakes in April, major earthquakes harbor the risk of destroying precious works of art and cultural heritage. Along with saving lives and safeguarding valuable data, the high expectations for what seismic isolation devices can do include protecting cultural artifacts of both tangible and intangible value.

With the completion in 2016 of the renovation of the Nara Buddhist Sculpture Hall at the Nara National Museum, which houses a multitude of Buddhist sculptures and other cultural artifacts, we spoke with Seiji Ohnishi about the events leading up to the installation of seismic isolation devices and his hopes for the technology.

— I've heard that all four of the national museums in Japan are investing in seismic isolation devices to protect their cultural artifacts. Could you tell me what triggered this and discuss the current progress of these endeavors? Could you also explain the reasons for installing seismic isolation devices in your renovated Buddhist Sculpture Hall?

The Great Hanshin-Awaji, Chuetsu, and Great East Japan earthquakes heightened our awareness of the need to protect cultural artifacts from earthquakes. In recent years, seismic isolation devices have been installed beneath the Kyushu National Museum and in the floor of the major exhibition room in the Kyoto National Museum's Heisei Chishinkan Wing.

We were granted a certain budget to renovate both the interior and exterior of the Nara Buddhist Sculpture Hall. Needing to improve our display and storage environment with this limited budget, we decided to employ seismic isolation devices in our display cases and pedestals. (See picture on the top right.) We chose to do this because the build-



Seiji Ohnishi  
Assistant Manager of General Affairs,  
Environment Improvement  
Nara National Museum

ing itself is considered an important cultural property, so we cannot make a great deal of changes to it. We feel that it is our duty to pass Japan's valuable cultural artifacts on to the next generation.

— What factors did you consider most important in introducing seismic isolation devices?

Earthquake vibration takes the forms of pitching, rolling, and long-period ground motion. Among the cultural artifacts we house are Buddhist sculptures which, in contrast to dishes, have a high center of gravity. For these, I felt that seismic isolation devices that could withstand rolling and long-period ground motion would be highly effective in preventing these sculptures from falling over. We expect that, even if an earthquake were to occur, our collections will be protected thanks to the seismic isolation devices.

— Please explain your future plans and hopes for the Nara National Museum.

In addition to providing an even better exhibition environment for our guests, we need to create a safe storage environment for our artifacts. Seismic isolation is an important step in making this a reality.



Western facade of the Nara Buddhist Sculpture Hall (Former Imperial Nara Museum Original Museum Building), designed in a Western style

## Corporate Governance

### Governance Structure

Based on the corporate philosophy of *providing innovative products to the world and generating new trends to contribute to the creation of an affluent society*, THK's fundamental philosophy of corporate governance is *maximizing corporate value*. With that in mind, we aim to increase our mid- to long-term corporate value through appropriate and efficient operations and by making management more transparent to our shareholders.

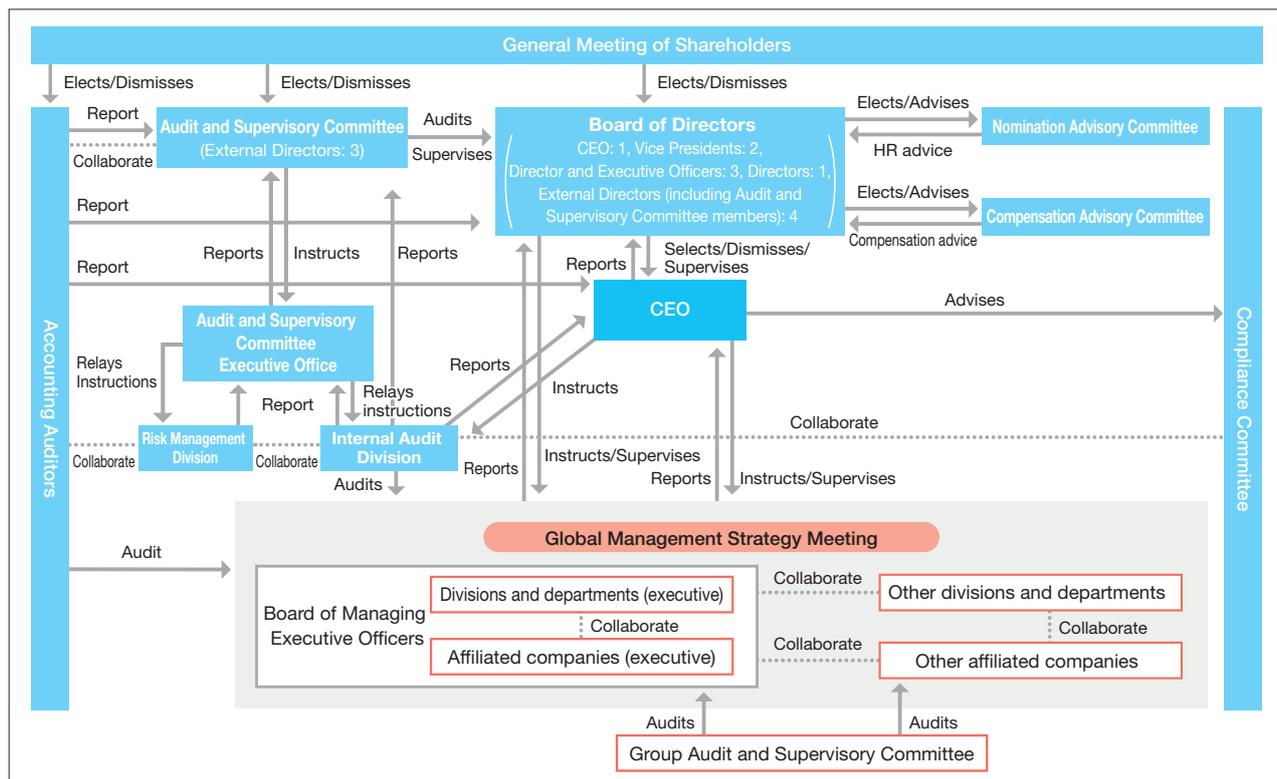
After our company's 46th Annual Shareholders' Meeting on Saturday, June 18, 2016, and with our transition into a company with an Audit and Supervisory Committee, we established a Nominee Advisory Committee and a Compensation Advisory Committee to act as advisors to the board of directors. The Audit and Supervisory Committee is made up of three external auditors, and it audits and supervises the jobs of directors and managing executive officers using our internal audit system. With our transition into a company with an Audit and Supervisory Committee, which serves in an auditing and supervisory capacity, the directors on the committee will participate in board of directors meetings and exercise their votes. In addition, by establishing a Nominee Advisory Committee and Compensation Advisory Committee, we plan to bring enhanced transparency and objectivity to management, strengthen the board of directors' auditing

process, and bring greater speed and efficiency to decision-making regarding the management of our corporate affairs.

THK's board of directors is made up of eight directors, including one external director. (None of these eight directors are members of the audit committee.) There are also three external auditors on the board who, together with those directors, supervise the decision-making and executive actions of directors and executive members regarding major company-wide affairs. THK maintains independence in accordance with the independence standards determined by THK and the Japan Exchange Group. By increasing the number of external directors possessing knowledge and credentials regarding corporate accounting and management from two to four, we show our determination to improve managerial oversight and make our management even more impartial, suitable, and legally sound.

In June of 2014, THK introduced a system of executive officers. We hold executive meetings attended by directors and executive officers, as well as global management strategy meetings, which are attended by executive officers and members from each department and affiliated company. Our different management areas work together to share information and enhance our corporate governance as a company.

### Governance Structure



# Compliance Structure and Training

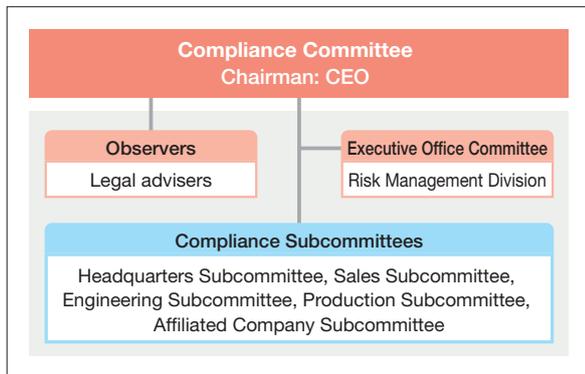
## Compliance Committee

The Compliance Committee is headed by our CEO and has been in operation since 2005. This committee receives reports and deliberates on the handling of policies for creating compliance systems, employees who have violated rules, and internal notices. The committee works with legal advisors, who serve as observers, to ensure proper and lawful practices.

## Compliance Subcommittee Members

We established compliance subcommittees, which are divided by department, with members selected from each office and region. Members of these subcommittees voluntarily hold information sessions on compliance, act as resources to advise others, and fulfill important roles in maintaining the overall compliance system.

### Compliance Structure



## Compliance Subcommittee Member Training Classes

In December 2012, in an effort to increase subcommittee group members' knowledge and ability to act regarding legal compliance, we held a class taught by a teacher not employed at THK. Participants held group discussions about why rules get broken and the right way to respond.



Training class for subcommittee members

## Training Class in India

In October of 2015, 14 local staff members from THK India Pvt. Ltd. held a training class on compliance. The lectures covered the laws and rules we must follow each day, as well as a discussion of how the trust we win from our customers helps us grow. We received a number of comments about the training. In the words of one individual, "It was an opportunity for me to reexamine myself." Another person remarked, "I learned to feel pride as a THK employee."



Training class in India

## Making the Most of e-Learning Materials

In order for employees to learn about the regulations they need to know for their everyday work, we published compliance materials to our internal e-learning environment. In March of 2016, we added new learning materials (13 short-answer problems) about the My Number law/individual identification number system.

## Training Classes at Production Facilities

We began holding training sessions for employees working at our manufacturing plants in 2013. In these classes, we used case studies relating to car accident liability, harassment, improper internet conduct, and more, in order to promote understanding of the importance of legal compliance.



THK INTECHS SENDAI Plant training class

## Internal Notification System

The THK Helpline internal notification system was established to prevent compliance violations and to enable quick and appropriate action in the event of an executive or other employee committing a violation. There were four cases reported in 2015, and we worked with the necessary departments to handle each case appropriately.

# Risk Management and Information Security

## BCP

THK has formulated a BCP (business continuity plan) to minimize damage and ensure a rapid business recovery in the event of a disaster such as a large-scale earthquake.

**Reducing server risks:** THK has reduced the risk we would face in a disaster by separating our core system servers and other main systems from their backups, locating them in two different data centers. We also practice the process of switching over to backups in the event of problems with our main equipment so that we can identify problems and make improvements, ensuring that we will be ready to respond quickly in a worst-case scenario.

**Securing equipment against earthquakes:** THK has installed stabilizing devices to prevent objects in its places of business—such as all-in-one printers and other office equipment, as well as storage racks for components, tools, and office supplies—from moving or falling over. We have also installed our company's seismic isolation devices beneath our coordinate measuring machines and tool storage racks.

**Maintaining daily necessities:** In response to the possibility of people being unable to return home after a large-scale disaster, THK has prepared necessities such as drinking water, food, blankets, and portable toilets at all of its places of business. For our plants with many employees, we have also prepared rescue gear, such as stretchers, and equipment that will allow business operations to resume.

**Disaster response training:** We periodically perform evacuation drills, fire drills, and injured person transportation drills at every place of business. Additionally, we use our safety confirmation system to perform drills for confirming the safety of all employees and use satellite phones to perform drills for communicating information to all employees.

**Infectious disease countermeasures:** We continuously gather information about infectious diseases occurring overseas, such as avian influenza and MERS (Middle East Respiratory Syndrome), and provide information and warnings as appropriate to employees whose work crosses international boundaries, as well as to employees assigned to or on business trips to international locations. We also distribute masks and disinfectant as necessary.

## Information Security

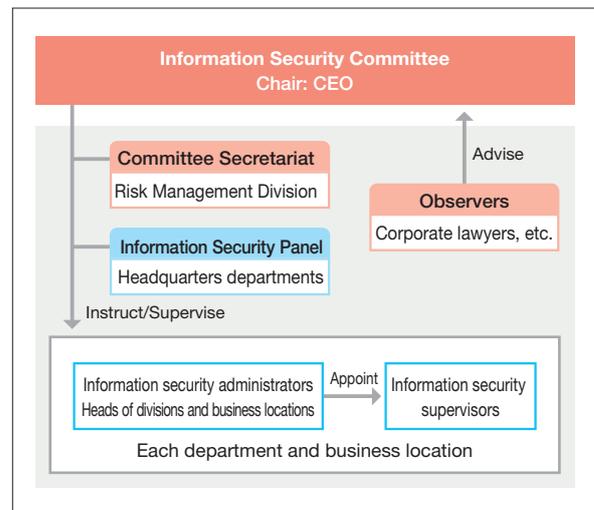
The Information Security Committee, chaired by the CEO, has been in place since 2006. This committee makes decisions concerning policies related to the establishment of an information security system and discusses responses to information security concerns.

In 2015, an internal information security audit was conducted by the Information Security Committee Secretariat at four locations in Japan, facilitating the establishment of an information security system.

In addition, we strive to continuously increase our employees' awareness of and educate them about information security by using the intranet to perform annual information security self-assessments throughout the company. We also endeavor to understand the true condition of information security and make improvements when issues are identified.

By centralizing our management of the information system in one department at our headquarters, THK has maintained above a certain level of security for the entire company and taken measures to prevent accidental information leaks or other incidents. For instance, we keep our antivirus software updated to prevent information leaks due to computer viruses, and we have strengthened our measures to prevent illegal access and transmission. As a means of dealing with targeted e-mail attacks from external sources, we have also introduced a system that detects viruses from external e-mails right before they enter the internal network and prevents their infiltration.

### Information Management System



## Together with Our Customers (Suppliers/Quality/Customer Satisfaction)

### Together with Our Suppliers

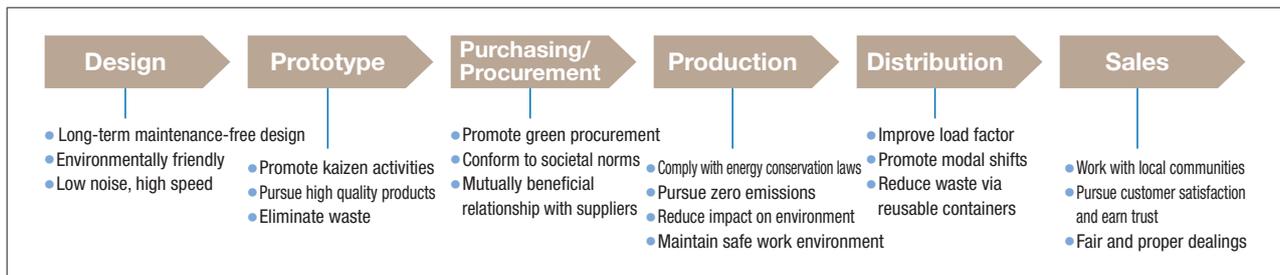
Throughout our supply chain, from design to sales, THK strives to adhere to societal norms and be environmentally conscious in order to facilitate the creation of a sustainable society. We have formed good partnerships with our suppliers, aiming for mutually beneficial relationships.

#### THK Basic Policy on Procurement

In order to continue to provide THK products that satisfy our customers, we establish good, healthy, and mutually beneficial relationships with our suppliers.

- Activities**
- 1 Procurement practices emphasizing communication with suppliers/Evaluating and choosing suppliers with thorough consideration for QCDES
  - 2 Fair and equitable dealings in compliance with all pertinent laws and societal norms
  - 3 Efforts to minimize costs/Encouraging the active pursuit of cost-saving projects and value-analysis initiatives
  - 4 Pursuit of global procurement
  - 5 Implementation of a BCP (business continuity plan)
  - 6 Environmental consciousness through green procurement

### THK's Supply Chain



### Quality Initiatives

THK has taken measures to provide all of our customers with safe, reliable products.

We have obtained the following public certifications:

- 1 ISO9001 quality management system at all production facilities
- 2 ISO/TS16949 automotive industry quality management system for our automotive business
- 3 JIS Q 9100 aerospace industry quality management system for our aerospace business

In doing so, we are engaging in each industry with an even stricter commitment to quality management.

We have also revolutionized our quality information system, creating a global network and sharing the opinions of our customers. Gathering quality information from customers around the world and quickly analyzing that data allows us to promptly deal with customer claims and provide service. We will continue to place great importance on customer satisfaction, approaching quality assurance from the customer's viewpoint and responding to the needs of the market and our customers.

### International Engineer Training (Comments from a Participant)

My name is Miles. I work in the engineering department at THK America. I participated in the GEM (Global Engineering Meeting) held in Tokyo in November 2014. The training was very comprehensive and included lectures at the Technology Center, practical experience assembling and inspecting the cross roller ring and LM Guide Model HCR at the MIE Plant, and a visit to Mitsui Seiki. What I learned through this experience still comes in handy today, enabling me to recommend even better products to our customers.



**Miles V. Prestwood**

Regional Mechanical Engineer

GEM was a great opportunity for the participating engineers from each branch around the world to learn the basic technology behind THK products and to gain technical training to be able to sell the great aspects of our products to customers.



**Osamu Haraguchi**

Leader  
Compliance Promotion Department Information Security Division

**Shuichi Nakano**

Leader  
Strategy Control Department Strategic Planning Division



**Gcom Holdings Co., Ltd.**

Established in 1971 as Fukuoka System Machines Ltd., our company develops, installs, and provides maintenance for a municipal information system (Acrocity) used primarily in towns and cities in Fukuoka. We contribute to the region by improving administrative work and always providing products and services that incorporate the latest technology.

## With a firm grasp of our needs and on-point proposals, THK advances our business

Gcom Holdings Co., Ltd.

### Q Tell us how you began using THK products.

As a company that handles municipal information systems, it is crucial that we ensure our own systems never fail. Spurred by the Great East Japan Earthquake, we formulated a business continuity plan (BCP), but found ourselves lacking a solution to protect our servers from earthquakes. While we had them fixed in place with anchors, many questioned the stability of this system. Just as we were discussing whether to stay with this anchor system or change to seismic isolation, THK presented us with an idea for seismic isolation which fit our needs. They had initially come to advise us on seismic isolation devices for our customers' municipal computer labs and facilities who were customers of ours, but when we expressed that we also wanted to pursue seismic isolation internally, the capabilities of THK's seismic isolation devices happened to perfectly match our needs, so we first asked THK to work on seismic isolation devices for our servers.

### Q What do you look for most in a supplier?

This is the obvious answer, but we look for high quality — and post-installation support. We look for support that is both diligent and prompt. Those are the things we stress the most.

It is also very important that the sales representatives we work with fully understand our needs. There are a great many sales representatives who only give one-sided product

explanations, which tell us nothing. I feel that this recent project with THK came together very smoothly thanks to how well THK's proposal matched what we were looking for. The solutions they proposed met our needs and were even considerate of our budget.

### Q What do you expect to see from THK in the future?

THK proved to be such a reliable collaborator for us, so I'd say I expect to see them reach out to more of our customers in the future. I'm hoping that we can work together to get more seismic isolation devices installed in municipal servers. I say this because if a municipality's system were to go down in a natural disaster, it would affect tens of thousands of residents. We often propose that our customers convert to cloud-based systems as a measure to protect against earthquakes, but there are many cases where this is difficult. When customers are installing system servers in those kinds of situations, I would like to present proposals that include the added value of THK's seismic isolation devices.



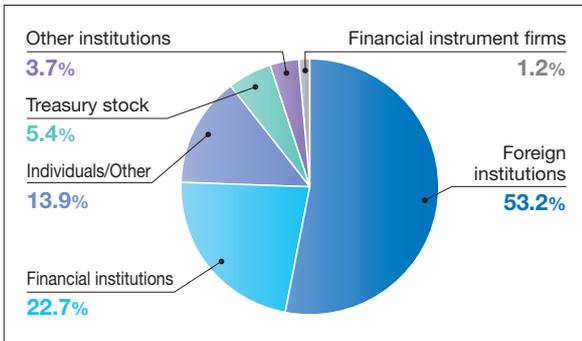
*Servers with seismic isolation devices*

# Together with Our Shareholders

## Investor Relations Event

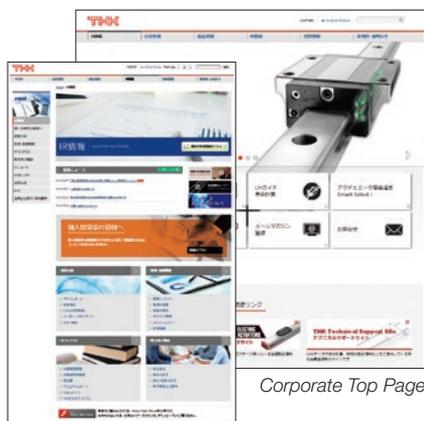
At the semiannual financial results briefing, our president explains the company's performance and strategies, leaving ample time for a Q&A session, where we receive candid feedback regarding our operations. In addition to this, we endeavor to open discussions with more and more investors through small-scale meetings and one-on-one interviews. We strive to take advantage of any opportunity to communicate with our institutional investors, whether local or international, through phone conference interviews, annual visits to American and European investors, and so on.

### Stock Distribution by Owner (Current as of March 31, 2016)



## Investor Relations on Our Website

We updated the Investor Relations section of our website in June of 2016. Along with creating a new section, *For Our Individual Investors*, which contains a collection of information of interest to our individual investors, we revamped the overall structure of our website to make it more readable, searchable, and usable. Please take a look when you have the chance.



Investor Relations

Corporate Top Page

## Shareholders Meeting

In aiming to create an *open forum meeting* that even more shareholders can attend, in 1998, we began holding our shareholders meeting on a Saturday in the middle of June to avoid the busy season. We also created a space in the meeting room for observers, to give suppliers and others who have a stake in THK the opportunity to better understand our business. As a result, we have seen even greater attendance.

Approximately five hundred shareholders attended our 46th Annual Shareholders Meeting held on Saturday, June 18, 2016. In addition to this, to enable people to experience THK products up close—something individuals have few opportunities to do in their everyday lives—we hold a product exhibition every year after our shareholders meeting. This year, our displays featured example product applications for machine tools and semiconductor machines, industrial machinery essential to *monozukuri*<sup>\*</sup>, and applications that are carving the way into new industries: seismic isolation devices, automotive and transportation products, robotics, and the renewable energy fields of wind and water energy.



46th Annual Shareholders Meeting



Shareholders Meeting Product Exhibition

<sup>\*</sup> Monozukuri is a Japanese word, often translated as "manufacturing," that suggests a high level of craftsmanship.

# Together with Our Employees (Health and Safety)

## Occupational Health and Safety Management System

In 2010, in order to eliminate work-related injuries and continuously promote the health and safety of our employees as an organization, we received certification for and began conforming to the Occupational Health and Safety Assessment Series (OHSAS\* 18001).

At each plant, we have established a health and safety committee which determines major controls and actions related to health and safety, educates employees through departmental meetings and postings, and promotes specific activities to ensure the health and safety of all who work in the plant. As one part of employing continuous organizational safety and health activities, we hold a "reciprocal safety audit" twice per year where individuals visit and perform internal audits of other plants. The purpose is to deepen inter-facility rapport and raise the level of control and auditing.

\* OHSAS: Occupational Health and Safety Assessment Series

## Stretching Class

In an effort to improve the health of our employees, our headquarters and Technology Center held a stretching class during lunch in October 2015. Forty-nine employees participated. Exercise instructor Miyako Tonami explained some basic stretches (to perform first thing in the morning, to relieve shoulder tension, etc.), and then everyone practiced them on their own.

While it was only a few minutes of stretching, comments from participants included: "My body feels warmer and more relaxed," and, "I want to keep doing this."

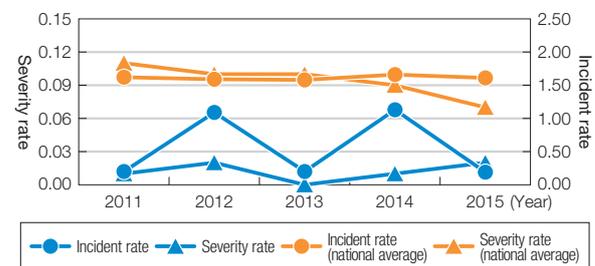


Leg and hip exercises

## Incident and Severity Rates

Helping employees improve their health and creating a pleasant work environment are important in maintaining a strong business. It is with this mindset that our Production Division established the occupational health and safety management system based on the Occupational Health and Safety Policy set forth in 2010. We strive to create a work environment that is safe, easy to work in, and pleasant.

### Incident and Severity Rates (at five THK plants in Japan)



Incident rate: Describes frequency of work-related injuries  
 $IR = (\text{Number of cases}) \div (\text{Labor hours worked}) \times 1,000,000$   
 Severity rate: Describes severity of work-related injuries  
 $SR = (\text{Number of lost workdays}) \div (\text{Labor hours worked}) \times 1,000$

## Certificate of Excellence/Safe Handling of Hazardous Materials

In June 2015, the Oita branch of the Japan Association for Safety of Hazardous Materials awarded the THK RHYTHM KYUSHU Plant with a certificate of excellence for safely handling hazardous materials. The certificate is given to companies that have gone 15 or more years without accidents or injuries and shown exceptional effort in maintenance (and improvements).

This plant stores 27 kL of Class 4, Level 4\* oil, so it is considered a facility that handles hazardous materials and must undergo inspections by the fire department. We received this certificate due to our quick responses to the guidance and suggestions we received during these inspections.



Certificate of Excellence

## Winning Entry of the Hand-Drawn Poster Contest

"Let's find safety issues and fix them together—  
Greater awareness means a safer workplace"

This was the slogan for the 88th National Safety and Health Week held in October 2015.

The MIE Plant participated in a hand-drawn poster contest for Safety and Health Week that was publicized by the Matsusaka Labor Standards Inspection Office. An employee from Manufacturing Section 1 submitted an entry, and hers was selected as a standout piece.



Winning entry



Rieka Ito  
 Manufacturing Department  
 Manufacturing Section 1  
 MIE Plant Production Division

\* Under the Japan Fire Service Act of 1948, a Class 4 hazardous material is a flammable liquid, and a Level 4 is a liquid with a flash point of 200-250 °C.

# Together with Our Employees (Supporting Development)

## Kaizen Proposal System

We started a *kaizen proposal system* with the goal of developing and improving our products, work efficiency, quality, safety, productivity, technology, and more. In our kaizen activity evaluation system, which greatly values the creativity and perspective of those who work on the manufacturing floor, all submitted proposals get recognized, and monetary rewards are given to the employees who submit them. Points are given based on these evaluations, and if the accumulated points exceed a certain threshold, they become eligible for a prize via secondary evaluation—a system unique to THK. In 2015, over five thousand proposals relating to *new markets for our parts* and *improving product quality* were submitted. As a result of continuously encouraging proposals, we are seeing not just process improvements, but also better observational skills and motivation among our employees.

### Proposal Submissions and Prize Recipients

	Proposals (Submissions)	Prize Recipients (Individuals)
2011	11,840	352
2012	11,871	331
2013	11,065	278
2014	7,213	192
2015	5,793	162

## e-Learning

As one part of our employee training, we have brought in e-learning, which enables people to study on their own no matter what time it is or where they are, as long as they have access to the internet. Last year, we expanded our primary curriculum of “business skills” and “product knowledge” to include another important topic: “compliance.” As of March 2016, we offer 59 courses that can be taken online.

### e-Learning Course Statistics

	Participation			Course Completion
	Eligible Individuals	Participating Individuals	Participation (%)	Completion (%)
Sept. 2012	2,049	1,192	58.2	73.2
Sept. 2013	1,951	1,181	60.5	74.0
Sept. 2014	2,012	1,260	63.0	77.0
Sept. 2015	2,018	1,246	61.7	73.6

## RHYTHM KYUSHU—Sensory Evaluation

At the THK RHYTHM KYUSHU Plant, we handle critical safety parts\*, so it is essential that we maintain a system of high-quality production. We have implemented many ideas in an effort to accomplish this, including sensory evaluation. To hone the ability of our employees to sense when something is wrong, we hold sensory evaluations for all operators twice per year to assess knowledge and to maintain and heighten quality awareness. For this test, we intentionally plant defective parts in a mix of sample parts of the same type that an individual typically works on, and the individual must sort good parts from bad using movement and visual inspections. Test takers must get them all correct; even a single overlooked defect means the individual must go through additional testing. The actual final inspection process is visual, so this sensory evaluation is very useful in helping individuals maintain their technique.



Left: Employee being tested (Yamazaki)  
Right: Test proctor (Inazuki)

Sensory evaluation test sheet

THKリズム九州検査課		
課長	技術員	班長
実施日 2016年 3月 25日 名前 山崎 秀貴		
*サンプル№1～20の振動及び外観の合否判定をして下さい。(OK/NGどちらかに○を記入) またNG品の場合のみ、その理由を記入してください (NG品記入例:ホルターA側に打痕あり)		
サンプル№	判定	NG品の原因
1	(OK) / NG	
2	OK / (NG)	右側 キャップレス
3	OK / (NG)	右側 ボルトがキズ
4	(OK) / NG	
5	(OK) / NG	
6	OK / (NG)	右側 キャップキズ

\* Critical safety part: Components connected to the basic car functions of driving, turning, and stopping, the obstruction of which can lead to major accidents.

# Together with Our Employees (Accommodating Employee Needs)

## Greater Flexibility for Accumulated Paid Time Off

We have expanded our system of accumulated paid time off so employees can use it to care for their children. Our system up until now has allowed an employee with one child of non-schooling age to take off five days per year, or ten days in the case of two children, but this has not always been enough. With the revision of this system, if an individual needs to take an extended period of leave to care for their child, they can now use the time off they have accumulated for this purpose.

## Shortened Working Hours

Our former system allowed employees with children under three years of age to work days shortened by two hours, and those with children ages three until schooling age to work days shortened by one hour. In response to employee requests, we have broadened this system to allow the work days of employees with children in third grade or below to be shortened by two hours. In addition, to allow for more flexibility and to accommodate preschool start times, work start and end times can now be set at 15-minute intervals rather than the previous 30-minute intervals.

## Recognition of Continuous Service

While many businesses honor employees at the end of each decade of service, in order to be able to recognize even more employees who have contributed many years to the business, THK presents awards to its employees after every five years of continuous service. In 2016, 813 employees were recognized and presented with commemorative gifts to honor their continuous service. Our European and American facilities similarly recognize those with many years of service at their holiday parties.

### Continuous Service Awards (2012-2016)

(Individuals)

	2012	2013	2014	2015	2016
Total	586	744	579	624	813

### HR Data Records

	2011	2012	2013	2014	2015
Childcare leave (individuals)	29	31	29	23	25
Shortened hours (individuals)	33	41	48	62	71

	2012.4	2013.4	2014.4	2015.4	2016.4
Disabled employees in the THK workforce (%)	1.89	2.01	2.24	2.23	2.21



## My Experience with Childcare Leave



**Toshinori Sato**

Assistant Manager  
Corporate Strategy Headquarters  
in charge of Appointive Global  
Human Resources Strategy

I learned a lot in the two months of childcare leave I took beginning in July of 2015.

First of all, by looking after a child 24 hours a day and dealing with stress that you can't prepare for the way you would for something at work, I experienced what it's like to be entrusted with the life of a child. I also came to understand the physical and mental state of employees who work shortened hours for their kids. I understood why the heightened awareness of time these individuals develop contributes to high efficiency in the work they do. I also realized how much the experience of caring for a newborn affects a couple's trust in one another, as well as a husband's awareness of what it means to care for a child.

Second, I learned that childcare leave is only possible with the understanding and collaboration of those at your workplace. I was hesitant about requesting leave at first, but thanks to everyone's understanding and their efforts to cover for me in my absence, my return to work afterwards went smoothly.

The third fact I became conscious of was the lack of recognition childcare leave receives. Friends from college told me that their companies don't offer anything like it, but childcare leave is actually something open to everyone, regardless of their gender. According to a government study, while both partners work in half of all families, 81.5% of women and 2.65% of men take childcare leave, so the individuals taking it are almost entirely women.

To address this problem, I believe that our workplace must recognize diverse working patterns, foster employee awareness, and develop systems that enable us to bring about results as a team. I personally plan to face my jobs both at work and at home without hesitation. I want to use my personal experiences to change the conception people have of childcare leave and to contribute to creating an atmosphere that better facilitates diverse working patterns.

\* Details of THK's system for childcare leave are described in the handbook distributed to all employees.

# Together with Our Employees (Local Communities)

## Charitable Contributions

As part of our contributions to society, THK provides financial assistance in times of natural disasters and donates money to organizations devoted to the advancement of science and the future development of *monozukuri*<sup>1</sup> in Japan. In addition, we sponsor a variety of events in communities where we have business locations.

### Donations

Date	Donation for:	Donation sent to:
May 2015	April 2015 Nepal Earthquake Relief Fund	Japanese Red Cross
July 2015	Japanese Red Cross activities	Japanese Red Cross
September 2015	Tropical Storm Etau relief	Japanese Red Cross
October 2015	The Disaster Relief Fund for Victims	Central Community Chest of Japan, Tokyo branch
January 2016	Japan Science Foundation	Japan Science Foundation
March 2016	2016 Taiwan Earthquake	Japanese Red Cross
May 2016	2016 Kumamoto Earthquakes	Japanese Red Cross

## Hydroelectric Power Generation Tour

In Kanagawa prefecture, periodic guided tours of farming facilities are offered to local residents to teach them about the importance of agriculture and agricultural land and why their protection and promotion are so critical.

In an event held in September 2015 called “Experience the taste of autumn with Ebina pears!,” a study trip was held to tour the hydroelectric power generation facility featured in last year’s CSR report.

In response to the explanation of these generators, which are powered by irrigation canals, the elementary school children and their chaperones gave us feedback such as, “It taught me that there are eco-friendly generators that use fresh water,” and, “It’s not wind—it’s water power! It’s incredible. I really hope this gets put to use.”



Explaining the hydroelectric power generation system

## World Scout Jamboree

The World Scout Jamboree, which takes place once every four years, was held in Yamaguchi prefecture in 2015 from late July until the beginning of August. This event was attended by 33,628 Scouts from 155 countries and regions. Each city in Yamaguchi prefecture was asked for its cooperation with the event, and Sanyo-Onoda made it their policy to emphasize the following to their visitors: 1. Traditional culture, 2. Sanyo-Onoda’s unique atmosphere, 3. Technological innovations, and 4. Safety and peace of mind. With regards to technological innovations, the city of Sanyo-Onoda asked the YAMAGUCHI Plant to allow plant tours for the event because of its excellence in terms of environmentally-friendly technology. Over two days, a total of forty Scouts visited the facility.

The visitors showed particular interest in the seismic isolation device simulator we have in the showroom. When they saw how little the water in the plastic bottle on the machine moved during the demonstration, some doubted there was real liquid inside. They also showed great interest during the

plant tour. Afterwards, we received comments from participants that it had been a beneficial and extremely satisfying day for them.



In front of the YAMAGUCHI Plant

<sup>1</sup> Monozukuri is a Japanese word, often translated as “manufacturing,” that suggests a high level of craftsmanship.

# Together with Our Employees (Local Communities)

## Combating Science Phobia

To do our part for the Childcare Support and Environmental Management Project promoted by Mie prefecture, in addition to participating in a seminar held by the prefectural government, the MIE Plant put up posters on a telephone pole by the elementary school near the plant and visited a school as a guest speaker to get students more interested in science.

In January 2016, we introduced 79 students at Matsusaka Technical High School to THK products, and they became more interested in industrial products.



Poster on a telephone pole in front of the elementary school near the MIE Plant

## To a Successful G7 Ise-Shima Summit!

The Group of Seven (G7 Summit) met on the island of Kashikojima in Mie prefecture at the end of May 2016. The MIE Plant assisted with event support to help make the summit a success.

We displayed posters in two places where all plant employees could see them: the general bulletin board and the board at the location where we hold the morning assembly. The office workers also pinned badges on their uniforms to catch the attention of plant visitors.



Ise-Shima Summit commemorative badges

## Removing Non-Native Fish from Lake Biwa

Populations of non-native species of fish such as black basses and bluegills have multiplied in Lake Biwa in recent years, which has caused a drop in the populations of native fish who originally inhabited the lake. We learned of the activities of the Lake Biwa restoration group, whose goal is to reduce the amount of non-native fish, and 14 people from the KEIJI Branch (now the KYOTO Branch and SHIGA Office) and WEST JAPAN OFC participated in the non-native fish removal event held in April 2015.

Unfortunately, a chilly rain started falling the morning of the event. Because it had also rained the day before, the water temperature had dropped, so our catch was no more than twenty fish. We will continue to actively participate in events closely tied to the local community.



Ready to fish!

## Recreating the Satoyama in Nanasawa

The Nanasawa area of the city of Atsugi has a rich natural environment and sweeping terraced rice fields rarely found in metropolitan areas. However, there have recently been problems managing those fields due to wildlife damage and an aging population. In an effort to utilize the resources of the *satoyama* (the border zone between foothills and farmland) and engage with local citizens, ten volunteers from EAST JAPAN OFC and the Engineering Division participated in a rice-planting event organized by the city of Atsugi.

Some of the volunteers had planted rice as children, but after a long time spent holding the same posture, many were met with sore muscles the next day. We received 17 kg of rice from the organizers as our share, but we donated all of it to the Atsugi child guidance center.



Muscles were sore the next day

## Promoting Environmental Management

### Basic Environmental Policy

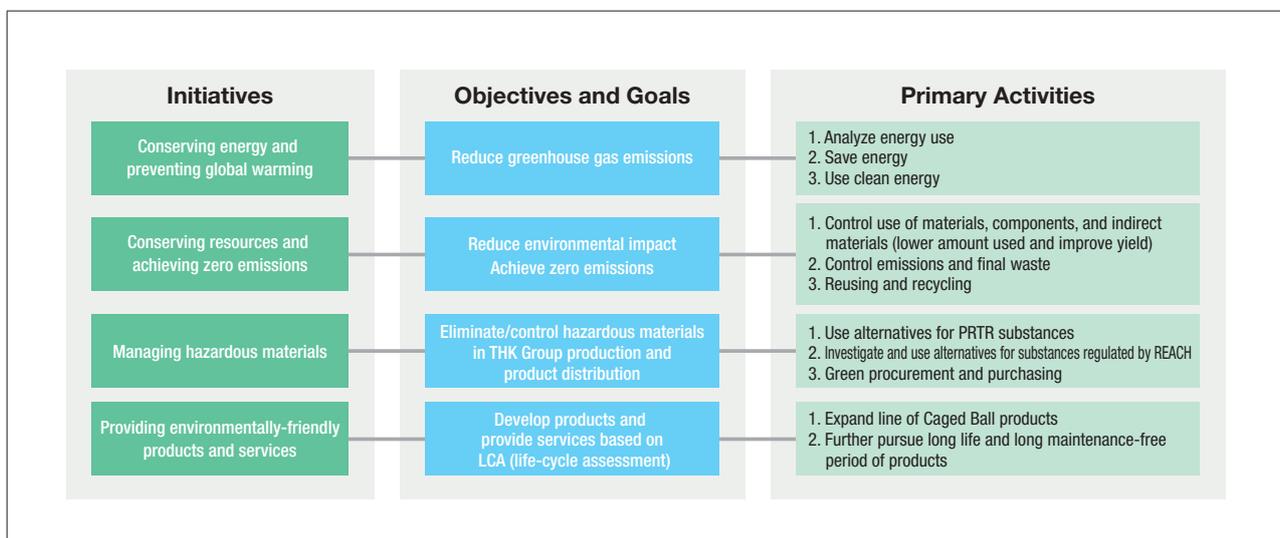
The THK Group contributes to both society and the economy through our pioneering role as manufacturers of Linear Motion Guides and other products. We also believe that it is a company's social responsibility to leave the global environment in a healthy state for the next generation, which is why we are promoting the following initiatives to continually decrease our environmental impact and to sustain and improve the natural environment.

### THK Group's Basic Environmental Policy

(Revised on June 3, 2013)

1. We consider conservation of the environment to be a major management challenge, and we are striving to accurately understand how our business activities, products, and services impact the environment. All divisions set appropriate environmental goals to address this challenge.
2. In addition to complying with environmental laws, we have set self-imposed standards that are reviewed regularly to improve the efficiency and effectiveness of our environmental management.
3. We will continually promote the development of products that help reduce environmental impact.
4. We will cut down energy use in our business activities and continually promote the reduction of energy consumption and greenhouse gas emissions.
5. With a particular focus on the reduction and recycling of waste from our manufacturing division, we will not only continue to promote the saving and recycling of resources, but also strive to prevent pollution.
6. To achieve greater collaboration with regard to our environmental activities, we provide guidance and support to our affiliate companies and business partners, and also strive to work in cooperation and harmony with the community.
7. This basic environmental policy is disseminated to all divisions in the group through education, training, and awareness campaigns, and we facilitate the timely release of information on the environment both within and outside the Group.

### Environmental Initiatives and Goals



# Environmental Management System

## Environmental Management System

THK has acquired ISO14001 Environmental Management System certification at its domestic and international production facilities. We strive for continuous improvement by utilizing the PDCA management cycle at each production base. In order to promote environmental activities throughout the THK Group, the Risk Management Division Environmental Management Department at our headquarters serves as the nexus for environmental impact reduction efforts conducted between the production, administrative, and distribution divisions. This department also checks on the progress

of environmental activities and expands successful policies to other locations.

Among our three goals for 2015, we were not able to achieve our target for conserving energy and preventing global warming (CO<sub>2</sub> emissions), but we did hit our target for conserving resources and achieving zero emissions (reducing the volume of waste that undergoes final disposal), as well as our target for managing hazardous materials (reducing the amount of PRTR materials we use).

### ISO14001 Certified Facilities

Facility	Date certified	Certifying body
YAMAGATA Plant, KOFU Plant, YAMAGUCHI Plant, MIE Plant, GIFU Plant	Dec. 17, 2010 (Renewal date)	JQA
TRNA (US)	June 13, 2001	SQA
THK RHYTHM Headquarters & HAMAMATSU Plant	Dec. 20, 2001	JIA
THK RHYTHM KYUSHU Plant	Dec. 20, 2002	JIA
TMA (US)	July 14, 2003	SAI GLOBAL
TME (France)	Feb. 3, 2004	AFAQ
THK NIIGATA CO., LTD.	Oct. 21, 2005	JQA
THK RHYTHM INASA Plant	Dec. 20, 2006	JIA
THK WUXI (China)	Jan. 7, 2008	CQC
DALIAN THK (China)	Dec. 18, 2008	TUV

Facility	Date certified	Certifying body
THK LIAONING (China)	Jan. 12, 2010	TUV
TRTC (Thailand)	July 9, 2010	URS
TRGC (China)	Dec. 9, 2010	SGS
TRMS (Malaysia)	Oct. 25, 2011	DQS
THK INTECHS MISHIMA Plant & SENDAI Plant	Mar. 21, 2013	ClassNK
TRA Michigan (US)	Oct. 24, 2014	DQS
TRA Canada (Tillsonburg)	Feb. 8, 2015	DQS
TRA Canada (St. Catharines)	Feb. 10, 2015	DQS
TRCC (China)	Mar. 17, 2015	BUREAU VERITAS
TRA Czech (Czech Republic)	Apr. 16, 2015	DQS
TRA GmbH (Germany)	Dec. 17, 2015	DQS

### THK Environmental Targets

No.	Task	2015 Results & 2016 Targets	Mid-Term Targets (by 2018)
1	Conserving energy and preventing global warming	<p><b>CO<sub>2</sub> emissions</b></p> <p>■ 2015 result 2015 target was 0.91. Result was 0.92. (Target was not met.)</p> <p>■ 2016 target 0.91 tons CO<sub>2</sub> per 1 million yen (1% reduction from previous year)</p> <p>Main tasks for 2016</p> <ol style="list-style-type: none"> <li>1. Update air conditioning units to energy-efficient units</li> <li>2. Change to energy-efficient lighting (LED)</li> <li>3. Introduce air leak detection system</li> </ol>	<p><b>CO<sub>2</sub> Emissions</b></p> <p>Baseline: 0.92 tons CO<sub>2</sub> per 1 million yen (2015 result)</p>
2	Conserving resources and achieving zero emissions	<p><b>Zero emissions rate</b></p> <p>■ 2015 result 2015 target was less than 0.50%. Achieved 0.26%. (Target was met.)</p> <p>■ 2016 target Less than 0.50%</p> <p>Main tasks for 2016</p> <ol style="list-style-type: none"> <li>1. Recycle grinding wheels</li> <li>2. Recycle plastics</li> <li>3. Thoroughly separate materials</li> </ol>	<p><b>Zero Emissions</b></p>
3	Managing hazardous materials	<p><b>PRTR substance use</b></p> <p>■ 2015 result 2015 target was 60,976 kg. Result was 45,490 kg. (Target was met.)</p> <p>■ 2016 target Use less than 44,125 kg of PRTR substances</p> <p>Main tasks for 2016</p> <ol style="list-style-type: none"> <li>1. Reduce fuel oil use</li> <li>2. Control use of equipment that runs on fuel oil and diesel fuel</li> <li>3. Promote green procurement</li> </ol>	<p><b>Reduce PRTR Substance Use by 3% per Year (kg)</b></p> <p>Baseline: 45,490 kg (2015 target)</p>

# Environmental Impact Overview

## INPUT

	2014	2015
Main raw materials	94,733 t	84,462 t (-10.8%)
Main indirect materials	3,351 t	3,074 t (-8.3%)
Packaging materials	4,289 t	4,315 t (0.6%)

## Energy Input

	2014	2015
Electricity	229,388 MWh	221,304 MWh (-3.5%)
Bunker A fuel oil	3,884 kL	3,916 kL (0.8%)
Liquefied natural gas	182 t	123 t (-32.4%)
Propane	831 t	894 t (7.5%)
Kerosene	47 kL	27 kL (-42.9%)

## Suppliers



Green procurement guidelines have been distributed to every supplier to facilitate the procurement of materials with low environmental impact.



In accordance with ISO14001, each facility pursues activities to reduce environmental impact, such as green procurement and efforts to achieve zero emissions. We also implement modal shifts, reducing the energy used for distribution.

## Customers



We provide our customers with energy-saving, long-lasting products which help reduce the environmental impact of our customers' production processes.

## OUTPUT

	2014	2015
Production volume	77,066 t	71,686 t (-7.0%)

## Waste

	2014	2015
Total waste	18,359 t	19,203 t (4.6%)
Recycled	15,981 t	16,598 t (3.9%)
Incinerated	1,831 t	2,102 t (14.8%)

## Air Emissions

	2014	2015
CO <sub>2</sub> emissions	159,745 t-CO <sub>2</sub>	152,453 t-CO <sub>2</sub> (-4.6%)
NO <sub>x</sub> *1	8,391 Nm <sup>3</sup>	3,170 Nm <sup>3</sup> (-62.2%)
SO <sub>x</sub> *2	2,304 Nm <sup>3</sup>	2,509 Nm <sup>3</sup> (8.9%)

\*1 NO<sub>x</sub> (Nitrogen oxides):  
Generated by the combustion of fuel in boilers and other sources.

\*2 SO<sub>x</sub> (Sulfur oxides):  
Generated by the combustion of sulfurous fuel in boilers and other sources.

\* This overview of our environmental impact is based on the following production facilities:  
Five domestic THK plants (YAMAGATA, KOFU, GIFU, MIE, and YAMAGUCHI) and THK Group plants (THK NIIGATA, two THK INTECHS plants, NIPPON SLIDE, and three THK RHYTHM plants)  
Five international THK plants (TMA (US), TME (France), DALIAN THK (China), THK WUXI (China), and THK LIAONING (China))  
NO<sub>x</sub> and SO<sub>x</sub> figures are for the five domestic THK plants only.

## Environmental Conservation Costs

(Units: millions of yen/year)

Type	Investment	Cost	Main activities
1. Business costs	185	240	
Pollution control costs	(63)	(52)	Monitoring air and water quality, performing maintenance on washing equipment and sewage tanks
Global environmental conservation costs	(121)	(59)	Installing energy-efficient auxiliary equipment
Recycling costs	(1)	(129)	Disposing of waste, recycling
2. Upstream and downstream costs	0	20	Green procurement activities
3. Management activity costs	1	198	ISO activities, reducing energy use, managing hazardous materials
4. Research and development costs	83	583	New product development
5. Community activity costs	0	7	Local activities, PR activities
6. Environmental damage costs	0	0	
Total	268	1,047	

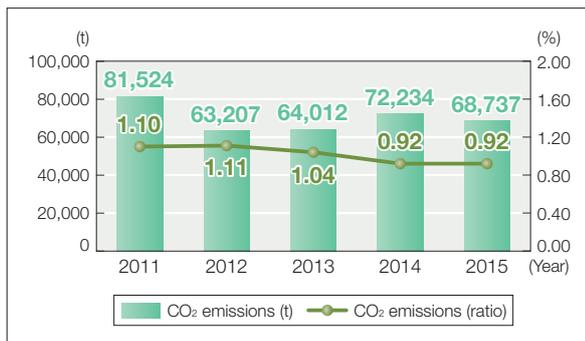
# Conserving Energy and Preventing Global Warming

## THK's CO<sub>2</sub> Emissions

Our target for reducing our CO<sub>2</sub> emissions is defined in terms of the ratio of CO<sub>2</sub> emissions to production volume in yen. Our target for 2015 was 0.91, but our actual ratio was 0.92, so we were slightly over and did not achieve our target.

We switched to high efficiency air conditioning units, changed from mercury vapor to LED lighting, and repaired our air supply systems at each of our facilities, but we did not reach our target because our use of air conditioning increased, primarily as a safety precaution on humid summer days. However, our actual volume of CO<sub>2</sub> emissions (absolute emissions) decreased about 4.8%, from 72,234 tons to 68,737 tons.

### CO<sub>2</sub> Emissions



## Installing LED Lighting

**TME:** In 2015, TME (THK Manufacturing of Europe, France) switched all of the mercury vapor lighting used in Factory 2 to LED lighting (344 bulbs) as a continuation of the lighting replacement project in Factory 1. This change reduced the amount of electricity used per month by approximately 59,000 kWh and improved the illumination inside the plant by about 14%. We aim to further save electricity by replacing the lighting in the office areas in 2016.



TME Factory 2

**THK NIIGATA:** In 2015, THK NIIGATA replaced around 670 fluorescent bulbs and 26 mercury vapor bulbs with energy-efficient LED lighting, reducing electricity consumption by approximately 217,000 kWh. The installation of the new lighting was not limited to the production floor, but also included the parking lot and offices. Between 2014 and 2015, we replaced 938 bulbs, or 87% of all 1,073 bulbs used at the facility. This reduced annual electricity use by about 318,000 kWh and CO<sub>2</sub> emissions by about 188 tons. We will move forward with improvements in areas where the lights stay off

most of the time, such as aisles and machine rooms, to achieve 100% energy-efficient lighting.



THK NIIGATA Distribution Center

**KOFU Plant:** At the KOFU Plant, we are continuing to replace our factory lighting with LED bulbs. In 2015, we replaced 86 fluorescent bulbs and 58 mercury vapor bulbs used in the production area with LED lighting. Making use of our past experience, we did some of the installation work ourselves. With this change, our annual electricity use was reduced by approximately 59,241 kWh. Our next high priority project will be replacing the mercury vapor lighting in our high ceilings, which will significantly reduce our energy use.



KOFU Plant Factory 1

## Increasing Visibility of Power Consumption at the YAMAGUCHI Plant

In order to use a reasonable amount of power and become an even more energy-efficient facility, the YAMAGUCHI Plant has installed power consumption monitors in each electrical room, creating an internal system to collectively monitor the power use of each piece of equipment.

With this system, power consumption data for factory lighting, air conditioning, power sources, compressors, and outlets is updated every hour and displayed on each computer in the factory. If the power consumed in one hour exceeds the standard, the number on the screen will blink, indicating where excessive power is being consumed.

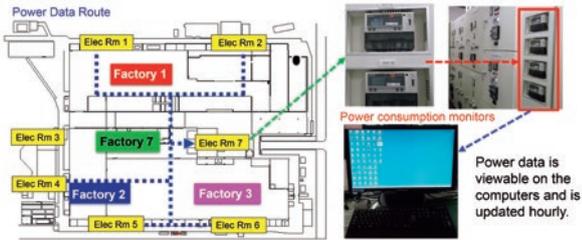
As a result, each department is able to see how much power they are using in real time and immediately take action. With the ability to clearly see (and experience) the results instantaneously, each area has become more conscious of energy conservation, which has led to cooperative, collaborative efforts with other departments to reduce power consumption.

In addition, by arranging and comparing the data from each area both side by side and chronologically, we have gradually come to learn which problems require attention and which improvements are needed, not just in each area or for each piece of equipment, but for our facility as a whole. Continuing to investigate this data will help us to further conserve energy throughout our facility.

## Power Consumption Visibility

### Objective

We created a system to allow us to see the power consumption of different pieces of equipment, which will clarify where there is waste and where we need to make improvements.



## Making Our Cold Forging Equipment Energy-Efficient

For four years, THK RHYTHM has been collaborating with our automotive manufacturer customers on energy-saving measures. This year, we worked on saving energy with our cold forging equipment. Under the guidance of our customers, we used measuring equipment to gain an understanding of our current energy consumption. We then developed sixteen energy-saving measures, including switching from a booster regulator to an electric booster compressor in order to increase the pressure of our compressed air, as well as integrating energy-efficient circuits into our hydraulic fluid and lubrication pumps. As a result of implementing thirteen such measures, we were able to reduce our annual power consumption by approximately 72,200 kWh and the CO<sub>2</sub> emitted from our cold forging process by 3.5%.



Electric booster compressor

## First Prize at the Green Curtain Contest

The MIE Plant participated in the city of Matsusaka's annual Green Curtain Contest and won first prize in the group entry category. City residents vote on the winner of each prize, and MIE Plant's entry received the most votes this year.

Since 2011, the year of the Great East Japan Earthquake, the MIE Plant has been growing goya (bitter melons), morning glories, and cucumbers every year along the outer wall of the facility as a way to save energy in the summertime.



Green Curtain Contest award ceremony

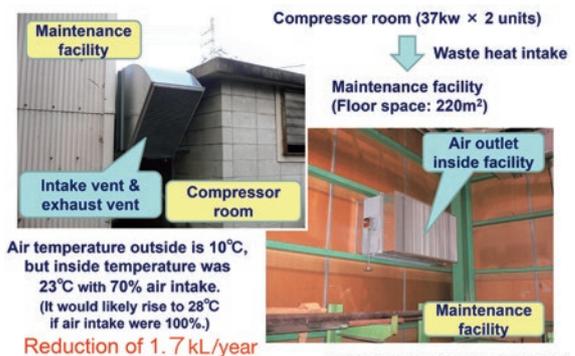
In 2015, we used the bamboo timber left over after a forest thinning to construct a handmade frame and created a 20-meter long green curtain of white goya. The energy-saving results of a green curtain are difficult to put in terms of numbers, but nature (these plants) can provide a cooling, refreshing effect beyond what numbers can express.

## Utilizing Waste Heat from Compressors

The MIE Plant implemented an energy-saving modification to utilize the warm air flowing from the compressor room for heating during the winter. This modification involved using a chamber box to channel the waste heat emitted from the air compressors into a duct, and then using fins to forcibly blow the air out of the exhaust vent. The fins are capable of changing the direction of the air to achieve an even flow, as well as closing so that the air can be vented outside when it is not needed.

Now modified to take in hot air, the building is able to get up to a temperature of 28 °C, even if the air temperature outside is 10 °C. (The room temperature can be changed by adjusting the amount of ventilation.) This building was previously heated in part by an oil stove, which was a safety and environmental concern, but this modification allowed us to reduce our energy use by about 1.7 kL of crude oil equivalent (a reduction of about 4.5 tons of CO<sub>2</sub> emissions) and reduce the PRTR substances we use by about 27 kg.

### Conserving Energy with Waste Heat



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# Conserving Resources and Achieving Zero Emissions

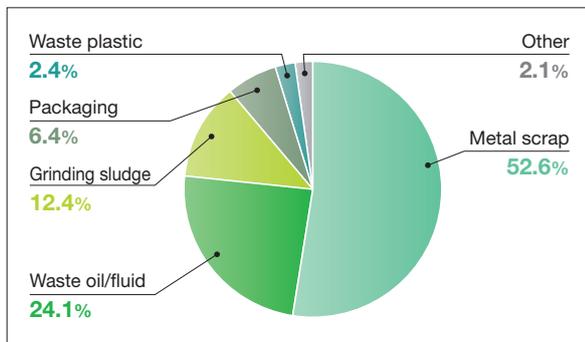
## Conserving Resources and Achieving Zero Emissions in 2015

THK is working to conserve resources and achieve zero emissions by thoroughly separating and recycling our waste. Our annual goal for our emissions rate is to be below 0.50% (final disposal volume/total waste volume), and we hit our target for the second year in a row with a rate of 0.26% in 2015.

### Waste Generation Volume



### Waste Composition



## Reducing Steel Waste

TMV (THK MANUFACTURING OF VIETNAM, Vietnam) worked on reducing the changeover test material (test pieces) used in the press (hole drilling) process as a means to conserve resources and reduce waste material. Previously, we had used the same material for our changeover tests as we had for our products, but we have reduced the amount of steel we consume by 2.2 tons annually by making use of the waste material generated during roll forming changeovers, which cannot be used for actual products.

In order to make use of our scrap material, we have created secondary confirmation tools to verify whether the material can be used or not, and we manage this material closely, marking changeover test material to distinguish it from actual product.

Even as this endeavor has reduced our consumption of

materials, our employees have also gained a greater awareness of waste materials, and their work has become more standardized.



Waste material area



Changeover test material

## Reducing Water Use

At TME (THK Manufacturing of Europe, France), three new coolant filtration devices using paper filters were installed for six rail grinders. Because the paper filters on these devices can remove grinding dust and oil, and they are also very successful at separating out grinding sludge, they enable us to use about 83%, or 6,500 L, less water per year than the previous coolant filtration devices did. Additionally, one filtration device used to be required per grinding machine, but now one device can be used for two grinding machines. We will add another at the beginning of 2016.



Coolant filtration device

## Cleaning the Kano River Floodplain

As part of our environmental beautification activities, the THK INTECHS MISHIMA Plant occasionally performs a clean-up of public areas.

In September 2015, volunteers participated in a clean-up activity organized by the town of Shimizu, picking up trash along the banks of the Kano River. The vast majority of trash was just litter, which drove home the message that everyone's cooperation is needed to keep public areas clean.



THK INTECHS MISHIMA Plant volunteers

# Managing Hazardous Materials

## PRTR Substance Use

In an effort to reduce the amount of hazardous materials (materials that can have a negative impact on the human body or an ecosystem) that we use, we are reducing our use of chemicals that fall under the PRTR system\*. The PRTR substances used at THK are primarily those found in the gasoline and heavy oil we use as fuel. Our goal is to reduce the amount we use by 3% each year, and we were able to significantly reduce the amount of heavy oil used for power generation from 62,862 kg in 2014 to 45,490 kg in 2015—a reduction of 17,372 kg (about 27.6%).

\* **PRTR system:** Laws that promote tracking the volume of emissions of specified chemicals into the environment and improving the control of these substances.

(kg)

Substance	Amount	Air Emissions
Xylene	2,970	28
Toluene	6,648	4,002
Ethylbenzene	1,143	15
Benzene	183	31
Methylnaphthalene	30,611	163
Other	3,935	—
Total	45,490	4,239

## Updating Our Washing Equipment to Reduce Hazardous Waste

THK RHYTHM has updated the automatic washing equipment that washes the reusable plastic containers used to ship products. Before, the oil concentration of the water discharged would sometimes approach the upper limit of effluent standards. However, the new washing equipment has an oil collection system, which collects the oil content of the washing fluid, and an industrial waste company now disposes of that liquid waste. As a result, the washing fluid is no longer discharged into the sewer system, and the oil content of the water that is discharged is well able to satisfy the effluent standards. We have also been able to drastically reduce the amount of water we use annually, from 3,120 m<sup>3</sup> to 195 m<sup>3</sup>.



Plastic container washing line

## VOICE

### Environmental Activities at the YAMAGATA Plant



**Shunichi Sato**

Manager  
YAMAGATA Plant  
Environment Education Section

The YAMAGATA Plant was certified under ISO14001 in December 2000 and OHSAS18001 (Occupational Health and Safety Assessment Series) in December 2010. In addition to maintaining a safe work environment, we are engaging in efforts to conserve energy, achieve zero emissions, and manage hazardous materials.

As part of our energy conservation efforts, we have increased the efficiency of our operations with an automatic control system for our compressors and switched over from fluorescent to LED lighting. We will also change the mercury vapor lighting in our production area to LED lighting. Additionally, in March 2016, we will begin improving (updating) our air conditioning/heating system, which has been an outstanding concern for many years, and we aim to finish by the end of June. As the thermal efficiency of our two heavy oil-consuming hot and cold water generators has decreased in the 25 years since their installation, we will replace them with two turbo freezers with good thermal efficiency.

After updating our equipment, the amount of heavy oil we use will decrease by about 446 kL (about 54%), leading to a significant reduction in our CO<sub>2</sub> emissions. Everyone at the YAMAGATA Plant will keep working together to pursue further environmental improvements.

#### Pursuing Environmentally-Friendly Activities



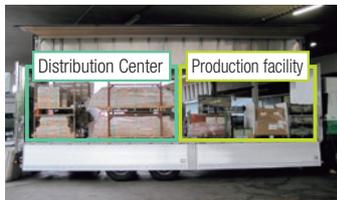
Employees at the YAMAGATA Plant periodically clean up the area around the facility as a way of contributing to the community, such as cleaning up before the Sakuranbo Marathon held in Higashine.

# Green Distribution Initiatives

## Green Distribution

The distribution division, which is centered around the Logistics Management Unit, continuously engages in *green distribution activities* that seek to reduce the overall environmental impact of our product distribution. We pursue many different activities, such as modal shifts and using trucks more efficiently, in keeping with our basic green distribution policy of reducing CO<sub>2</sub> emissions generated by transportation and improving transportation efficiency.

In 2015, we combined purchasing and sales logistics to improve our load factor. With just purchasing or sales logistics alone, there are times when the amount of cargo is not enough to fill a large truck, but combining them has allowed us to improve our load factor and make our transportation more efficient.

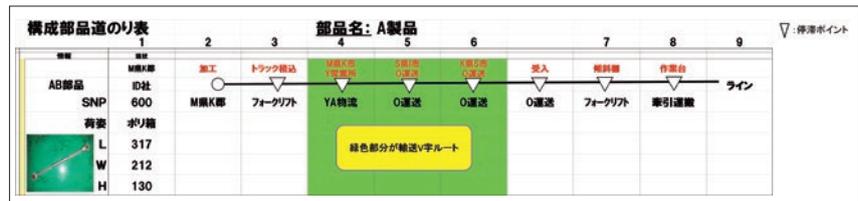


Improving load factor through consolidation

## Reducing CO<sub>2</sub> from Truck Transportation

THK RHYTHM uses tracking sheets so that we can visualize the logistics process of our components in order to shorten hauling distances and reduce delays. In addition to using this method, we made further improvements for transportation and distribution within the Kanto region this year. These improvements, which take advantage of the changes in the landscape of logistics presented by the opening of the Ken-O Expressway, were aimed at seeking out new inland freight forwarders near our production facility and making the distance between us and the port as short as possible for truck transportation. These improvements were very much worth

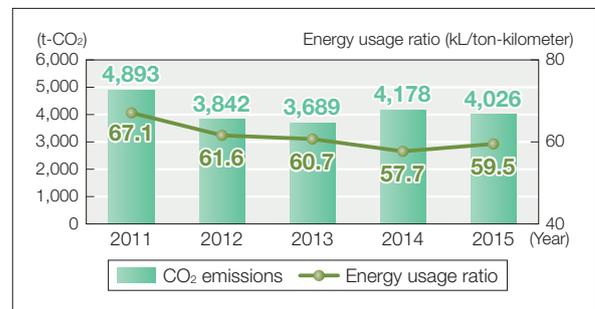
### Component Tracking Sheet



## Reducing Our CO<sub>2</sub> from Transportation

Our CO<sub>2</sub> emissions from transporting products and components went from 4,178 tons of CO<sub>2</sub> in 2014 to 4,026 tons in 2015, a reduction of 153 tons (about 3.7%). However, due to an increase in diesel-powered truck transportation, our energy usage (ratio of energy use to freight transport in ton-kilometers) increased by about 3.1%, going from 57.7 in 2014 to 59.5.

### CO<sub>2</sub> Emissions and Energy Usage from Transportation (THK only)



the effort, as we were able to reduce the distance our trucks travel by 28,320 km per year, lower our CO<sub>2</sub> emissions by about 60%, and cut our transportation costs, as well. We will continue to pursue environmentally-friendly, low-cost distribution in the future.

## Purchasing Eco-Cars

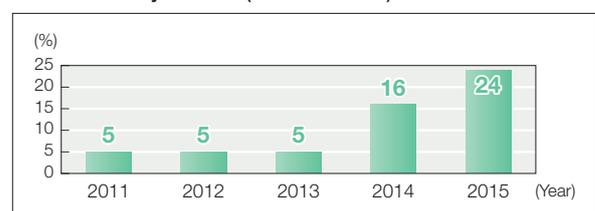
Based on our philosophy that "it is a company's social responsibility to leave the global environment in a healthy state for the next generation," TALK SYSTEM is working with suppliers in an effort to help preserve and improve the global environment. As one effort to prevent global warming, a number of the vehicles purchased for use by the sales team are hybrid vehicles, which have high fuel economy and are able to lower the amount of CO<sub>2</sub> emissions. We began purchasing these vehicles in 2006, and we now have eleven. We will endeavor to further reduce



Purchasing hybrid vehicles

our environmental impact by employing green driving practices.

### TALK SYSTEM Hybrid Cars (Percent of Total)



## Third Party Opinion

I commend the efforts of everyone involved in providing such a large volume of useful information so articulately in this tenth edition of the CSR Report. In his message, Mr. Teramachi stated that THK is “committed to the further study of technology to contribute to the creation of an affluent society.” The dynamic nature of THK, which is always looking toward the future and creating many new products, came through in this report.

For about twenty years, I was involved with high-speed milling research as a collaborative researcher at RIKEN, gaining much experience related primarily to cutting. Recently, I have been involved with precision/fine cutting technology, assisting with endeavors in new areas, such as the development of items from tools to machining centers, as well as cutting technology itself. At the same time, since EMO (Hannover) in 1981, I have been attending exhibitions such as IMTS (US) and JIMTOF (Japan), and I have had articles published in many journals and newspapers, primarily articles introducing topics related to cutting. Through gathering material for those articles and speaking with people involved in those areas, I have also observed how production technology has evolved. An exhibition in China (CIMT: Beijing), a country showing considerable growth, was recently added to the list of shows I attend, and I have felt lately that the rapidly-evolving fields of machine tools and production technology have been moving in a new direction. I visit THK's display booth whenever I attend an exhibition, and by encountering displays other than machine tools and cutting tools, I see the way new products and technology are being developed. At the same time, I can see the rapid development that began with smart phones and is now leading to other smart industrial goods, such as cars and consumer electronics. The high-precision, fine cutting technology that supports this development is one of Japan's strengths, and we have now achieved 10-micrometer end mills and high-precision cutting on a nano level. Cutting on this scale requires not just a minimization of tool wear and surfaces that are ground with a high level of precision, but also a feed drive system that both responds quickly and moves smoothly. Because of this,

THK's high-performance linear guides are indispensable as machine components. Factory automation utilizing robots is advancing globally. There is a massive demand for robots, and they are now starting to expand in the direction of performing assembly work. The two-armed “NEXTAGE®” robots with vision sensors and a high level of performance are being placed in areas of assembly work to replace human work. Even some of my clients are using them in lieu of human work. In the CSR Report, I was able to see that there are collaborative industrial-academic efforts to standardize the software that robot manufacturers in the past had developed individually, which will allow the needs of the IoT era to be met. Going forward, I think there will be a demand for endeavors incorporating software collaboration with CNC machine tools. In the message from the CEO, Mr. Teramachi expressed his sympathy about the Kumamoto Earthquakes in April. These earthquakes occurred in a region thought to be beyond the risk of earthquakes, so that event sent a major shock throughout Japan. There is a pressing need to be prepared for earthquakes, which could occur at any time and anywhere in Japan. In particular, THK's seismic isolation and damping devices are recognized as an extremely effective method of protecting Japan's valuable buildings and works of art from earthquake damage. One can really say these devices are an example of products that contribute to society. As production bases become globalized, the production of industrial goods is becoming more information-based and is moving toward a new stage. While THK is walking a steady path that anticipates the future, I believe that there will be a demand for initiatives aimed at further speeding up the production process. I can highly recommend the CSR Report as an effective tool for THK and everyone involved with the company to understand the issues THK must engage with now and in the future. In closing, I wish to express my sincere appreciation for the opportunity to contribute to this report.



### Dr. Toshitaka Matsuoka

President, Professional Engineer (Specialty: Mechanical Engineering), Dr.Eng.  
MATSUOKA Engineering Consultants Office Ltd

**Profile:** Born in 1940. Worked at Hitachi, Ltd.; Seco Tools Japan K.K.; and the GE Superabrasives division. Currently works at MATSUOKA Engineering Consultants Office Ltd (a production technology consulting business), which he founded in 1987.

**Qualifications:** Professional Engineer (Specialty: Mechanical Engineering), Dr.Eng. (University of Tokyo)

**Main activities:** Collaborative researcher at RIKEN (high-speed milling research). The Japan Society for Die and Mould Technology: Served as honorary member, director, planning chairperson, die and mould engineer council executive committee chairperson, and high-speed milling research chairperson. Yamanashi prefecture: Former external research assessor, visiting researcher, and examination committee member for The Resona Foundation For Small And Medium Enterprise Promotion and the former The Die and Mould Technology Promotion Foundation.

**Major awards:** The Japan Society for Die and Mould Technology's Award for Great Achievement and Award for Technological Achievement

**Major works (publications):** *Sessaku kakou deetabukku, Atarashii ana-kakou gijutsu, CNC sessaku kakou no susumekata, Hajimete no sessaku kakou* (Kogyo Chosakai Publishing), *Kanagata no NC kakou tekunikk, Katagijutsu benran* (co-author), *Purasuchikku kanagata handobukku* (co-author), *Kousoku miiringu no kiso to jissen* (Nikkan Kogyo Shimbum), *Purasuchikku shashutsu seikei kanagata* (co-author) (Nikkei Business Publications), *Tsuuringu no kiso to ouyou* (Japan Industrial Publishing), *Sessaku kakou no kiso* (co-author) (Morikita Publishing), etc.

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