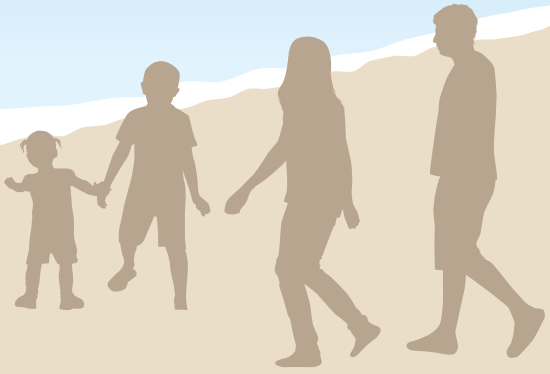
Bringing you a better future

Corporate Social Responsibility Report 2017

DAIHEN Group

Working in Harmony with Society



DAIHEN Corporation

Corporate data

Company name	**DAIHEN Corporation**
Date established	December 1919
Capital	¥10,596 million
Business	Manufacture, sale, and repair of dispersed power systems; welding machines; industrial robots; RF generators, clean transfer robots and PV inverter.
Head office location	2-1-11 Tagawa, Yodogawa-ku, Osaka 532-8512 Japan Tel: +81-6-6301-1212
Business offices and plants	Juso Plant (Osaka), Rokko Plant (Kobe), Mie Plant (Takigun, Mie), Kanehira Plant (Osaka), Chitose Plant (Chitose, Hokkaido)
Regional offices	Hokkaido Regional Office, Tohoku Regional Office, Tokyo Regional Office, Chubu Regional Office, Chugoku Regional Office, Kyushu Regional Office
Website	www.daihen.co.jp

Main subsidiaries and affiliates

In Japan

- SHIHEN TECHNICAL Corporation
- KYUHEN Co., Inc.
- The Chugoku Electric Manufacturing Company, Incorporated
- DAIHEN Industrial Machinery Corporation
- DAIHEN System Corporation
- DAIHEN Techno Support Corporation (*Since July 2018)
- DAIHEN Stud Co., Ltd.
- DAIHEN Electric Machine Co., Ltd.
- DAIHEN Fuse Corporation
- Minami Electric Co., Ltd.
- DAIHEN Technos Co., Ltd.
- Hanshin Yosetsu Kizai Co., Ltd.
- DAIHOKU Industry Co., Ltd.
- DAIHEN Business Service Co., Ltd.
- DAIHEN Logistics Co., Ltd.
- Daiki Corporation
- DAIHEN Engineering Co., Ltd.
- DAIHEN Welfare Enterprise Co., Ltd.
- Daiichi Seiko Co., Ltd.

International

- DAIHEN, Inc. (U.S.A.)
- OTC DAIHEN Europe GmbH (Germany)
- OTC DAIHEN Asia Co., Ltd. (Thailand)
- DAIHEN Electric Co., Ltd. (Thailand)
- OTC DAIHEN Bangkok Co., Ltd. (Thailand)
- DAIHEN Advanced Component, Inc. (U.S.A.)
- Mudanjiang OTC Welding Machines Co., Ltd. (China)
- OTC (Taiwan) Co., Ltd. (Taiwan)
- OTC Industrial (Shanghai) Co., Ltd. (China)
- DAIHEN Korea Co., Ltd. (Korea)
- OTC Industrial (Qingdao) Co., Ltd. (China)
- DAIHEN OTC (Beijing) Co., Ltd. (China)
- DAIHEN Advanced Machinery (Changshu) Co., Ltd. (China)
- OTC DAIHEN India Pvt. Ltd. (India)
- PT. OTC DAIHEN Indonesia (Indonesia)
- DAIHEN VARSTROJ welding cutting and robotics d.d. (Slovenia)
- DAIHEN MEXICO S.A. de C.V. (Mexico)

Executive officers

As of June 28, 2017

Directors and operating officers

President and Chief Executive Officer	Tetsuya Tajiri
Senior Executive Vice President and Member of the Board	Shigekazu Koshino
Executive Vice President and Member of the Board	Naoki Urai
Executive Vice President and Member of the Board	Kazuo Kamo
Senior Vice President and Member of the Board	Keiki Morimoto
Senior Vice President and Member of the Board	Shoichiro Minomo
Member of the Board	Kusuo Sanjo
Member of the Board	Shigenobu Aikyo

Auditors

Standing Auditor	Yuzo Morino
Standing Auditor	Kanji Iwasa
Auditor	Haruo Urata
Auditor	Masayuki Furusawa

Operating officers

Senior Vice President	Koichi Igarashi	Vice President	Yasuhiro Ohnishi
Senior Vice President	Yoshio Kondo	Vice President	Toshiaki Takigawa
Senior Vice President	Hajime Furuichi	Vice President	Yuji Yoshizako
Senior Vice President	Shingo Wada	Vice President	Tomoyuki Ueyama
Senior Vice President	Kentaro Kaneko	Vice President	Hiroaki Oichi
Vice President	Masanobu Uchida	Vice President	Ryouhei Tanaka
Vice President	Ichiro Yamano		
Vice President	Yasuhiro Nishimori		
Vice President	Kohei Funada		

Editorial policy

We published this report with the goals of contributing to our stakeholders' broader understanding of our approach and initiatives, fulfilling important aspects of our social responsibility, and establishing a relationship of greater mutual trust. Moreover, in order to ensure a broader understanding of this report, we sought to enhance its readability and ease of understanding.

Reporting period

This report covers fiscal year 2016 (April 1, 2016, to March 31, 2017). This report also contains some information from before and after fiscal 2016.

Scope of organizations covered

In principle, this report spans the initiatives of the DAIHEN Group, which comprises DAIHEN Corporation and its consolidated subsidiaries. The environmental report contained herein presents the environmental initiatives of our Group plants — in Tottori, Oita, Matsudo, Eniwa, Hirosaki, Kagawa, and Izumiotsu — that are participating in the environmental management system of DAIHEN Corporation.

Reference guidelines

- *Guidelines 2013* of the Global Reporting Initiative (GRI)
- *Environmental Reporting Guidelines* (Fiscal 2012 Version), Ministry of the Environment, Japan
- *Environmental Accounting Guidelines* (Fiscal 2005 Version), Ministry of the Environment, Japan
- *JIS Z 26000*, Japanese Standards Association

Next issue

The next issue of this report is scheduled for autumn 2018.

Disclaimer

This report includes our plans and prospects as of the date of publication; projections based on management plans and management policies; and past and current data on the DAIHEN Group. The reader is advised that these projections are assumptions or judgments based on the best information available at the time, and the possibility exists that future business performance may differ due to changes in various conditions, unforeseen results, and changes to forecast business activities.

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The DAIHEN Group exists for the purpose of “pleasing our customers and serving society.” In other words, our job is to “make not just our customers but all of our stakeholders happy at the same time.”

To fulfill that purpose, we view it as our mission as a manufacturer and the basis of who we are to first and foremost supply customers with “products of value” they themselves recognize and make ourselves useful in this world as a business.

We are currently implementing our DAIHEN Value 2017 medium-term business plan very much cognizant of that purpose. Heavily weighted on “creating value with products by DAIHEN,” the plan began with us honing our proprietary technologies as a means for developing products of exceptional performance. In the current Phase II, we have raised the bar and are focusing our efforts on developing products with features and capabilities that will be heralded as “firsts” in their industries and the world.

These efforts have steadfast come to fruition as products and technologies that have proven useful to customers in their manufacturing endeavors, such as the “D-Arc” high-efficiency arc welding system that is the first in the industry to weld steel plates of a maximum 19 mm in thickness in a single pass, the “RF Wireless Power Transfer System” that, as the first industrial system of its kind in the world to work by magnetic resonance, charges wireless devices very efficiently even in the event of some misalignment between units, and the world’s first “additive manufacturing technology using a conventional metal 3D printer for molding high strength, high conductivity copper alloy.”

Our hope is that the products and technologies we deliver contribute to the customer through their manufacturing activities and, at the same time, help in some way or another to solve the mountain of issues society faces. For example, in the energy management system, multiple interconnected power sources and storage batteries could coordinate with each other for efficient energy usage by adopting our proprietary “Synergy Link” technology for distributed, autonomous cooperative control. It would help the customer to reduce both labor and costs, and, because it leads to the effective use of clean energy, it would add greatly to the fight against climate change, as well. Moreover, FA products — like wireless charging systems for AGV/AGF that enable 24-hour automatic operation and AI robots that, in addition to industrial robots for all sorts of applications, transport parts and materials by determining the best travel path themselves and adapting their movements to the environment — will support efforts to automate factories and stabilize quality, while, parallel to that, help solve labor shortages and improve labor productivity.

The DAIHEN Group will continue to develop “products unique to DAIHEN” that contribute the most to our customers’ efforts to manufacture value.

As we pursue these goals, your continued support means everything to us.

田尻 哲也

Tetsuya Tajiri

President and Chief Executive Officer

DAIHEN Corporation

The DAIHEN Group is committed to achieving simultaneous "contentment for all."

The DAIHEN Group's objective is the simultaneous achievement of contentment for all involved with our Group, including our customers, employees and their families, shareholders, suppliers, and local communities.

To achieve this, all Group employees have agreed to adopt "The DAIHEN Way" as an indicator of our core values while also following the action guidelines setting forth the respective roles of our employees as well as our work practices.

The DAIHEN Group is dedicated to contributing to the sound development of society by taking steps to support the achievement of simultaneous contentment for all.

Corporate Objective

Achieving Simultaneous Contentment for All* (then president Keijiro Kobayashi, 1985)

* Including our customers, employees and local communities their families, shareholders, suppliers, and

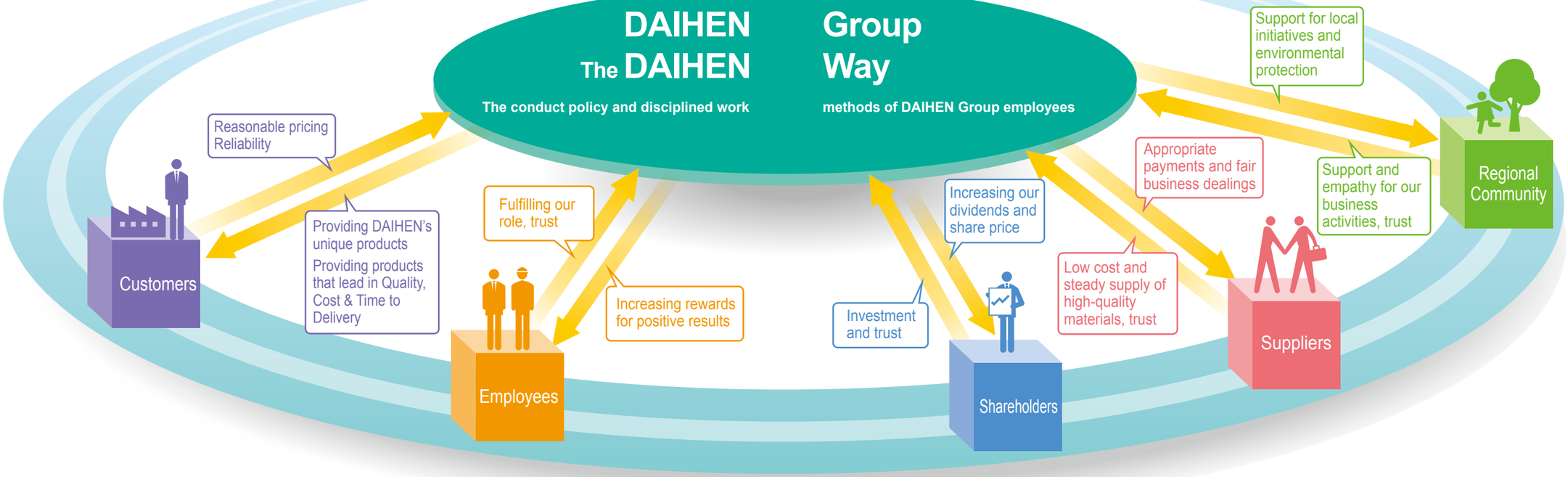
Corporate philosophy

Reliability & Creativity

DAIHEN aims to achieve healthy growth and contribute to society by creating value while upholding the relationship of trust we have established with our stakeholders.

Building on our founding spirit

Superior quality, reasonable price, and on-time delivery



DAIHEN's Action Charter

For the market

- We shall provide safe, high-quality products that meet customer needs and satisfy our customers with timely services and a straightforward response. In this way, we shall win the confidence of our customers through our business activities.
- We shall remain sensitive to change and enthusiastically create new products and technologies while developing new markets.

With our fellow workers

- We shall nurture an environment in which our employees are highly motivated to maximize their abilities and we shall properly evaluate the performance of our employees.
- We shall voice our frank opinions and shall jointly develop a vision for the future as well as an innovation plan. With a strong will, we shall prevail against our competitors.

To win the confidence of shareholders

- We shall continuously develop a stable business so that we can earn profits and increase our corporate value. In addition, we shall publicly disclose accurate information as necessary.

For all our suppliers

- We shall conduct honest trade with our suppliers so that they receive appropriate payment for the products and services they provide.

As members of society

- When we do business, we shall observe the laws and regulations of the corresponding country or region and shall respect their cultural norms and customs. In addition, we shall strive to protect the environment so that we can maintain good relations with society.
- We shall respect human rights and shall treat all people equally. We shall not intrude on personal privacy and shall act sensibly as a member of society.

To please our customers and contribute to the world, we remain focused on developing DAIHEN products that offer unique added value.

Business performance for fiscal 2016

Outline

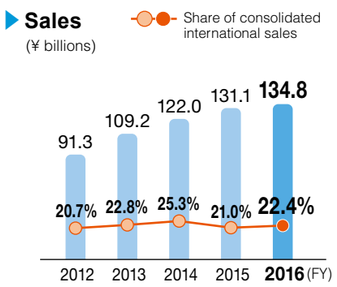
The business environment in fiscal 2016 was slow in the first half of the year due to a general slump across the emerging economies of Asia, but investment in advanced components spiked and investment in automation picked up strongly in China during the last six months of the year.

Given the situation, we stuck to our DAIHEN Value 2017 medium-term business plan under which we focused on developing and launching “products unique to DAIHEN” with world/industry-first features and capabilities. As a result, orders increased by 8.1% year-on-year to 145.812 billion yen, and sales by 2.8% year-on-year to 134.870 billion yen.

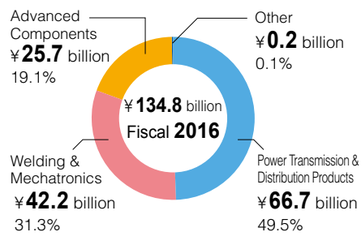
In terms of profit, though we automated production, reduced back-office operations and took other steps to strengthen efforts within our Loss-Cutting Initiative, the yen’s appreciation dragged down our performance figures resulting in a decrease in operating income of 624 million yen from the previous year to 8.705 billion yen and consequently a decrease in ordinary income of 351 million yen from the previous year to 8.879 billion yen.

Additionally, net income attributable to owners of the parent fell by 968 million yen from the previous year to 6.252 billion yen, as the gain on negative goodwill by making Chugoku Electric Manufacturing Co., Inc. a consolidated subsidiary the year before was posted as extraordinary gain.

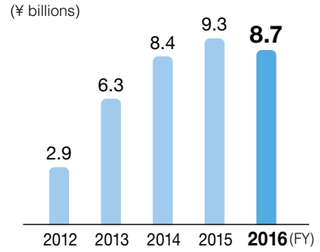
Sales (¥ billions)



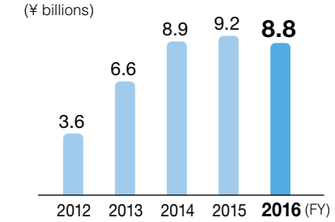
Sales by segment



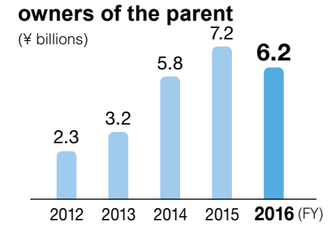
Operating income (¥ billions)



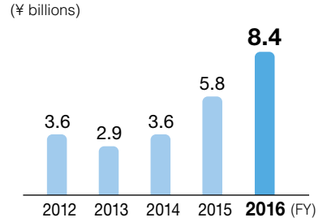
Ordinary income (¥ billions)



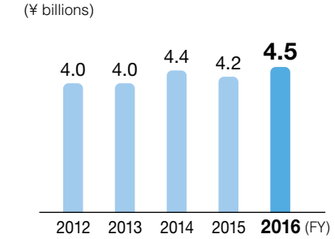
Net income attributable to owners of the parent (¥ billions)



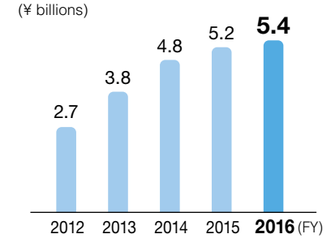
Capital investment (¥ billions)



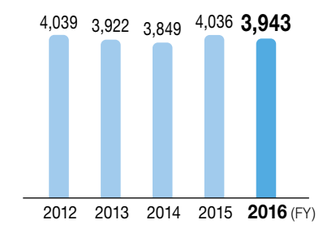
Depreciation (¥ billions)



Research & development cost (¥ billions)



Number of employees



Fiscal 2016 results

Strengthening our unique approach to product development

We are currently implementing our DAIHEN Value 2017 medium-term business plan, which places top priority on strengthening our development efforts in order to please customers and serve society. As a key component of that, we are seeking to create “products unique to DAIHEN” with world/industry-first features and capabilities.

In fiscal 2016, we increased our investment in R&D by 200 million yen from the previous year to 5.4 billion yen and sales of “products unique to DAIHEN” rose by 9.3 billion yen from the previous year to 35.3 billion yen.

Started verification testing for virtual power plants

We developed our “Synergy Link*” technology for distributed, autonomous coordinated control in order to build virtual power plants (VPP) that optimally balance power supply and demand by treating multiple power generation and storage sources as a single power plant, more easily and at low cost.

Using “Synergy Link,” we built a VPP of the solar power generation and storage systems at two business sites of ours (Juso Plant and DAIHEN Technology Institute) and started compiling verification data. We have shown it in operation to many customers.

* “Synergy Link” does not use expensive central management and control equipment like conventional centralized control systems do. It is the first control technology in the world to guide a power system to the best output level by having connected equipment autonomously determine output values so that the total output of the entire power system attains a target set by a host (cloud).

Juso Plant (Osaka City)

DAIHEN Technology Institute (Kitsuki City, Oita Prefecture)

Established copper-alloy 3D additive manufacturing technology using a conventional metal 3D printer

Through joint research with the Osaka Research Institute of Industrial Science and Technology, we developed the world’s first “copper-alloy 3D additive manufacturing technology using a conventional metal 3D printer.”

The practical realization of 3D additive manufacturing that makes the best use of the electrical conductivity and thermal conductivity of copper is expected to fuel technological innovations for manufacturing in all fields of industry, including the aerospace, automobile, and medical industries by enabling complicated forms that cannot be made with conventional processing methods.

Example application
Heat sink for motor cooling
Note: The heat sink has been cut in half for explanatory purposes.

Our Loss-Cutting Initiative

To internally generate capital for funding R&D operations, we automated production, reduced back-office operations and took other steps to strengthen activities within our Loss-Cutting Initiative.

In our efforts to automate production, we are not focusing on individual units but entire lines including pre- and post-processes.

As a result, we achieved a saving of 9.1 billion yen (up 2.4 billion yen from the previous year), significantly exceeding cost increases in R&D.

Robot assembly automation at our Rokko Plant

The robot assembly line at our Rokko Plant is built on the concept of “manufacturing robots with robots.” There, we are fully utilizing our own transfer robots and other AI products. The plant is 80% automated, which is more than the 70% automation level we targeted.

Stronger overseas servicing support

Welding/Robot business expansion overseas Enhanced sales power through technical centers

Europe

Activities started at our new sales office in Southern Germany (November 2016)

We opened a new sales office with a large technical center in Munich, Germany where many automotive manufacturers concentrate. Coordination between the new office and Varstroj d.d. (Slovenia), which we purchased in 2014, is being strengthened to accelerate business expansion in Europe.

China

First full-fledged technical center in Wuhan by a Japanese robot manufacturer (February 2017)

With the automotive industry in China continuing to expand, we were the first Japanese robot manufacturer to open full-fledged technical centers in Tianjin, Guangzhou and Shanghai, and now Wuhan. Our goal is to increase sales to Japanese auto makers.

Special Feature 1

The Pursuit of DAIHEN Value: **The quest to build virtual power plants**

The original article can be read on our website. http://www.daihen.co.jp/newinfo_2017/news_170223.html

Development and application of distributed, autonomous coordinated control technology — “Synergy Link”

DAIHEN is participating in METI’s VPP Building and Demonstration Project, developing control technology of our own and building energy management systems.

Social Debate

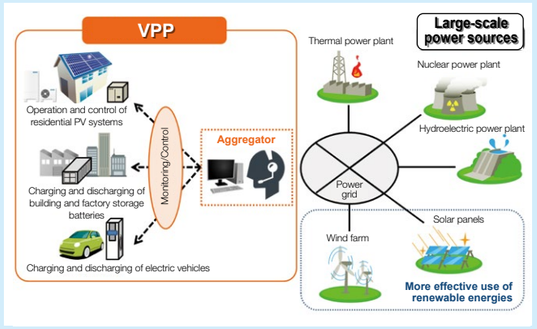
In the wake of the Great East Japan Earthquake, debate is being waged on freeing the nation’s power supply system from its long-standing dependency on large-scale power sources (thermal, hydroelectric and nuclear power plants), and stably and effectively utilizing renewable energies that are rapidly spreading. As the customer side (factories, buildings, homes, etc.) increasingly introduces its own energy resources (storage batteries, electric vehicles, Ene-Farm residential fuel cell systems, etc.), the search is on for ways to effectively use those resources.

Searching for Solutions

VPP Building and Demonstration Project of Japan’s Ministry of Economy, Trade and Industry

Virtual Power Plants (VPP) are one thinkable approach to ensuring a power supply and demand balance on par with conventional large-scale power sources. The idea is to remotely integrate and control customer-side energy resources using IoT (Internet of Things) and advanced energy management technology so that they collectively operate like a single power plant or VPP.

The VPP Building and Demonstration Project aims to establish integrated control technologies and test their ability to remotely control energy resources. Success in effectively utilizing energy resources and using them to balance power supply and demand is expected to spur greater introduction of renewable energies.



Our activities in METI’s VPP Building and Demonstration Project

Activities in 2016

DAIHEN was part of a 14-company consortium that included Kansai Electric Power, to jointly apply and win approval for the Ministry of Economy, Trade and Industry’s (METI) 2016 VPP Building and Demonstration Project. For the project, we built new facilities for demonstration purposes (②-1 solar power generation system and ②-2 storage battery system) at the DAIHEN Technology Institute and connected them to existing facilities (① solar power generation + battery storage system) at our head office using our proprietary “Synergy Link” control technology, to prove that a VPP could be built between two separate sites.

① Solar power generation + storage battery system at our head office

②-1 Solar power generation system at the DAIHEN Technology Institute

②-2 Storage battery system at the DAIHEN Technology Institute

Activities in 2017

DAIHEN applied for the position of resource aggregator* in METI’s follow-up 2017 VPP Building and Demonstration Project Using Customer-Side Energy Resources, and was selected for the project. In this project, we are expanding the functional capacity of the system developed in 2016 and, in cohort with Kansai Electric Power, will verify the VPP services in the field.

* A business that integrates, manages and controls distributed energy resources across the power grid based on a direct contract with users to connect their energy resources to the VPP and control them.

Products and Technologies for Solving the Social Debate

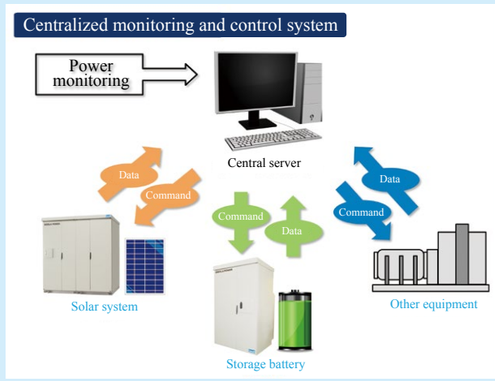
Building an Energy Management System Using “Synergy Link”

Optimally managing energy on a factory, building or community basis by effectively utilizing customer-side energy resources is an important subject in the quest to shape a sustainable, recycling-based society.

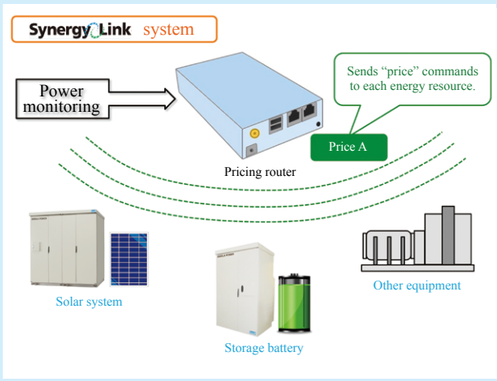
The system for making this happen is called an “energy management system” or EMS. Before, the general practice was to use a high-performance server within a centralized system to monitor and control each piece of equipment. However, the bigger a system gets, the more complex the calculations and processing tasks required of the server get. Moreover, the communication infrastructure needs to be strengthened to handle the massive volume of communication traffic between units. And, when centralized systems have to be expanded through hardware additions and the like, the entire system sometimes has to be redesigned, which then becomes an issue of time and money. In fact, introducing or expanding a VPP that remotely integrates and controls multiple customer-side energy resources generates huge costs and requires a great deal of time to complete.

As a solution to these issues, DAIHEN developed technology for distributed, autonomous coordinated control, which we named “Synergy Link.” In “Synergy Link,” a general-purpose pricing router issues “price” commands to the customer-side energy resources, in order to steer the output of the whole system. Upon receiving these price commands, the customer-side energy resources determine their output level by themselves. Because the energy resources are linked to one another, they impact each other based on the way they operate. This interaction guides the system to the best output conditions.

With “Synergy Link,” the amount of processing and communication traffic do not increase no matter what size the system is and, because a central server is unnecessary, initial investment costs can be greatly reduced. Moreover, since “Synergy Link” does not control the status of the individual customer-side energy resources whatsoever, it additionally solves the issues associated with system expansion.



Conventional centralized monitoring and control system



“Synergy Link” system

Merits of Synergy Link

- **A high-performance central server is unnecessary because there is no need to control the customer-side energy resources.**
- **The user is spared the cost of the central server and communication network hardware when introducing the system.**
- **Systems can be easily expanded and modified by adding or removing customer-side energy resources. (There is no limit on the number of connected energy resources.)**
- **Operation of the overall energy management system is optimized.**

Special Feature 2

The Pursuit of DAIHEN Value: Technological innovations in welding

Welding 19 mm-thick steel plates in a single pass

Practical applications in high-current, CO_2 arc welding. Greatly improved efficiency in plate welding.

Social Debate

In welding plates by CO_2 arc welding*, it is necessary to first prepare a groove, then lay several welds on top of that. It not only takes time but also presents numerous other issues like welded parts deforming under the heat. With the shortage of skilled labor getting worse, new technology that can make plate welding more efficient is needed.

* CO_2 arc welding is the most commonly used welding method. It works by generating an arc (discharge) with a flow of electric current between a continuously fed welding wire and a target workpiece, while the weld point is shielded from the air by carbon dioxide gas.

Products and Technologies for Solving the Social Debate

Development of "D-Arc" High Efficiency Arc Welding System

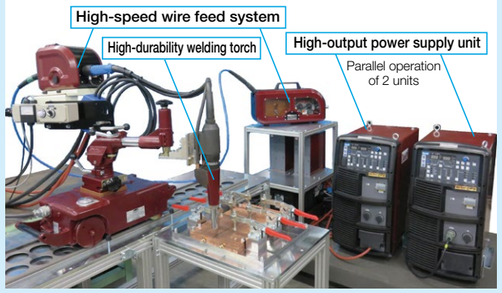
It is common knowledge in the welding world that a high current makes plate welding more efficient, but currents of 500 A and higher seriously destabilize the arc in CO_2 arc welding when using conventional technologies, so many gave up hope of any sort of practical application with high currents.

We, nevertheless, as welding pioneers, stuck with it and, by meticulously analyzing CO_2 arc phenomena through joint research with the Joining and Welding Research Institute of Osaka University and applying our digital inverter control technologies, successfully stabilized control in CO_2 arc welding with electric currents of 500 A and above for the first time in the world.

Incorporated with this technology, our "D-Arc" high efficiency arc welding system welds 19 mm-thick plates, which previously required 6 welding passes, in a single pass. It will improve both the efficiency and quality of welding large structures like buildings, bridges, ships, construction machinery and more.

Illustrated view of D-Arc

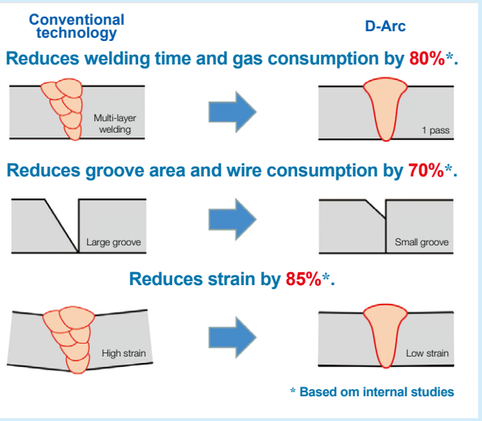
Configuration of the D-Arc welding system



For an introductory video of this product, visit the following:

https://www.youtube.com/watch?v=M-NOe-StSVk

Efficiency comparison between conventional technologies and "D-Arc"



Commentary

Sticking to the job of making the impossible possible

Absolutely convinced that we could do it, we stuck with developing a new process for plate welding. Because we refused to give up, we developed proprietary technology for controlling the welding waveform (voltage amplitude control) that eventually led us to stabilizing a high current buried arc, which could not be done before. This technology opened the door to solving a number of issues plaguing conventional multi-layer welding in one cool sweep. The "D-Arc" into which we built this technology is drawing attention as a revolutionary product that defies the conventional wisdom of the welding world.

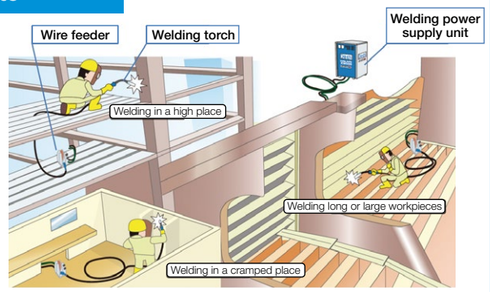
Hayato Baba
Welding Research Department, Welding Products Division

Coded signals to counter interference in noise-heavy workplaces

Enhanced efficiency in welding large structures by using high-speed power-line communication technology that requires no additional communication cables

Social Debate

At worksites where welding large structures like steel frames, bridges and marine vessels, welders have to move from weld spot to weld spot holding the wire feeder in one hand and the welding torch in the other. With the cable between the welding power supply and wire feeder as much as 50 m long in some cases, it is very strenuous for welders to pull the heavy cable over extended distances. Moreover, the longer a cable is, the greater chance of a disconnection there is, which causes many wishes to eliminate the cable entirely.



Products and Technologies for Solving the Social Debate

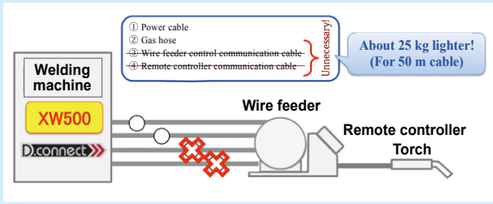
Development of "D.connect" high-speed power-line communication technology

Progress in communication technology made it at least theoretically possible to integrate communication and power cables or, in other words, to superimpose communication signals over a power line. However, in factories and other environments where various types of equipment are running and especially places where noise interference is heavy like welding sites, high-speed communication over power lines was long assumed difficult to achieve.

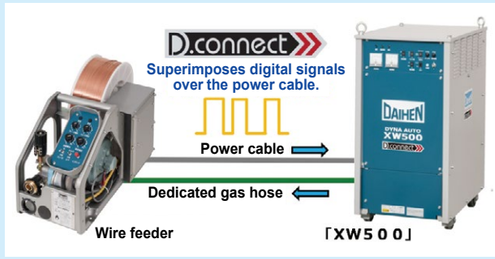
Nevertheless, under our policy of "understanding customer needs and developing original products unique to DAIHEN," we developed "D.connect" high-speed power-line communication technology that enables fast stable communications even in harsh noise environments such as welding sites. We launched the "Dyna Auto XW500" high-performance welding machine as the first product to incorporate this technology.

By superimposing communication signals between the welding machine and wire feeder on the cable that supplies power needed for welding, the XW500 reduces the 4 cables that were needed before to 2. With 50 m cables, this means about 25 kg less weight, which greatly reduces the load of moving from location to location placed on the welder.

Cable comparison between welding machines with and without "D.connect"



Overview of D.connect



For an introductory video of this product, visit the following:

http://www.daihen.co.jp/movie/welding/XW500/Dconnect_introduction.mp4

Commentary

Technology born by listening to feedback and ideas from users

What we defiantly set out to do was to improve operability in order to reduce the physical load placed on the welder. Time and time again, the development team actually tried lugging prototypes around welding sites. We listened to what welders wanted and made adjustments. We stood nearby and watched, for example, how fast the start switch was flipped, in order to perfect the product as best possible. Developed through trial and error to meet worksite needs, the "Dyna Auto XW500" of the "D.connect" series is perhaps the product that most represents DAIHEN.

Futoshi Nishisaka
Control Development Sect., Engineering Dept., Welding Products Division

We are focused on developing our businesses globally on the three pillars of power transmission & distribution products, advanced components, and welding & mechatronics.

DAIHEN Corporation began manufacturing pole-mounted transformers in 1919 by instituting a dedicated mass production system. Since then, the company has been developing a series of products that respond to the needs of society. These products include high-performance welding machines incorporating electronic technology that grew out of transformer manufacturing as well as various industrial robots and components for semiconductor manufacturing systems, all of which are fueling the growing trend toward automation.

Today, the DAIHEN Group comprises 36 companies and is actively working to develop its global business while applying its energy conversion and control technologies to the telecommunications and environmental markets.

Corporate history

1919 1920 1940

1919 The Company is established in Nakatsucho, Osaka prefecture.

○ July 1930 The plant is relocated to its current location in Juso.
○ March 1934 Production of electric welding machines begins.

1960

○ July 1961 A welding machinery plant is completed in Settsu.
○ October 1961 The company's shares are listed on the Tokyo Stock Exchange.
○ December 1967 The Chitose Plant is completed.

1970

○ November 1973 The Mie Plant is completed and begins full-scale production of high-capacity, extra-high-voltage transformers.

1980

○ May 1980 Production of arc welding robots begins.
○ November 1982 The Settsu Robot Plant is completed.
○ December 1985 Osaka Transformer Co., Ltd. is renamed DAIHEN Corporation.
○ November 1987 The company begins production of RF plasma generators for semiconductor manufacturing.
○ November 1987 The company is awarded the Deming Application Prize.

1990

2000

○ December 1995 Certification of ISO 9001 registration
○ June 2001 The company system and vice-president system are introduced.
○ October 2003 Certification of ISO 14001 registration
○ October 2007 The Rokko Plant is completed with the relocation of the Settsu Plant.

2010

○ December 2009 DAIHEN Advanced Machinery (Changshu) Co., Ltd. is established.
○ November 2010 MECS (wafer transfer robot) business is acquired.
○ June 2011 OTC DAIHEN India Pvt. Ltd. is established.
○ July 2012 PT. OTC DAIHEN Indonesia is established.
○ February 2014 Varstroj d.d. acquired.
○ July 2015 Chugoku Electric Manufacturing Co., Inc. is made a consolidated subsidiary.
○ October 2016 DAIHEN MEXICO S.A. de C.V. is established.

Product development history


Pole-mounted transformer

Transformers


AC arc welding machine


Oil-immersed power transformer


Cast resin transformer


High-capacity extra-high-voltage transformer


Pad-mounted transformer


Pole-mounted amorphous core transformer

Power receiving and distribution systems


Step voltage regulator


Pole-mounted automatic vacuum section switch

Switches

Automated distribution systems

Power monitoring, control and communication equipment


Power receiving and distribution equipment


Switch terminal unit


Pad-mounted multi-circuit vacuum switch


Saltproof pole-mounted transformer (Applicable to Zn/Al thermal spraying)

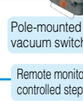

Substation device


Top-runner transformer

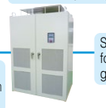

Remote monitoring and control equipment


Pole-mounted automatic vacuum switch (with sensor)


Switch terminal unit (with sensor)


Remote monitored and controlled step voltage regulator


Pole-mounted transformer with auto tap changer


Substation package for solar power generation


Power conditioner for solar power generation (PV inverter)


RF generator

Power center

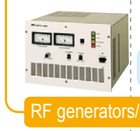
Power receiving & distribution

Control & telecommunications

Power distribution

Dispersed power products

Power Products Business Segment


RF generator for plasma applications

RF generators/matching units


RF automatic matching unit


30 kW high power RF generator


Microwave supply system for plasma application

Microwave generators/Tuners


High-power microwave supply system

Power supply products for plasma generation

Large robots for vacuum environment


Wafer transfer robot for vacuum environment


Large glass panel transfer robot for vacuum environment


Wafer transfer robot for vacuum environment

Robots for vacuum environment

Clean transfer robots

Clean transfer systems


LCD panel transfer robot

Clean transfer products

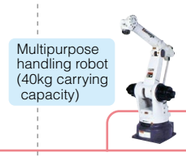
Semiconductor & FPD related Business Segment


Wafer transfer robot for atmospheric environment


Vertical multi-articulated arc welding robot


Wireless power transfer system

In-plant automatic transfer

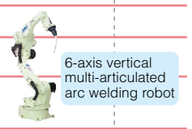

Multipurpose handling robot (40kg carrying capacity)

Handling robots

Factory automation systems


Multipurpose handling robot (200kg carrying capacity)

Mechatronics


6-axis vertical multi-articulated arc welding robot

Arc welding robots


Inverter controlled super plasma cutting machine

Air plasma cutting machine

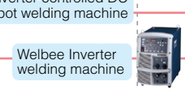

Inverter-controlled compact air plasma cutting machine


Inverter-controlled DC spot welding machine

Spot welding machines

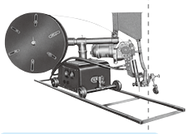

Fuzzy control inverter MIG welding machine


AC/DC pulsed MIG welding machine


Welbee Inverter welding machine

Metalworking

Welding & Mechatronics Business Segment


Submerged arc welding machine (Auto melting)


THOR-T Cartesian-coordinate arc welding robot

Welding machines

Principal subsidiaries and affiliates

19 companies in Japan

- SHIHEN TECHNICAL Corporation
- KYUHEN Co., Inc.
- The Chugoku Electric Manufacturing Co., Inc.
- DAIHEN Industrial Machinery Corporation
- DAIHEN System Corporation
- DAIHEN Techno Support Corporation (*Since July 2018)
- DAIHEN Stud Co., Ltd.
- DAIHEN Electric Machine Co., Ltd.
- DAIHEN Fuse Corporation
- Minami Electric Co., Ltd.
- DAIHEN Technos Co., Ltd.
- Hanshin Yosetsu Kizai Co., Ltd.
- DAIHOKU Industry Co., Ltd.
- DAIHEN Business Service Co., Ltd.
- DAIHEN Logistics Co., Ltd.
- Daiki Corporation
- DAIHEN Engineering Co., Ltd.
- DAIHEN Welfare Enterprise Co., Ltd.
- Daiichi Seiko Co., Ltd.

17 companies outside Japan

- DAIHEN, Inc. (U.S.A.)
- OTC DAIHEN Europe GmbH (Germany)
- OTC DAIHEN Asia Co., Ltd. (Thailand)
- DAIHEN Electric Co., Ltd. (Thailand)
- OTC DAIHEN Bangkok Co., Ltd. (Thailand)
- DAIHEN Advanced Component, Inc. (U.S.A.)
- Mudanjiang OTC Welding Machines Co., Ltd. (China)
- OTC (Taiwan) Co., Ltd. (Taiwan)
- OTC Industrial (Shanghai) Co., Ltd. (China)
- DAIHEN Korea Co., Ltd. (Korea)
- OTC Industrial (Qingdao) Co., Ltd. (China)
- DAIHEN OTC (Beijing) Co., Ltd. (China)
- DAIHEN Advanced Machinery (Changshu) Co., Ltd. (China)
- OTC DAIHEN India Pvt. Ltd. (India)
- PT. OTC DAIHEN Indonesia (Indonesia)
- DAIHEN VARSTROJ welding cutting and robotics d.d. (Slovenia)
- DAIHEN MEXICO S.A. de C.V. (Mexico)

The DAIHEN Group is dedicated to the emergence of a sustainable society of the future through innovative manufacturing.

The products and technologies developed by the DAIHEN Group are ubiquitous and contribute to our daily lives in innumerable ways. Our electric power transmission and distribution products, such as transformers, provide electricity to factories, buildings, and households from power stations and transformer substations. Welding machines are indispensable for construction and for fabrication of steel structures such as bridges, marine vessels, and steel frames of buildings. In addition, our welding robots and transfer robots play an active role in factory automation. The technology and products our Group has developed contribute to the fabrication of the semiconductors that underpin our modern IT-reliant society as well as photovoltaic and wind power generation facilities.

Power transmission & distribution products

1 Power transformers

Our reliable, high-quality transformers contribute to the stable supply of power, providing a long service life, low loss, low noise and compact design.

2 3 Solar power generation package with built-in storage batteries

Integrates a solar power generation system and storage system for private consumption. The package helps factories and buildings reduce their electricity bills.

3 Top Runner transformer

Top Runner transformers are noted for their low energy loss. Their high efficiency contributes to reduced CO_2 emissions.

4 Step voltage regulator

These units support a stable supply of power through optimal voltage control in order to overcome voltage fluctuations on the transmission lines, such as those resulting from interconnection with dispersed power sources.

4 Pad-mounted transformer

Supports effective underground power distribution as well as landscape conservation in urban areas while preventing disasters and securing space for roads.

4 Pole-mounted transformer

Transforms the high-voltage power flowing through distribution lines, contributing to reliable power for day-to-day use in society.

RF generator for plasma applications

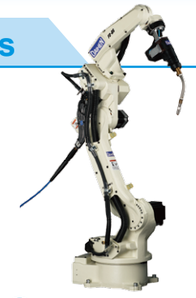
5 RF generator 5 Microwave supply system for plasma application

This RF generator produces the stable, high-quality plasma essential to microfabrication in the semiconductor device manufacturing process.

Industrial robots

6 Wafer transfer robot

Contributes to higher productivity by ensuring high-speed, high-precision transfer of silicon wafers in a clean environment where absolutely no dust is permitted.



7 Arc welding robot

This high-performance welding robot offers advanced operation and contributes greatly to improved quality and productivity on automobile production lines.

8 Handling robot

Handling robots transport materials quickly and accurately on various production lines and help to improve the factory working environment.

Welding machines

9 Digital Inverter welding machine

The Welbee incorporating digital welding control is a state-of-the-art welder designed with environmental protection in mind.

10 Submerged arc welding machine

Our submerged arc welders offering stable and highly efficient high-current welding have proved indispensable to the shipbuilding industry.

11 Stud welding

Studs are welded to steel beams, etc. to tightly wedge floor slabs to the beams. They are widely used with buildings and bridges to join steel and concrete.

Wireless charging

12 Wireless power transfer system for AGV (Automated Guided Vehicle)

Charges AGVs with the same efficiency as a wired system even if the AGV stops slightly out of position. The system is integral to completely automating factories.

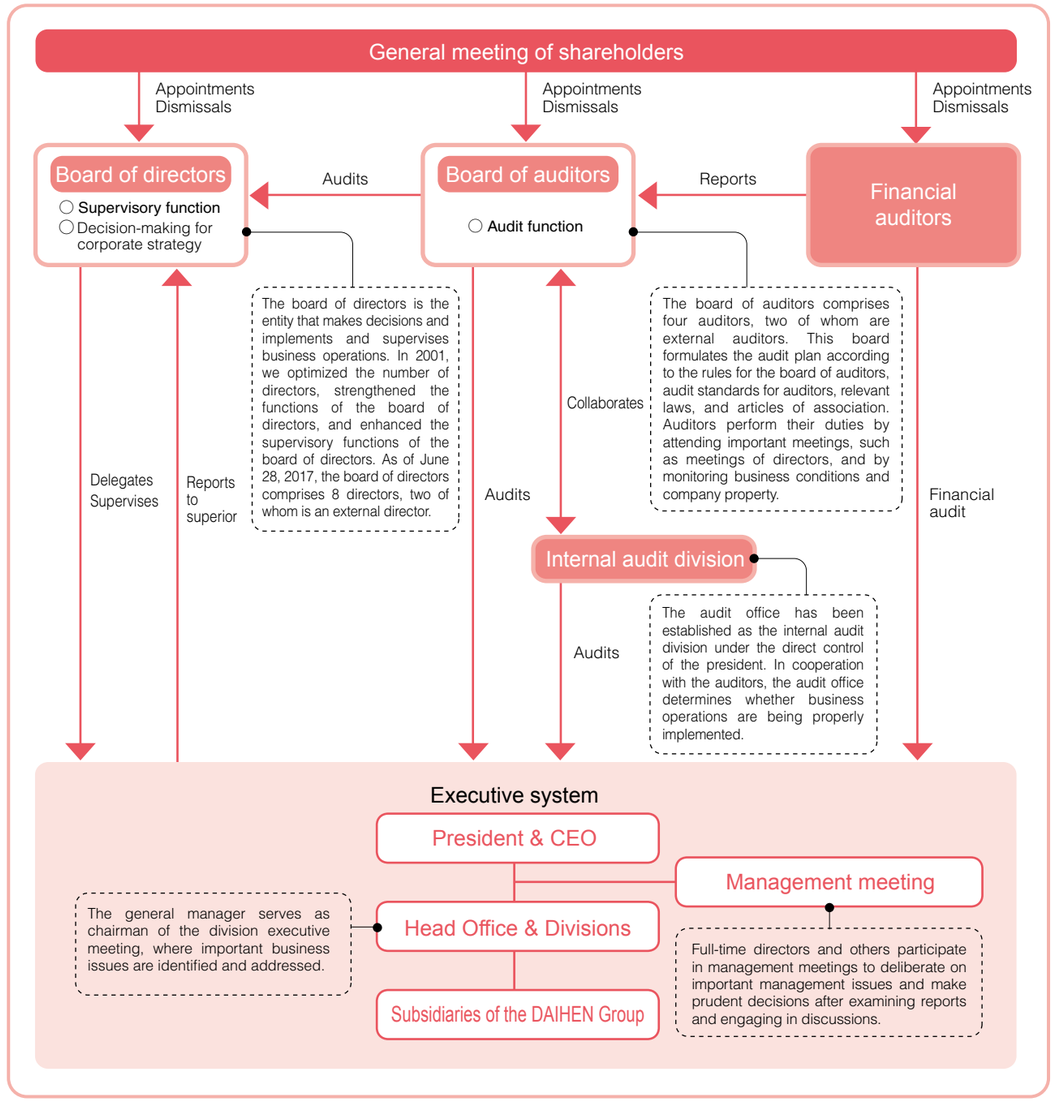
Corporate governance

An underlying principle of all our operations is to win the trust of our customers and all elements of society. The DAIHEN Group is striving to enrich its corporate governance in order to improve the transparency of management and ensure full compliance.

Ensuring management transparency and thorough compliance

The DAIHEN Group maintains a board of auditors that monitors the business undertaken by the board of directors. In June 2001, we adopted an executive officer system and enhanced the decision-making and supervisory functions of the board of directors to ensure the efficient operation of our business.

Corporate governance system



Compliance and Risk Management Initiatives

In addition to fulfilling our corporate social responsibility, we continue to seek ways to improve compliance awareness among all our employees. We are addressing this issue by implementing various initiatives intended to ensure that we do not betray the trust of the public.

In the area of risk management, we streamlined our manuals and regulations and instituted training in preparation for natural disasters and accidents; moreover, we are promoting the development of a system to serve as a framework for ensuring compliance in relation to risks associated with misconduct and legal violations.

As for risks related to rapidly developing information systems and the intellectual property field, we are addressing risk management through workshops, enacting various rules and regulations, and keeping employees informed throughout the company.

The DAIHEN Code of Ethics

As the basis for our internal regulations, this manual includes the rules with which we must comply as a corporation as well as all relevant laws and regulations. We have adopted the DAIHEN Code of Ethics, which specifies methods of compliance. It also indicates how we are to operate our business according to the key concepts of our corporate philosophy, "Reliability & Creativity."

DAIHEN Code of Ethics

A pocket-size version of this publication has been distributed to all Group employees to support appropriate behavior and decision-making according to the highest ethical standards.

Guide to Compliance with Laws and Regulations

As a means of preventing legal violations resulting from a lack of recognition or ignorance of the law, we have developed a compliance guide that summarizes the laws and regulations that all employees must follow. It also presents specific incidents involving violations of the law. This guide can be viewed or printed from any computer on the corporate network.

Click on the right icon to view the DAIHEN Code of Ethics, DAIHEN's Action Charter, Guide to Compliance with Laws and Regulations, and other documents.

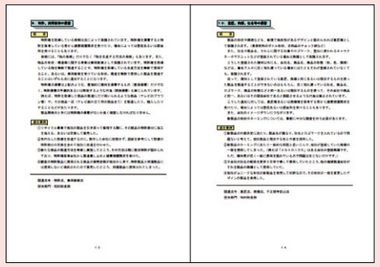
Training for compliance with laws and regulations

To ensure consistency of compliance and to increase the profile of corporate ethics and the law, we provide in-house training focused on compliance and the DAIHEN Code of Ethics. This training is provided to recent hires, mid-career employees, and employees in management positions at various levels.

By extracting laws and rules from our Guide to Compliance with Laws and Regulations, if those are considered deeply linked to specific job categories, we provide regulatory compliance training workshops — including supplemental commentary and case studies — for specific occupations. Training workshops are also held with a focus on how to conclude contracts and on specific laws and regulations.

These training workshops on compliance have been expanded in scope to encompass the entire Group, and we are raising awareness among all employees who must comply not only with laws, but also with internal regulations and corporate ethics.

Regulatory compliance training workshop



Guide to Compliance with Laws and Regulations

Establishment of a counselor's office for the Compliance Helpline

We have established a counselor's office for the Compliance Helpline to prevent and detect illegal actions at an early stage. This helpline will maintain the confidentiality of all employees, and DAIHEN will not prejudice any employee who engages in consultation with the counselor.

In addition, the Regulation for Protecting Whistleblowers provides our whistleblower protection rules.

Strengthening information security

In light of the growing importance of information security, the entire DAIHEN Group has adopted a variety of initiatives to enhance our information security system.

Main initiatives currently in force

Creation of an Information Security Committee

Our Information Security Committee (ISC) improves the information security policy for maintaining and managing information security from a single unified perspective. The ISC also promotes awareness activities such as required security training and education, in order to make the DAIHEN workforce conscious of the importance of information security, and introduces tools for preventing leaks and illegal access to confidential information, etc.

Compliance with our information security policy

In the DAIHEN Group, we establish "Information Security Policies," "Rules on Information Security Measures" and "Rules on the Protection of Personal Information," and organize them to facilitate compliance. In order to verify that the information security measures are working properly, we conduct internal audits every year and, if inadequacies are detected, improvement plans are crafted and implemented.

Promotion of information security awareness activities

Information security measures are explained to the workforce in an educational session, in order to raise employee awareness. Specifically, awareness activities such as training and education are conducted to alert employees to targeted email attacks aimed at businesses and organizations.

To promote compliance at our overseas business sites as well, we explain our policies, rules and measures through educational sessions similar to Japan and provide guidance for the use of information security tools.

Strengthening our information security infrastructure

To avert the risk of information being leaked due to the theft, loss, unauthorized access or other misfortune to befall PCs and external storage devices, we scrupulously encrypt PC hard disks, log operating histories and manage external storage devices. Moreover, we have introduced various systems to strengthen our information security infrastructure such as an automatic system for generating passwords for email attachments and a thin client system that prevents files from being saved to PC disks.

[Main activities for fiscal 2017]

We will strengthen information security across the entire Group by improving awareness and establishing measures.

- Improve the operation and management level of important servers.
- Establish practices to carefully check and manage the IT environments on a departmental basis.

Initiatives to protect our intellectual property

In the area of intellectual property, we are implementing a variety of initiatives to support risk management and legal compliance. For example, we comply with applicable laws and regulations relating to intellectual property rights before we undertake to develop, manufacture, or sell a product; in addition, we always confirm that we are not infringing the intellectual property of another company (to prevent the risk of infringement). This approach ensures that our customers can use our products in full confidence.

Risk management

In order to prevent infringement of the intellectual property of other companies, we periodically check publications on patents and the like obtained by other companies. When developing or improving the design of a product, we always seek patent clearances and design reviews (DR) to confirm that we are not infringing on the intellectual property rights of other enterprises.

At the same time, with regard to our own proprietary technology, we have established a patent protection network. The purpose of this network is to ensure our products remain superior to those of other companies, stabilize our business operations, and improve our corporate advantage using our fair rights to intellectual property.

Legal compliance

To take steps to avoid infringing on the intellectual property of other companies is to respect their intellectual property. This leads to our intention to produce stronger intellectual property. Therefore, we study various concepts and superior technologies developed by other companies in patent journals and the like as inspiration in order to increase our motivation to develop innovative products. In this way, we can make our products much more attractive.

In addition, we periodically provide our employees with legal training and training in intellectual property so that they understand the risks of infringing the legality and intellectual property rights of others. We continue to work toward comprehensive awareness in all aspects of our work. We have also held company-wide workshops on contracts. To ensure all employees understand and adhere to contract details when they forge contracts with trading partners, we invite a lawyer to hold workshops using concrete examples. These workshops are helping to raise awareness of compliance among our employees.

Company-wide workshop on contracts

To win the confidence and meet the demands of shareholders

In order to meet the expectations of shareholders and investors and justify their confidence in us, we remain committed to the sound and transparent management of our business. Moreover, we are dedicated to business development and are engaged in dissemination of accurate and pertinent information.

Basic policy

The policy of the DAIHEN Group is to implement the corporate philosophy characterized by the keywords "Reliability & Creativity." We are upholding this policy by faithfully and honestly providing safe, high-quality products and services that meet the needs of our customers while continuing to demonstrate reliability through our business operations. Moreover, while remaining dedicated to creating value and developing markets with new products and innovative technologies, we are diligently contributing to social development.

In addition, by implementing comprehensive investor-relations initiatives to provide information on our Group's business and financial circumstances as required for sound investment decisions, we intend to earn the ever deeper confidence of shareholders and investors.

Increasing our corporate value

Today, we cannot differentiate ourselves in the market merely by focusing on quality, cost, and delivery (QCD). Instead, we believe that we can further augment our corporate value by leveraging intangible assets such as our personnel, technical expertise, sales routes, intellectual property, and environmental preservation initiatives. Through this approach, we can establish a foundation of sustainable development that will enable us to maintain our competitive edge well into the future.

In order to increase the value of these intangible assets, we will take steps to strengthen the organizational capability of our entire Group while developing our human resources, formulating a patent network for our core technology, and further enhancing relations with shareholders, business partners, customers, and other stakeholders.

Paying good dividends

DAIHEN has adopted the important policy of continually paying a good dividend to our shareholders. We are committed to maintaining this policy of returning profits to shareholders subject to our profitability, financial circumstances, and the future development of our business.

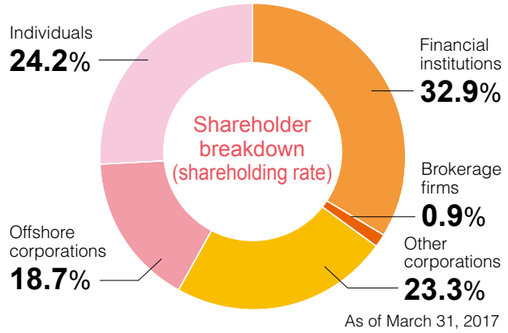
○ Five-year record of dividend payments

Fiscal year	2012	2013	2014	2015	2016
Dividend (in yen)	7	7	8	12	12

○ Stock data

As of March 31, 2017

Number of shareholders	8,356
Shares outstanding	135,516,455

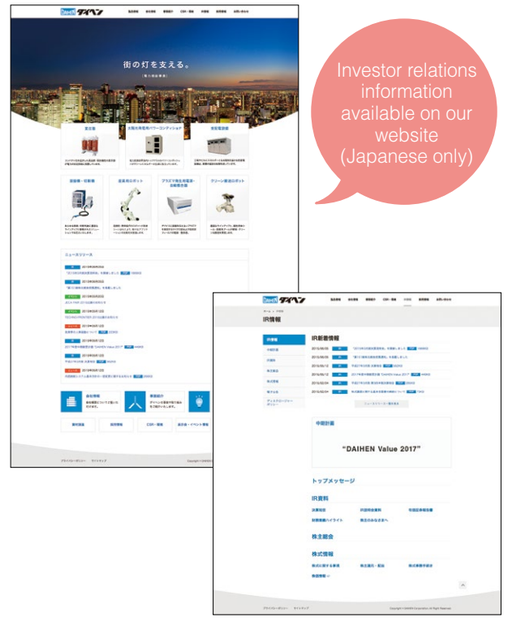


As of March 31, 2017

Information disclosure

We disclose all information required by legal disclosure standards. In addition, if we determine that it is necessary to disclose additional information to increase shareholder understanding of our company, we will disclose such information immediately and accurately through various media, even if disclosure of such information is not required by any laws or regulations.

Moreover, we will continue to proactively release information about investor relations activities through our corporate website (www.daihen.co.jp) and IR conferences for institutional investors, etc.



Earning the confidence of our customers by providing high-quality goods and services

In accordance with our quality policy, the DAIHEN Group remains committed to winning the confidence of customers by providing good products, systems, and services. In addition, we are dedicated to enhancing customer satisfaction.

Earning the confidence of our customers

Quality policy

As reflected in our corporate philosophy “Reliability & Creativity” and our founding spirit of “High Quality, Low Price, and Prompt Delivery,” DAIHEN has been striving since its establishment to provide customers with reliable products and services. Our strong emphasis on quality has clearly won us the great confidence of our customers.

In order to retain this confidence, DAIHEN has adopted a quality policy and is now taking steps to heighten quality in cooperation with our contractors.

Quality policy

In accordance with our founding spirit and corporate philosophy, we are winning the confidence of our customers by providing outstanding products.

Each division is addressing “customer satisfaction” as an indicator of customer trust. We intend to further increase our efforts in this regard.

Commentary

Aiming to reduce defects to zero

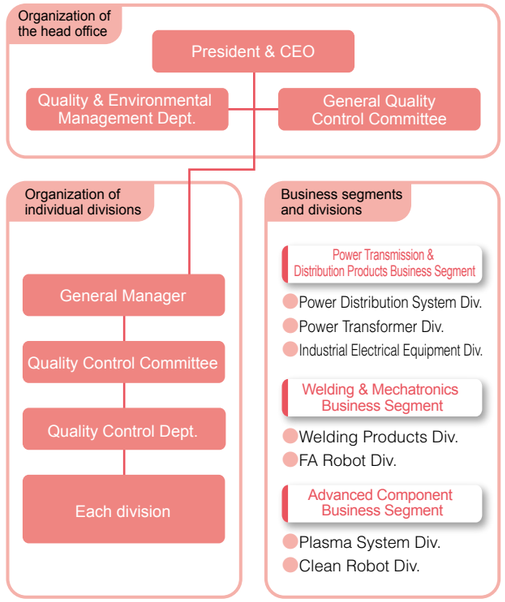
Kazutaka Sei
General Manager,
Quality Control Department
Plasma System Division

The Plasma System Division supplies high-frequency power supply units for generating plasma, which is absolutely essential in manufacturing state-of-the-art semiconductor devices. Our turnout has rapidly increased because of the growing demand stemming from increased capacity of memory devices and expanded use of IoT. In order to maintain product quality high and supply stable even under the pressures of increased production, we are promoting quality improvement activities that emphasize process FMEA to prevent defects originated in manufacturing from leaving the plant, and quality audits and guidance for suppliers. Moreover, in order to meet the increasingly higher quality requirements of customers, we are proactively introducing a new approach to quality management, known as “statistical process control” (SPC), that uses statistics to manage quality inconsistences. Going forward, the division and our manufacturing plant will continue working as one in order to further enhance quality and reduce defects to zero.

Quality assurance system

At DAIHEN, each of our business segments maintains a quality management system. Under their guidance, the respective Quality Control Committees established in each division and each product group discuss quality issues and report on any that arise. We have also established the General Quality Control Committee to provide oversight throughout all divisions. This committee examines problems common to all divisions, receives reports on significant quality problems from each division, examines the reports received on significant quality problems, implements countermeasures for these significant quality problems following their examination, and feeds back the results to all divisions.

○ Quality assurance system



Response system for significant quality problems

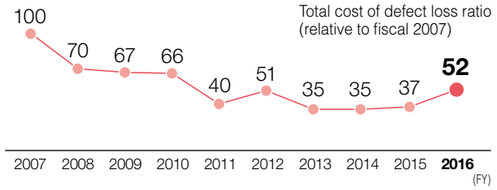
The DAIHEN Group has established a system whereby, if one of our products causes or develops the potential to cause a fire, an accident resulting in death or injury, or damage to customer property, or if a minor product issue causes the loss of many customers, we regard such a case as a “significant quality problem.” Our problem-solving team then takes immediate countermeasures against the problem while disclosing the problem company-wide and takes steps to prevent a recurrence.

No one has ever filed a suit against our company for products that do not conform to the Product Liability Act. Nevertheless, it is very important that we root out any significant quality problems to win the confidence of our customers. The entire company, therefore, is now making efforts to discover and correct significant quality problems.

Enhancing customer satisfaction

The DAIHEN Group implemented an Absolute Quality Initiative between fiscal 2006 and fiscal 2008. During the three-year period beginning in fiscal 2009, we promoted further quality improvements through our Quality Initiative (Q Initiative). During the three-year period beginning in fiscal 2012, we promoted our new Quality Initiative with an emphasis on minimizing risks to quality. In fiscal 2013, we went back to basics and circulated PDCA activities to address individual quality problems and risks. We are steadily incorporating corrective actions and preventive measures. As a result, we have gradually improved our sales ratio to total cost of defect loss. Treating fiscal 2007 as 100, our score for fiscal 2016 was 52, which was slightly worse than the previous year. We are very confident that these activities will both gain greater trust from customers and greatly contribute to customer satisfaction.

○ Trend in total cost of defect loss ratio



Certification of ISO 9001 registration

Since 1995, a succession of divisions of the DAIHEN Group have obtained certification of registration with ISO 9001, the international standard for quality management systems. Today, all divisions and international production plants, except for new divisions, have acquired certification of ISO 9001.

Acquiring certification of ISO 9001 registration expands our foundation for doing more than just meeting customer requirements; it testifies to our company-wide commitment to comply with the original purpose of the ISO 9001 standard, which is to continuously improve our structure in order to ensure customer satisfaction.

○ ISO 9001-registered divisions and companies

Fiscal year	Divisions, company name
1995	Welding Products Division
1996	Power Transformer Division
1997	Power Distribution Products Division
1998	Mechatronics Division
1999	Power & Control System Division
	DAIHEN Electric Co., Ltd.
	APS Division, ACT Division
2001	Mudanjiang OTC Welding Machines Co., Ltd.
2004	OTC DAIHEN Asia Co., Ltd.
	OTC Industrial (Qingdao) Co., Ltd.
2009	DAIHEN OTC (Beijing) Co., Ltd. (China)
2016	DAIHEN Stud Co., Ltd.

Quality control exclusive training initiative

In order to maintain and improve quality across the DAIHEN Group, all Group companies are putting a lot of time and effort into human resource training. As a part of that, educational activities focused specifically on quality management are being developed inside and outside Japan.

Starting from 2016, the training curriculum was devised to primarily practice quality control techniques, bolster our prevention initiatives and strengthen our ability to logically think our way through problems. In addition to practice in FMEA and FTA, study of failure, exercises in design review, reviewer training and our own “Why-Why Analysis” training, we introduced human error analysis and countermeasures from a psychological perspective.

Moreover, we continue to implement training in statistical analysis, which serves in analyzing data in relation to product design, development and manufacture.

Report being given as a part of “Why-Why Analysis” training

Lesson in statistical analysis

Reviewer training class

Small group movement

In the DAIHEN Group, business operations are directed toward attaining policy objectives based on every individual employee having a proper understanding of what our Group policy is. Within that, we are conducting small group activities from a top-down approach with which we aim to find better ways to look at and execute work, make improvements and efforts, and maintain and improve the quality of our products and services by putting together and condensing that attainment process with a logical and scientific train of thought.

In support of these activities, we train each employee in the fundamentals: QC perspectives and approaches, seven QC tools, seven new QC tools, problem-solving procedures, target-attainment procedures, and report-writing and the like. In this way, we are upgrading our job control and improvement capabilities while improving quality awareness. We can provide a visualization of the progress of our small group activities through our intranet while keeping everyone informed of the results of our initiatives.

Establishing an active workplace and improving our personnel system by providing rewarding work

We are establishing an active workplace and improving our personnel system by providing rewarding work. Moreover, we are supporting our employees' choice of varied working styles.

A personnel system dedicated to enhancing employee motivation

DAIHEN has established a personnel system designed to support and motivate our employees and provide them with rewarding work. For example, we reassign employees to accommodate the personality, work attitude, and abilities of each individual. In addition, we train our employees to develop a spirit to take on challenges; clarify our evaluation standards; and treat all the employees fairly and appropriately. In this way, our personnel system is supporting all our employees.

We believe that supporting and motivating our employees and providing them with fulfilling jobs will allow each employee to maximize his/her abilities and to develop a satisfying career. As a result, workplaces become active and our business develops at the same time. And, as DAIHEN develops, we improve the working conditions of our employees. These improvements are further contributing to employee motivation by making work more rewarding. In other words, we are aiming at a self-sustaining "personnel cycle" that can keep business going indefinitely.

In order to establish this "personnel cycle" and keep it self-sustaining, our performance evaluation system sets clear targets that the individual employee should strive to achieve and, by motivating the individual to produce results from their efforts, aims to help him/her develop his/her abilities in the process. It is a simple and easy-to-grasp system that serves to both manage targets and develop human resources.

A training system that supports employee development

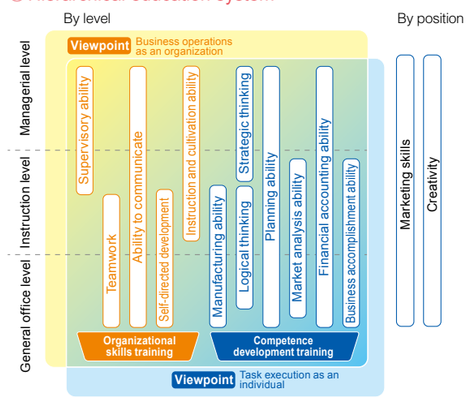
Human resource development at DAIHEN is done through daily on-the-job training, off-the-job training such as our hierarchical education programs, and incentive-driven correspondence courses that individuals can fit into their own schedules.

Our hierarchical education system is designed to improve employee skills and enhance our organizational strengths through position-specific training programs on the one hand, while, on the other, to maximize results as a united workplace by tailoring training content to the weight that "business operations as an organization" and "task execution as an individual" have at each position and level. It helps members of the same workplace not just improve their own skills but also build complementary relations with their colleagues based on the roles they play.

Moreover, to develop the skills required in each engineering, manufacturing and sales, efforts are being made to enhance creativity and marketing skills.

Going forward, we will continue to explore program content and timing in order to make our training efforts more effective.

○Hierarchical education system



Developing new recruits as a workplace activity

A "mentoring program" has been introduced in order to systematically guide new recruits in the right direction and get them up to speed in their assigned workplaces as quickly as possible. Rather than managers or supervisors, mentors are someone who can steer the new recruits through daily tasks and counsel them on life issues from a common ground approach. The primary purpose of the program is to help the new recruits settle into their jobs as soon as possible and promote their growth so that they can execute their work smoothly. To make the mentoring program even more effective, not only is one mentor assigned to each new recruit but also the entire workplace is tasked with aiding the new recruits. In other words, developing human resources is a workplace activity.

This idea of an entire workplace developing its new recruits is intended to create a constructive atmosphere in which everyone instinctively assists the new recruits in the same way they themselves received help and guidance when they were new. It is also meant to encourage young employees to set their sights on serving as mentors and growing into workplace leaders.

Mentors following up on new recruits

Lecture meeting in support of working women

A lecture meeting in support of working women was given to our female employees as part of corporate efforts to promote the advancement of women in the workplace.

Because jobs continue to require higher levels of knowledge and expertise, the presentation was loaded with content aimed at encouraging women employees at DAIHEN to take that first big step, broaden their reach and be forward-looking when undertaking their jobs. In order for not just women but any employee to expand his/her scope of activity, it is important not only for the individual to develop the right mindset but also for his/her superiors and those around him/her to better understand the individual. Therefore we will continue to provide mechanisms that allow all employees work enthusiastically.

Creating an environment that facilitates work

We are now creating an environment to facilitate work so that all employees can maximize their abilities.

Support for balancing work with childcare and nursing care responsibilities

Support systems aimed at helping employees balance work with childcare and nursing care responsibilities have been improved so that employees strapped with personal issues of the sort can keep working. We have made changes that offer our workforce greater leeway than statutory requirements, such as by extending the applicable period of paid child nursing leave (5 days) and exemptions from overtime work for childcare reasons through the sixth grade of elementary school, and by introducing a 4-day workweek for employees that have to care for family members. Moreover, knowing that nothing is ever perfect, labor and management discuss work-life balance support based on actual employee needs whenever necessary.

Going forward, we will collect and analyze issues that weigh on employees in order to provide working conditions that allow our people to work in a fresh and lively manner.

Employee satisfaction survey

We conducted an employee satisfaction survey covering all DAIHEN Group employees in Japan in order to reflect the results in our various systems and measures, including our personnel system. This enabled us to periodically determine the awareness and satisfaction levels of DAIHEN Group employees in the workplace regarding work and the company. In order to ensure our employees can work enthusiastically with good job satisfaction, we will continue to conduct this survey in an effort to devise a better structure and improve the workplace environment.

DAIHEN Group Heart Festival

The DAIHEN Group Heart Festival is a big field day event that brings together Group employees, their families and people from cooperating companies from across Japan.

Held every year since 2007, it was planned and created as a place and opportunity for brewing a sense of belonging and satisfaction as a member of the DAIHEN Group through competitive events between divisions and other contests where teamwork channels the participants' energy toward a shared goal. Moreover, through the process of forming teams, practicing and actually competing with employees from cooperating companies as well as their families, the festival aims to improve communications beyond organizational boundaries.

In commemoration of the festival's 10th year, this year took on a slightly different tone than before with a "Families First" theme by adding a competitive program that families would enjoy more plus a barbeque and other activities, which drew over 1,700 participants.

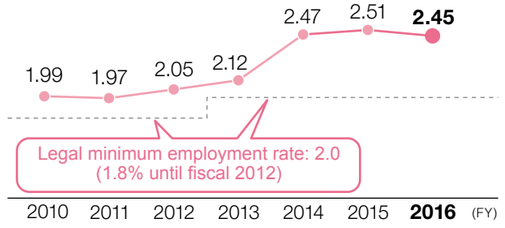
Moreover, new recruits gave a Japanese drum performance that they had prepared just for this day and were given a hearty welcome to the DAIHEN Group by everyone there.

Because of the energy and enthusiasm the Heart Festival brings out in people, we will continue to shape and stage the event so that everyone connected to the DAIHEN Group will feel more attached and happier to be a part of the Group.

Promoting employment of persons with disabilities

Daiki Corporation became a special subsidiary of DAIHEN in 1983. Daiki is now promoting employment of persons with physical and mental disabilities while improving the working environment for these individuals. As a result, DAIHEN's employment rate for persons with disabilities in Japan is now 2.45%, which is above the legal minimum employment rate of 2.0% (1.8% until fiscal 2012).

○Trend in the employment rate for persons with disabilities



Corporate Action Plan under the Act on Promotion of Women's Participation and Advancement in the Workplace

We established an exploratory committee of labor and management representatives to find ways for women to demonstrate their skills and play more active roles in the workplace. In June 2016, they formulated and submitted the below "Corporate Action Plan" to the Equal Employment Office of the Osaka Labor Bureau.

1. Period
   June 1, 2016 – May 31, 2019 (3 years)
2. Situation at DAIHEN
   In our recruiting practices every year, we look primarily for engineering graduates, however about 90% of the applications for technical positions come from men, because women represent only about 10% of that category. Moreover, about 70% of the applications we receive for office positions come from men. As a result, women account for a small percentage of our workforce.
3. Target
   Raise the percentage of women amongst new recruits (graduates and midcareer transfers) to 18% or higher.
4. Activities and timeline for recruiting and hiring more women
   June 2016 Explore policies and targets for hiring more women.
   October 2016 Explore ways to hire more women.
   December 2016 Explore proposals on deploying women in cohort with divisions/departments.
   January 2017 Formulate recruiting plans for the next year with higher numbers of women.
   March 2017 Implement measures to hire more women.
   August 2017 Assess efforts and explore ways to solve outstanding issues.

Our health and safety initiatives

Health and safety unite the DAIHEN Group under our corporate objective of “simultaneous contentment for all.” All related activities are based on our philosophy of “health and safety first.”

Group Policies

Across the DAIHEN Group, health and safety initiatives are viewed as the basis of our corporate objective of “simultaneous contentment for all” and underpinned by our philosophy of “health and safety first.”

To promote these initiatives, managers and supervisors use self-directed efforts to enhance health and safety awareness and take steps to prevent accidents in the workplace. We facilitate comprehensive health and safety initiatives with the participation of all employees so that they themselves come to understand the need to protect their own health and safety. DAIHEN continues to follow a policy of promoting a safe, healthful, and comfortable workplace for all.

Highlighted activities

Safety guidance via no-tolerance safety patrols

Since fiscal 2015, we have conducted safety patrols and guidance at our 16 production plants and 7 technical centers in Japan, under a “No-Tolerance Safety Project” via patrol squads consisting of outside work safety and health consultants and key personnel in charge of safety at DAIHEN. In fiscal 2017, we added risk assessments in which the actual situation in every workplace was verified, risks were identified and analyzed, and countermeasures were instructed.

Having continued the patrols for 3 years, we successfully raised both the safety and health level at our production plants and technical centers and the safety awareness of our workforce.

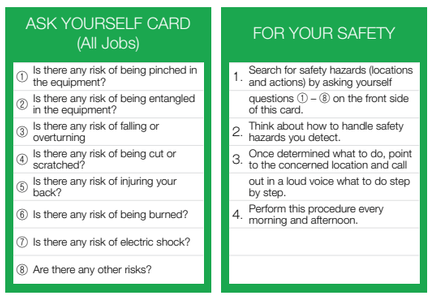
Guidance being imparted during no-tolerance safety patrols

Thorough safety enforcement by “Ask Yourself Card”

As an important activity in fiscal 2017, “Ask Yourself Card” was passed out to all plant workers to raise safety awareness and make it a standard practice to ensure work safety. As a result, everyone is responsibly verifying safety before commencing work, which has virtually eradicated unsafe behaviors.

To make sure that workers are taking all necessary safety precautions, supervisors in each workplace are patrolling to see that operators are following the hazard prediction and point-and-call techniques on the card, and are using check sheets to manage worker safety performance.

Supervisor checking safety on patrol of the workplace



ASK YOURSELF CARD (All Jobs)

① Is there any risk of being pinched in the equipment?
② Is there any risk of being entangled in the equipment?
③ Is there any risk of falling or overturning
④ Is there any risk of being cut or scratched?
⑤ Is there any risk of injuring your back?
⑥ Is there any risk of being burned?
⑦ Is there any risk of electric shock?
⑧ Are there any other risks?

FOR YOUR SAFETY

1. Search for safety hazards (locations and actions) by asking yourself questions ① – ⑧ on the front side of this card.
2. Think about how to handle safety hazards you detect.
3. Once determined what to do, point to the concerned location and call out in a loud voice what to do step by step.
4. Perform this procedure every morning and afternoon.

Ask Yourself Card (Front/Back)

Thorough health and safety management of on-site subcontractors

At DAIHEN, we are doing a lot to prevent accidents with on-site subcontractors. This includes our having in place a system for communicating, coordinating and sharing information with subcontracted companies, jointly imparting education and training in industrial health and safety with them, having subcontractors partake in our Health and Safety Committee, and proactively sharing information.

Work being instructed to on-site subcontractors

Health and safety program conducted jointly with on-site subcontractors

Self-care and line care departed from stress tests

We conduct stress tests every year and discuss those results with industrial physicians and our infirmaries. From that, we invite outside instructors to impart training in self-care and line care on a business site basis.

Training class in line care

Training in selfcare for young employees

Driving aptitude diagnostic test as a tool for ensuring safety awareness behind the wheel and better driving

We are preventing traffic accidents involving company vehicles by regularly having our drivers take a driving aptitude diagnostic test of the National Agency for Automotive Safety and Victims’ Aid (NASVA). Those results serve for drivers themselves to reflect on their driving tendencies and are used by supervisors to advise drivers on safe driving. Moreover, event data recorders are installed in all corporate vehicles and we are sequentially replacing our fleet with new vehicles equipped with safety features. So, not just by safety training alone but via equipment investment as well, we are doing a lot to make our drivers and supervisors more conscious of safe driving and to ensure they drive safely.

Drivers taking a driving aptitude diagnostic test

As a partner to our customers, we seek to achieve mutual prosperity and outstanding customer satisfaction.

To provide our customers with excellent products, we are promoting green procurement to ensure fair and equitable trade with our suppliers in the interests of mutual development.

Basic policy regarding material procurement

To meet customer demand by providing valuable products and services to our customers, we depend on the cooperation of suppliers offering excellent products and technologies. The DAIHEN Group believes that one of the most important elements of manufacturing competitive products is the procurement of high-quality materials. Therefore, on our website, we always list the items we seek to procure. In addition, we have adopted a basic policy for material procurement so that we can maintain and develop partnerships with our suppliers.

– Basic policy regarding material procurement –

Offering openness and fairness of opportunities

We openly provide opportunities for all our suppliers to participate in trade, regardless of nationality, region, business scale, or business experience.

Fair evaluation

We adhere to principles of competition as the basis on which we select suppliers. We generally take management reliability and technical development capability into consideration and make a fair evaluation in addition to evaluating quality, price, and delivery date.

Mutual development

We maintain sound trade relations based on mutual trust with suppliers and strive to support reciprocal corporate development.

Compliance with the law

We faithfully meet our contractual obligations with our suppliers, negotiate according to laws and regulations, and maintain healthy business practices.

Our policy is not to use conflict minerals that serve as a source of funds for warlords who violate human rights.

Communication with our suppliers

To promote mutual understanding with our suppliers, we hold an annual Briefing Session on Procurement Policy at which we explain our material procurement policy to our suppliers and engage in related discussions.

In addition, we perform a fair evaluation of a supplier's business status and accomplishments. We invite suppliers to our annual Briefing Session on Procurement Policy and honor outstanding suppliers. In this way, we are enhancing our relationships with our suppliers.

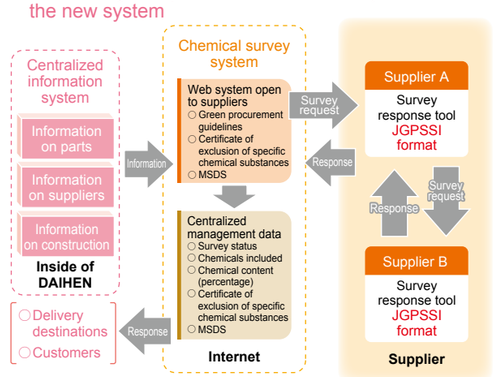
Policy briefing session for suppliers

Green procurement initiatives

The DAIHEN Group establishes a new survey system for chemical substances.

To promote green procurement, the DAIHEN Group reviewed the conventional chemical substance survey system and decided to introduce JGPSSI format, the standard response tool used in the electrical and electronic industries. This new chemical substance survey system is connected to our centralized in-house information system. The JGPSSI format we have introduced allows for reciprocal data exchange and joint use of environment data in our supply chain. This innovation has resulted in rapid and easy environmental surveys. We will use this new system to promote the manufacture of eco-friendly products.

○ Outline of green procurement and surveys taken with the new system

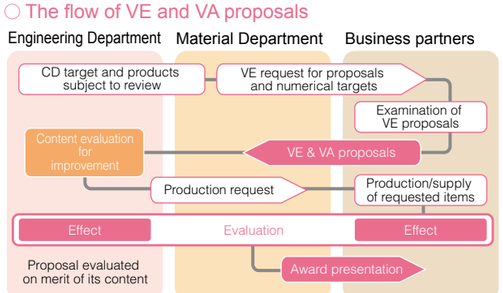


Working together with our suppliers to raise productivity

The DAIHEN Group aims to ensure quality and improve market competitiveness while streamlining our manufacturing processes and enhancing ease-of-manufacturing by actively implementing cost reductions focused on Value Engineering/Value Analysis (VE/VA) proposal initiatives.

Through these activities, we jointly participate in improvement proposals together with those who place and receive orders, and we share the results with both parties. We believe this is a desirable way to operate our business while earning reasonable profits.

○ The flow of VE and VA proposals



Seeking symbiosis with the local community and cooperation with society

As a member of the local community, each plant is deepening its interchange and establishing a positive relationship with community residents while fulfilling its corporate social responsibility through various support initiatives.

Communication with the local community

Keeping the community in focus

Every August, DAIHEN Industrial Machinery in Tottori opens up a part of their site to the general public for their annual summer festival. The festival includes various events, kiosks manned by employees, and a drawing for prizes while offering opportunities for local residents and DAIHEN Group employees and their families to mingle.

Moreover, Daihoku Industry Co., Ltd. in Eniwa, Hokkaido contributes to local events and collaborates on Eniwa Candle Night.

Summer festival hosted by DAIHEN Industrial Machinery

Eniwa Candle Night

Neighborhood schools participate in plant tours

Our Rokko Plant in Kobe and DAIHEN Industrial Machinery offer plant tours to neighborhood elementary schools, day-care centers, and technical colleges. It also provides junior high school students with internships in order to gain work experience. In this way, the manufacturing sites of our Group are imparting in young people an understanding of the significance and appeal of work.

Gaining work experience at the Rokko Plant

Tottori Plant Tour

Comments by participants

- There were a lot jobs that they let me try, so I tried a bunch of different things.
- They would talk to me while they were working and politely explain what they were doing.
- I learned just how fun and just how demanding work can be.
- This was a good reference for exploring a career path. I left thinking that this was the kind of company I want to work for in the future.

Supporting social welfare, education, and cultural initiatives

Support for social welfare

The Hakuaisha, a social welfare service corporation that carries out social welfare activities in Yodogawa-ku, Osaka, holds a regular event known as the Hakuaisha Carnival. Every year, employees wishing to make donations provide numerous items for the fundraising bazaar.

Support for scientific education

We dispatch company employees as part-time university lecturers to provide support and help students improve their abilities. This effort includes providing students with an introduction to leading-edge robotic and welding technologies.

Support for art and culture

We participated in initiatives in support of the Osaka Philharmonic Orchestra, the Kansai Philharmonic Orchestra, Kobe Luminarie, and Nagashibina Maranic (marathon and picnic) event in Mochigase (Tottori City).

We stand together with everyone, and we won't forget that our Group has the support of many people.

Cleanup activity surrounding our offices and plants

Each location of the DAIHEN Group is proactively engaged in cleanup campaigns and is contributing to regional beautification initiatives. Going forward, we intend to participate in future regional beautification and vitalization efforts such as these.


Juso


Rokko


Kanehira


Oita


Hirosaki


Izumiotsu


Matsudo


Mie


Eniwa


Chitose

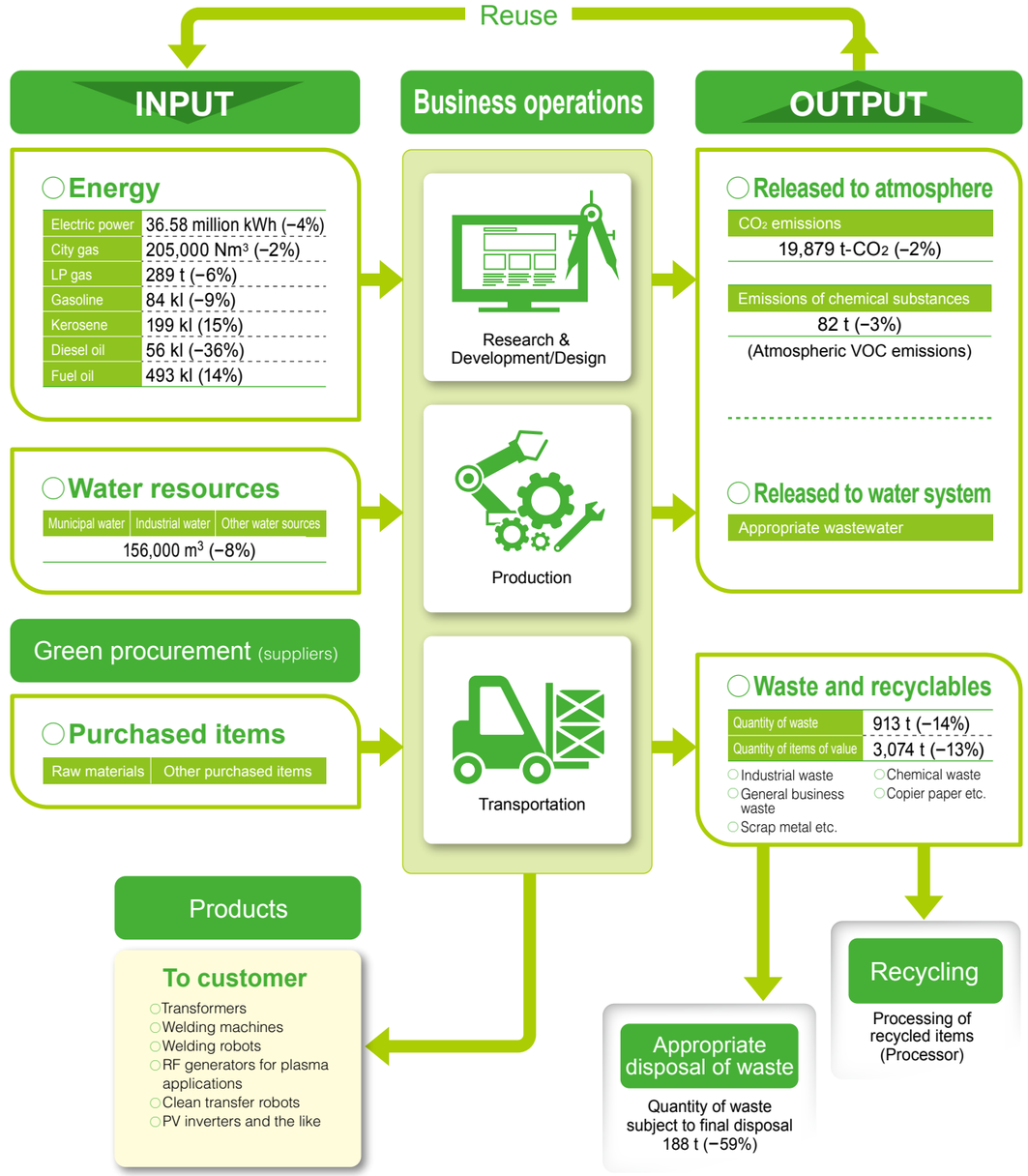

Tottori


Kagawa

The environmental impact of our business activities

In addition to determining the environmental impact of our business activities, the DAIHEN Group is working hard to reduce its overall environmental impact from every angle by remaining constantly aware of all phases from product planning and development through to production.

Relation between the DAIHEN Group's environmental impact and business operations



Notes:

- Scope of data: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, and Kanehira Plant) and Group production bases (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.
- Figures apply to fiscal 2016. Figures in parentheses are relative to fiscal 2015.

Environmental management at the DAIHEN Group

The DAIHEN Group aims to develop as a company that becomes the first choice of society at large. We consider environmental preservation to be one of our most important issues, and we are thus committed to environmental management in order to establish a better relationship with stakeholders through our environmental preservation initiatives. We are promoting environmental conservation through the implementation of environmental safeguards and are contributing to the emergence of a sustainable society by instituting environmental management that focuses on the environmental impact of our business operations.

Contributing to the emergence of a sustainable society is the social responsibility of the DAIHEN Group, and environmental management represents an important primary factor when evaluating a company's sustainability.

In constructing and operating its Environmental Management System (EMS), the DAIHEN Group is seeking to increase its own sustainability by contributing to the emergence of a sustainable society through the environmental considerations of its business operations, the environmental contribution of its products, the environmental aspects of its social contribution, and so on as shown in the illustration below.

Above all, the environmental contribution of both of our eco-friendly products during and after application is increasingly important to our Group manufacturing businesses. By achieving this, we intend to meet our responsibilities as an enterprise.

Contributing to the emergence of a sustainable society

Implementation of environmental management at the DAIHEN Group

1 Eco-friendly business operations

We are monitoring the environmental impact of the business operations of the DAIHEN Group and are implementing various initiatives to reduce this impact at the product manufacturing stage. In addition, we are expanding such activities to our international production hubs in China, Thailand, and elsewhere and addressing the construction of a global environmental management system.

2 Contributing to the environment through our products

The environmental contribution of our eco-friendly products both during and after application is the most significant mission of our Group manufacturing businesses. We will fulfill our responsibilities as an enterprise by producing numerous eco-friendly products and by contributing to the emergence of a recycling-centered society.

3 Contributing to society through environmental initiatives

While building a better relationship in the future with our customers, local residents, shareholders, and all other stakeholders through the DAIHEN Group's various environmental activities, we are promoting activities to increase the sustainability of the DAIHEN Group. For this reason, we believe it is important that each employee in the Group implement voluntary and concrete actions as a member of society.

Environmental Management System (Basis of activities)

○Compliance ○Risk management ○Communication ○Training and education

Environmental preservation initiatives: policies and systems

The DAIHEN Group has established its own Environmental Policy based on both its Basic Philosophy and Conduct Policy. The Group has established an environmental management system and is promoting environmental conservation through a variety of means.

The DAIHEN Group environmental policy

Basic Philosophy

The DAIHEN Group responds to the trust of society by developing technologies and providing products that place a value on people and resources under the DAIHEN corporate philosophy "Reliability & Creativity." The DAIHEN Group seeks to contribute to an abundant future and a healthy environment as a corporate group that fills a role as the popular choice of society.

Conduct Policy

In an effort to implement its basic philosophy, the DAIHEN Group will voluntarily adopt proactive global environmental conservation initiatives according to the following guidelines in all our business operations including power transmission and distribution products, welding machines, FA products, semiconductor equipment, dispersed power systems, and other products in the energy and power electronics field.

1 Reduce environmental impacts resulting from business operations.

We shall address the following initiatives by considering all steps encompassing product design, development, procurement, manufacturing, and distribution as well as product use and disposal.

1. Promote energy-efficiency initiatives and take steps to help mitigate the risk of global warming.
2. Promote resource conservation, waste reduction, and recycling.
3. Reduce the environmental impact of the use of chemical substances.
4. Offer green products.
5. Promote green procurement.

2 Comply with laws and other requirements.

We shall comply with the relevant legal and environmental requirements and other requirements that we decide to adopt. We shall also adopt and administer voluntary management standards and implement pollution controls to prevent any occurrence of environmental pollution.

3 Establish environmental objectives and targets and periodically review them.

Each division of the DAIHEN Group shall establish environmental targets and promote environmental preservation initiatives.
Moreover, each division shall periodically review its targets, and continually seek to improve its environmental management system in ways that ultimately enhance its environmental performance.

4 Raising environmental awareness

We shall enrich environmental education and deepen understanding of environmental policy among all who are working for or within organizations and seek to increase environmental awareness through initiatives intended to contribute to society.

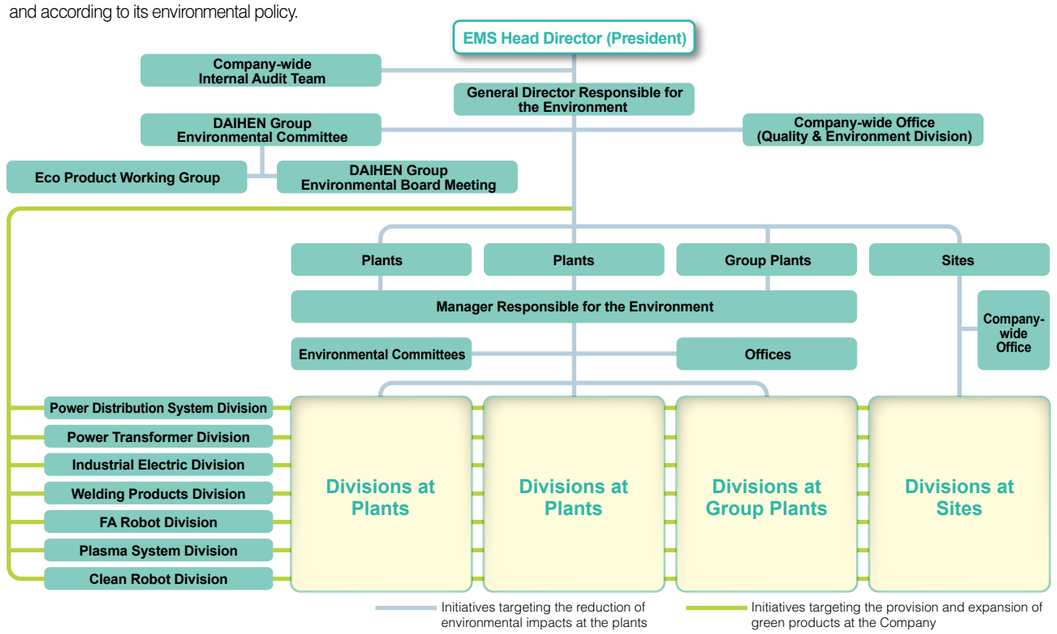
5 Enhancing environmental public relations

We shall provide stakeholders with timely environmental information, collect a broad range of environmental data, review our environmental preservation initiatives, and transmit information in a clear manner.

Environmental Management System

The DAIHEN Group has established and implemented the DAIHEN Group Environmental Management System under the President & CEO of DAIHEN Corporation as the EMS Head Director and the Environmental Officer as the General Director Responsible for the Environment. The DAIHEN Group promotes a variety of environmental conservation initiatives through its business operations and according to its environmental policy.

The DAIHEN Group has established a system that supports environmental protection initiatives from two directions; each office and plant implements environmental conservation related to its business operations, and each division develops plans for eco-friendly products and services. The Eco Product Working Group and the DAIHEN Group Environmental Board Meeting, organizations under the auspices of the DAIHEN Group Environmental Committee, have been established in an effort to promote Group-wide initiatives.



Environmental management system

The DAIHEN Group has proactively established an effective environmental management system and continuously improves it in order to strengthen environmental management groupwide. We intend to continue promoting environmental preservation initiatives in the future.

Certification of ISO 14001 Registration

The DAIHEN Group has established and implemented a Group-wide environmental management system compatible with the ISO 14001 international standard as part of our environmental preservation initiative under our Environmental Policy. We are dedicated to continual reduction of our environmental impact.

○ Group Company sites that have acquired certification of ISO 14001 registration

Companies in Japan

Company name	Site
DAIHEN Corporation DAIHEN Electric Machine Corporation DAIHEN System Corporation DAIHEN Logistics Co., Ltd. DAIHEN Engineering Co., Ltd. DAIHEN Technos Co., Ltd. DAIHEN Welding Mechatronics System Corporation	Head Office / Juso Plant Rokko Plant Mie Plant Chitose Plant Kanehira Plant
DAIHEN Industrial Machinery Corporation	Tottori Plant
DAIHEN Technology Institute	Oita Plant
DAIHEN Stud Co., Ltd.	Matsudo Plant
Daihoku Industry Co., Ltd.	Eniwa Plant
Minami Electric Co., Ltd.	Kagawa Plant
DAIHEN Fuse Corporation	Izumiotsu Plant
DAIHEN Aomori Corporation	Hirosaki Plant

Companies outside Japan

Company name	Country
OTC DAIHEN Asia Co., Ltd.	Thailand
DAIHEN Electric Co., Ltd.	Thailand
Mudanjiang OTC Welding Machines Co., Ltd.	China
OTC Industrial (Qingdao) Co., Ltd.	China
DAIHEN OTC (Beijing) Co., Ltd.	China

Environment-related incidents and complaints

No incidents related to environmental issues were filed in fiscal 2016. The following two complaints were filed in fiscal 2016 and were addressed, including steps to prevent a recurrence.

○ Environment-related complaints in fiscal 2016

Detail of complaint	Originating workplace	Response
Rainwater from a drain on the northern side of a canning factory flooded the street.	Juso Plant	Modifications were made on factory grounds to ensure proper drainage.
When constructing a fence on the northern side of a canning factory, curbstones of a side ditch were moved without confirming boundary lines.		The curbstones were returned to their original location along the side ditch.

Environmental training and internal awareness initiatives

The DAIHEN Group provides wide-ranging environmental training in an effort to improve the environmental awareness of all employees, enable them to recognize their responsibilities, and translate their duties into action.

Expansion of environmental training opportunities

The DAIHEN Group provides three levels of environmental training targeted at specific groups: all DAIHEN Group employees; various employee segments, such as new hires; and employees requiring specific expertise such as personnel undergoing internal audit training and personnel assigned environmental protection duties. Training materials and the relevant data used for various training courses are published internally on the Web and are used for training within division and for improvement of knowledge.

Publication of Eco News

Currently the periodic house journal Eco News is published on the company intranet in order to train all employees as part of their in-house training. It is also intended to raise the environmental awareness of all employees.

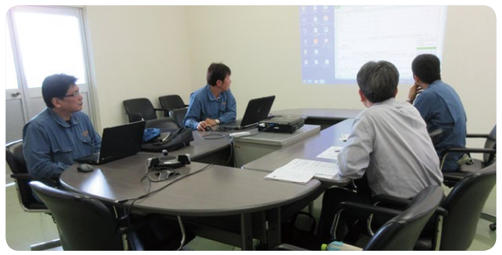
Environmental cards distributed

We distributed a pocket card to all our Group employees and temporary workers that contains the text of “My Environmental Declaration” and lists our environmental policies and targets.

Internal environmental audits

In 2016, we conducted internal audits of all 99 divisions within the DAIHEN Group.

These audits placed emphasis on whether or not, in fiscal 2016, priority environmental targets were considered and appropriately applied in setting division targets, whether or not environmental laws and regulations were being properly observed, and whether or not environmental efforts were helping the divisions to achieve their business objectives.



Internal audit under ISO14001 in fiscal 2016

Results of internal audit for fiscal 2016:
12 items identified (all corrective measures completed)

DAIHEN Group environmental accounting in fiscal 2016

As a group of manufacturers, the DAIHEN Group engages in an extensive range of environmental initiatives. We adopted environmental accounting because we believe that cost-benefit analysis supports effective and appropriate initiatives. In the future, we will allot sufficient funds where needed and will engage in additional environmental initiatives by expanding the scope of application of environmental accounting.

Elements of environmental accounting

Accounting period: Fiscal 2016 (April 1, 2016 to March 31, 2017)

Reporting workplaces:
Juso Plant (including the head office), Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant of DAIHEN Corporation, DAIHEN Group production sites (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant and Izumiotsu Plant)

Note: This report has been compiled according to the DAIHEN Group Environmental Accounting Guidelines. These guidelines are in conformity with the Environmental Reporting Guidelines published by the Ministry of the Environment, Japan.

○ Costs of environmental initiatives

- ○ Costs are calculated by separating investment expenditures and expenses.
- ○ Expenses include labor costs, but do not include depreciation.
- ○ Costs including objectives (combined costs) excluding environmental costs are calculated proportionally by our criteria.

(Millions of yen)

Classification		Major initiatives	Investment	Cost
Business area costs			175	71
Breakdown	1. Pollution control	Maintenance and management of facilities to control air, water, vibration and noise pollution.	5	22
Breakdown	2. Global environmental preservation	Introduction, maintenance, and management of energy-efficient equipment; introduction of energy conservation initiatives, etc.	168	11
Breakdown	3. Resource recycling	Waste reduction, recycling, externally consigned disposal, resource-conservation initiatives, etc.	2	38
Upstream and downstream costs		Green procurement promotion activities etc.	0	1
Management activities		Management of environmental preservation organizations, environmental education, information disclosure, construction and maintenance of environmental management systems, etc.	0	76
R&D		Promotion of green products R&D etc.	188	816
Community activities		Community environmental preservation initiatives, donations to environmental organizations, etc.	0	1
Environmental remediation		Environmental remediation cost	0	0
Miscellaneous		Participation in industry groups, information exchange meetings with affiliated companies, etc.	0	12
Total			363	977

○ Benefits of environmental initiatives

Classification	Item (unit)	FY2015	FY2016	Difference
Resource inputs	Total energy input (kL in crude oil equivalent)	8,024	8,140	−116
Global warming prevention	Greenhouse gas emissions (t-CO_2)	14,550	14,431	119
Waste reduction	Total waste and other emissions (t)	862	724	138
	Waste final disposal amount (t)	32	8	24
Air pollution control	Atmospheric emissions of VOCs (kg)	24,924	24,477	447

Economic benefits of environmental initiatives

○ Monetary benefits

(Millions of yen)

Item	Details of effects	Amount
Income	Business income by sale of valuables resulted from business activities	29

○ Estimated effects

(Millinos of yen)

Item	Details of effects	Amount
Sales of green products	Power Transmission & Distribution products Top Runner transformers, transformers for power companies, PV inverters, and other products	17,964
	Welding & Mechatronics products Energy-efficient, gas-saving, low-spatter welding machines, welding robots, and other products	6,796
	Advanced Component products RF/Microwave generators and matching boxes, Wafer/glass substrate transfer clean robots and other products	6,153

Note: The above were calculated using the environmental preservation objectives ratio.

○ Estimated major (individual) effects

(Thousands of yen)

Item	Details of effects	Amount
Energy conservation	Reduced power consumption by installing FEMS equipment.	6,557
	Reduced power consumption by adopting special environmental LEDs for crane lights.	3,000
	Reduced power consumption by replacing plant lighting with LEDs.	2,659
	Reduced power consumption by adopting high-efficiency motors for drying oven ceiling fans.	2,540
	Reduced power consumption by automating production (fuse element manufacture, silicon coating).	1,092
Weste reduction	Reduced waste by utilizing returnable steel shipping containers.	3,300

Note: Estimated benefits from the current year’s investment and initiatives are appropriated as a five-year benefit because the benefits are longer term.

International environmental accounting

Accounting period: Fiscal 2016 (April 1, 2016 to March 31, 2017)

Reporting workplaces:
OTC DAIHEN Asia Co., Ltd. (Thailand); DAIHEN Electric Co., Ltd. (Thailand); Mudanjiang OTC Welding Machines Co., Ltd. (China); OTC Industrial (Qingdao) Co., Ltd. (China)

○ Costs of environmental initiatives

Investment	¥9 million
Costs	¥40 million

Note: Figures exclude payroll and depreciation.

Environmental initiatives: plans and results

Under our Voluntary Environmental Action Plans, the DAIHEN Group has adopted medium-to-long-term environmental objectives and targets, and we are thus closely focused on environmental preservation. In the DAIHEN Group's 5th Voluntary Environmental Action Plan, which was initiated in fiscal 2016, we pursued three initiatives: prevention of global warming, waste reduction, and air pollution control. These were adopted as common initiatives at our 18 plants, including the offshore production plants of the DAIHEN Group.

Because the activities we implemented in fiscal 2016 were closely tied to daily operations, we attained our targets for all 10 objectives.

Moreover, we significantly exceeded our target ratio for certified green products among new products resulting from our Group policy of "creating value with products unique to DAIHEN."

As a result of our effort to expand sales of certified green products, we greatly surpassed our targeted ratio for the prevention of global warming index.

With regard to CO_2 emissions, we attained our target despite the challenges presented by the extended time our plants were running in order to increase turnout for the moderately paced economic growth of industrially advanced nations and strong equipment investment in Japan and elsewhere, thanks to the various activities that plants and offices undertook to reduce energy consumption.

We reached our waste reduction target by recycling materials, converting waste into usable resources, and expanding use of returnable steel shipping containers. We also cleared our air pollution control target via constructive actions to curb emissions, etc.

The positive results achieved in fiscal 2016 have encouraged us to revise our fiscal 2017 targets upward and do more at our plants and offices to protect the environment by promoting energy conservation measures, reducing waste through the effective use of resources and strengthening how we manage chemical substances.

The DAIHEN Group's 5th Voluntary Environmental Action Plan and Results of Initiatives

Stage	Corporate objective	Medium-term plan	Policy	Target for Fiscal 2016		Results of Initiatives in Fiscal 2016	Initiatives in Fiscal 2016	Evaluated by DAIHEN
Management	Simultaneous contentment for all	—	Promoting environmental management	Build an EMS compliant with ISO14001:2015.		Completed EMS review.	[Building ISO14001:2015-compliant EMS] ・Review of standard documents: Environmental policy, manuals, rules ・Briefings to explain revisions: Nov. 9 – Dec. 16 ・Review of standard documents by departments: Jan. – Feb.	○
			Green procurement	Promote green procurement with suppliers to broaden our environmental contribution. (50% or more of all suppliers who have concluded basic business agreement with DAIHEN)		65% of all suppliers officially certified	・Environmental questionnaire for 117 suppliers (109 replies received) ISO14001 certification or other official certification acquired: 76 suppliers (65%) Activities conducted to conserve energy, conserve resources, reduce waste, manage hazardous materials, etc.: 98 suppliers	○
			Reducing environmental risk	0 environmental accidents* (* An accident that causes environmental damage (soil, water quality, etc.) to DAIHEN or third parties, or seriously impacts the natural environment)		0 environmental accidents	・Disposal of low concentrated PCB equipment stored at the Juso Plant (Dec.) ・39 units including equipment that may contain PCBs at all plants (Transformers × 22, capacitors × 15, other 2)	○
Products		Create value with products unique to DAIHEN	Developing green products	Percentage of new products certified as "green" 70% or more		88.6% of new products "green" certified	・Certified products … Power Distribution 7, Power Transformer: 4, Industrial Electric Equipment: 1, Dispersed Power System: 2, Welding Products: 1, FA Robot: 2, Plasma System: 3, Clean Robot: 11 ・Percentage of green products amongst new products: 88.6% (31 of 35 products)	○
			Promoting sales of green products	Percentage of all sales accounted for by green products 50% or more		51.4% of all sales accounted for by green products	・[Total green products] Super Eco Products: 16, Eco Products: 208 Sales of green products 53,373 million yen/ Sales of all products 103,833 million yen = 51.4%	○
			Creating values that customers themselves recognize	Reduce CO_2 emissions by 35,000 tons/year via green (energy-saving) products.		35,600 tons	Expansion of qualifying energy-saving products ・Contribution to CO_2 reduction 35,603 tons	○
Processes		Promote our Loss-Cutting Initiative	Preventing global warming	Reduce CO_2 emissions intensity of plants and in distribution by 6% from fiscal 2010 levels.		Reduced by 32.8%	● Production automation and process review [Rokko, Eniwa, Hirosaki] ● Shorter test time, reduction in test loss [Mie] ● Operation of solar power generation system [Juso, Tottori, Oita] CO_2 emissions intensity result: 0.15 t-CO_2/million yen Fiscal 2016 target: 0.22 t-CO_2/million yen → Reduced by 32.8% relative to fiscal 2010 levels (Reference) Total CO_2 emissions: 19,879 t-CO_2	◎
			Preservation of biodiversity	○ Reduce water consumption intensity by 20% from fiscal 2010 levels. ○ Promote efforts to preserve biodiversity at each business site.		Reduced by 30.8%	● Removal of cooling tower for cooling/heating [Tottori] ● Use of water-saving faucets and check valves [Juso, Izumiotsu, Oita, Matsudo] ● Participation in river cleanup activity organized by community [Hirosaki] Water consumption intensity result: 1.22 m^3/million yen Fiscal 2016 target: 1.4 m^3/million yen → Reduced by 30.8% relative to fiscal 2010 levels	◎
			Waste reduction	Percentage of waste disposed of by landfill 0.5%		0.28% disposed of by landfill	● Increased and thorough sorting of waste [Juso, Mie, Izumiotsu, Kagawa] ● Conversion of waste into valuable resources [Rokko, Mie, Chitose, Izumiotsu] ● Introduction of coating booth and viscosity reducing agent for paint sludge [Eniwa] Percentage of waste from plants in Japan disposed of by landfill → 0.28% (Reference) Total waste discharge excluding valuable resources: 913.1 tons	◎
			Air pollution control	Reduce VOC emissions intensity by 20% from fiscal 2010 levels.		Reduced by 44.9%	● Appropriate operation of coating robots, standardization of priming method [Kanehira] ● Use of thinner (for cleaning) recycling machine [Eniwa] ● PRTR-free thinner for cleaning and topcoat [Kagawa] VOC emissions intensity result: 0.64 kg/million yen Fiscal 2016 target: 0.92 kg/million yen → Reduced by 44.9% relative to fiscal 2010 levels (Reference) Total VOC emissions: 81,544 kg	◎

The DAIHEN Group's 5th Voluntary Environmental Action Plan

Under our 5th Voluntary Environmental Action Plan, we have set medium-term action targets (fiscal 2016 – 2018) for each of the "Management," "Products" and "Process" stages.

In the "Management" stage, we are adapting the environmental management systems we have been using from before to the revised ISO requirements, rebuilding them as a platform integrated with our business activities and rounding them out into more effective tools.

In the "Products" stage, we are continuing the push to create and supply green products with a strong emphasis on the values of our customers and, as energy-saving (high efficiency) products, simultaneously contribute to society by first and foremost helping the fight against climate change.

In the "Process" stage, we are expanding the activities that plants in Japan are implementing to protect the environment and preserve biodiversity to our production sites outside Japan, and sharing the results they have posted from those efforts, in order to address environmental protection from a global perspective.

We will further accelerate activities within the DAIHEN Group in order to contribute to society through our efforts to protect the global environment and bring "simultaneous contentment for all."

Stage	Corporate objective	Medium-term plan	Policy	Target for Fiscal 2017	Target for Fiscal 2018
Management	Simultaneous contentment for all	—	Promoting environmental management	Upgrade to an EMS compliant with ISO14001:2015.	Maintain and improve ISO14001:2015-compliant EMS.
			Green procurement	Promote green procurement with suppliers to broaden our environmental contribution. (75% or more of all suppliers who have concluded basic business agreement with DAIHEN)	Promote green procurement with suppliers to broaden our environmental contribution. (100% of the suppliers who have concluded basic business agreement with DAIHEN)
			Reducing environmental risk	0 environmental accidents	0 environmental accidents
Products		Create value with products unique to DAIHEN	Developing green products	Percentage of new products certified as "green" ~~75%~~→90% or more	Percentage of new products certified as "green" ~~80%~~→90% or more
			Promoting sales of green products	Percentage of all sales accounted for by green products 55% or more	Percentage of all sales accounted for by green products 60% or more
			Creating values that customers themselves recognize	Reduce CO_2 emissions by 40,000 tons/year via green (energy-saving) products.	Reduce CO_2 emissions by 45,000 tons/year via green (energy-saving) products.
Processes		Promote our Loss-Cutting Initiative	Preventing global warming	Reduce CO_2 emissions intensity from fiscal 2010 levels. ~~7%~~→35%	Reduce CO_2 emissions intensity from fiscal 2010 levels. ~~8%~~→37%
			Preservation of biodiversity	Reduce water consumption intensity from fiscal 2010 levels. ~~25%~~→33% Promote efforts to preserve biodiversity.	Reduce water consumption intensity from fiscal 2010 levels. ~~30%~~→35% Promote efforts to preserve biodiversity.
			Waste reduction	Percentage of waste disposed of by landfill ~~0.4%~~→0.25%	Percentage of waste disposed of by landfill ~~0.3%~~→0.25%
			Air pollution control	Reduce VOC emissions intensity from fiscal 2010 levels. ~~25%~~→50%	Reduce VOC emissions intensity from fiscal 2010 levels. ~~30%~~→50%

→ ** indicates targets that were upward-revised after recording fiscal 2016 results.

Prevention of global warming

Controlling CO_2 emissions

Plan

DAIHEN Group (18 plants)

Reduce CO_2 emissions intensity **by 6%** from FY2010 levels.

Do

We have been committed to reducing CO_2 emissions at the 18 plants of the DAIHEN Group, including six plants at production sites outside of Japan. Some of those actions are listed below.

Introduction to initiatives of our plants

- ○ Replacing equipment with energy-saving products (LED lighting, air conditioning, compressors, high-efficiency motors for drying ovens, thermal insulation for walls)
- ○ Efficient operation of equipment (Power consumption monitoring on a per-equipment basis, checking for and repairing air leaks, thermally insulating drying ovens)
- ○ Efficiency improvements to production lines (Automation of silicon coating, welding and sleeve crimping processes; floorplan changes)
- ○ Shorter inspections and testing ○ Management and energy-saving of air conditioning

Newly introduced energy-saving compressor

Automated robot assembly line

Check & Act

We attained CO_2 emissions targets within the DAIHEN Group by taking a plethora of actions such as by introducing energy-saving equipment and making efficiency improvements to production lines.

In fiscal 2017, we will continue to implement and manage our energy-efficiency measures and climate change initiatives by adopting target values and assessing our performance.

DAIHEN Group (18 plants)

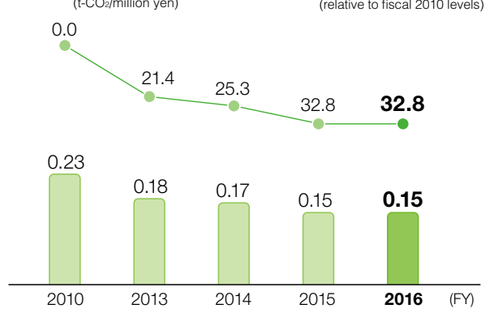
CO_2 emissions intensity relative to fiscal 2010 levels

Reduced CO_2 by 32.8%

(Fiscal 2016 result: 0.15 t-CO_2/million yen)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), and production sites outside Japan [Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.]

CO_2 emissions intensity and reduction of the DAIHEN Group by fiscal year



Waste reduction

Efficient use of resources

Plan

DAIHEN Group (12 plants in Japan)

Percentage of waste disposed of by landfill **0.5%**

Do

We have been committed to reducing waste to effectively use resources at the 18 plants of the DAIHEN Group, including six plants at production sites outside of Japan. Some of those efforts are listed below.

Introduction to initiatives of our plants

- ○ Sorting of waste by material
- ○ Reuse of wood crates
- ○ Conversion of consumed bushings into valuable resources
- ○ Waste reduction via accuracy improvements and standardization of work (Improvements to coating processes, equipment tuning, work outsourcing, etc.)
- ○ Use of returnable steel shipping containers, improvements to packaging methods and materials

Sorting of waste by material


Consumed bushings collected for alternative use


Returnable steel shipping containers

Check & Act

We attained waste reduction targets within the DAIHEN Group because each of our plants meticulously manages waste via sorting, reuse and conversion into valuable resources.

In fiscal 2017, we will continue implementing and managing our waste reduction efforts by adopting target values and assessing our performance.

DAIHEN Group (12 plants in Japan)

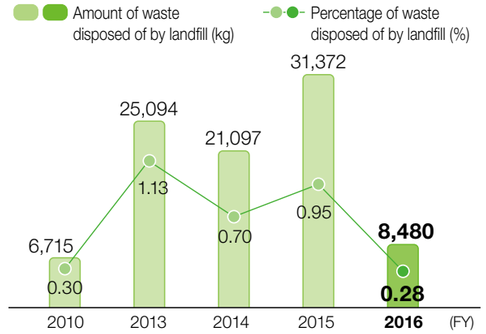
Percentage of waste disposed of by landfill

0.28%

(Amount of waste disposed of by landfill in fiscal 2016: 8,480 kg)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant and Izumiotsu Plant), and production sites outside Japan [Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.]

Amount of waste disposed of by landfill and percentage thereof amongst all waste in the DAIHEN Group by fiscal year



Air pollution control

Management of chemical substances and control of emissions

Plan

Reduce the intensity of atmospheric emissions of VOCs **by 20%** from fiscal 2010 levels.

Do

We have been committed to reducing VOC (Volatile Organic Compounds) emissions at DAIHEN Group, including plants at production sites outside of Japan. Some of those actions are listed below.

Introduction to initiatives of our plants

- ○ Reduced consumption through quality improvements
- ○ Conversion to powdered coatings
- ○ Use of PRTR-free thinner


Powdered coating line


Coated transformer casing

Check & Act

We attained VOC emissions targets within the DAIHEN Group via quality improvements and changes to work procedures.

In fiscal 2017, we will continue implementing and managing our actions to reduce VOC emissions by adopting target values and assessing our performance.

The DAIHEN Group will continue to promote green procurement in order to control the use of chemical substances in our purchased parts and materials before we incorporate them in our products.
For details, see “Green procurement initiatives” on page 27.

DAIHEN Group (18 plants)

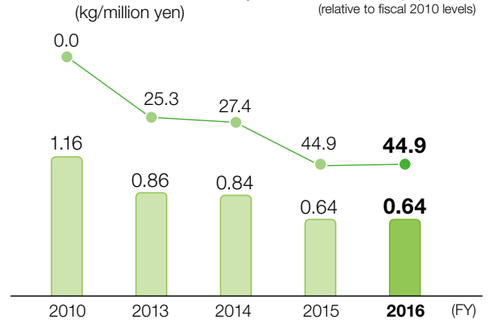
VOC emissions intensity from fiscal 2010 levels

Reduced by 44.9%

(VOC emissions intensity in fiscal 2016: 0.64 kg/million yen)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), and production sites outside Japan [Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.]

VOC emissions and reduction of the DAIHEN Group by fiscal year



Our eco-friendly product development brings results

In order to contribute to the emergence of a low-carbon society committed to recycling as we engage in product manufacturing, the DAIHEN Group is promoting product development intended to reduce environmental impacts during the product usage stage.

High capacity, extra-high voltage transformer engineered for low maintenance and loss

Maintenance reduced with a high-capacity vacuum valve on-load tap changer

Future foreseen shortages of maintenance technicians have in recent years heightened needs for reduced maintenance in the form of unmanned checks and servicing. This has played out with transformers.

Transformers are equipped with an on-load tap changer that regulates voltage fluctuations so as to supply a stable current. With conventional oil-immersed tap changers, because the insulating oil becomes dirty, the tap changer has to be lifted from the unit for inspection and the oil filtered with an on-load oil purifier. However, the vacuum valve tap changer we developed adopts a vacuum valve as the tap changer and does not pollute the insulating oil. As a result, it effectively extends oil replacement and inspection intervals (maintenance-free up to 200,000 cycles by JEC standards). It also makes an on-load oil purifier unnecessary and reduces the equipment footprint.

By developing the first-ever high-capacity vacuum valve tap changer to be made in Japan, low maintenance has become a reality with all transformer lines from low and medium to high capacity. Moreover, the high capacity model is compatible with oil-immersed tap changers, so it also reduces the cost of remodeling existing equipment.

Applying low-loss technology to reducing power consumption

3D electromagnetic field analysis has primarily been applied to low and medium capacity transformers to lower power consumption. Wanting to do similarly with high capacity transformers, we applied this technology and reduced power consumption by about 42 kW (approx. 6% from before).

Comment from the developer

Riki Osako
Engineering Dept.
Power Transformer Div.

Q What was the theme or background to the development of this product?

Vacuum valve tap changers have been adopted with low and medium capacity transformers. In this project, the Regulator Development Section of the Power Transformer Division has successfully developed a high capacity model for a high capacity transformer (200 MVA, 154 kV) that is being developed for a power company. Development has been steered to deliver a long-life, low-loss and compact product demanded by our customers.

Q During product development, what challenges did you encounter?

Because the transformer was to be installed indoors, it had to be compact despite the high 200 MVA capacity and required inspection passageways and maintenance space. We had to reduce loss at the same time, which took design work in the opposite direction of keeping the product compact, so it was particularly challenging to optimize the designs of the windings and iron cores.

Welbee Inverter W350 for automatic AC/DC-pulsed MIG/MAC welding

Welding structures for cars and other transportation equipment are trending toward thinner plates and lower heat capacities in order to improve fuel efficiency by reducing vehicle weight. These conditions, however, are ripe for a welding flaw known as a "burn-through" — a hole burned through workpieces by the heat of the arc — and make it difficult to ensure welding quality. Our Welbee Inverter W350 incorporates proprietary waveform control technology into AC pulsed welding in order to control the amount of heat input to workpieces, paving the way to high quality, burn-through-free welding of extremely thin plates of 1 mm or less in thickness that was hard to do before.

The W350 increases the EN ratio — a parameter for controlling heat input to workpieces — from the 40% of predecessor models to 50% (25% improvement), which makes high quality welding possible not only with aluminum but also common and stainless steels as well as difficult-to-manage joint with a gap. Moreover, a droplet temperature is low, so less fumes, which are a concern from both an environmental and health perspective (see the photos), are generated. And, the rated output current is about 20% higher, which effectively expands the scope of applicability to medium thick plates and contributes to high-performance welding.

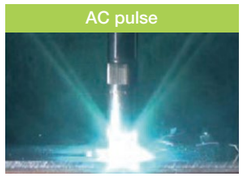
Comparison of fume generation

● Welding speed: 40 cm/min

DC pulse

Welding current: 80 A
Wire feed rate: 5.2 m/min
Welding voltage: 17.8 V

AC pulse



Welding current: 80 A
Wire feed rate: 5.9 m/min
Welding voltage: 17.8 V　EN ratio: 20%

Comment from the developer

Keiji Kadota
Research & Development Dept.
Welding Products Div.

Q What was the theme or background to the development of this product?

The WB-W350 is DAIHEN's first AC pulsed welding machine and unique within the industry as well. We designed it to meet the needs of a wide range of users by expanding its scope of applicability to plate thicknesses and providing them an efficient means for practicing and improving their AC pulsed welding.

Q During product development, what challenges did you encounter?

AC pulsed welding cyclically switches polarity, so there is an instant with 0 amps. During that instant, the arc was interrupted and could not be reignited, which shut welding down. We probed the cause and countered the issue from both tangible and intangible aspects to shorten the 0-amp period as much as possible and successfully prevent arc interruption.

* Welbee is a nickname we use for welding machines that incorporate the "Welbee Chip" welding control IC developed by DAIHEN.

Operating Eco Product Accreditation System

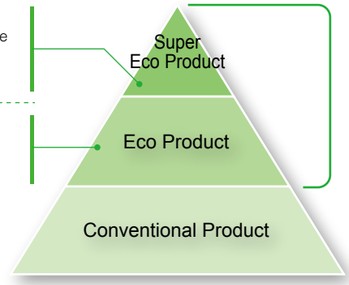
The DAIHEN Group has introduced its own environmental impact assessment standard for products. Since then, we have been promoting green product development.

We introduced the Eco Product Accreditation (Green Labeling) System, launching full-scale operation in fiscal 2008. This innovation helps us to clearly convey to customers the environmental benefits of our products and technologies and thus differentiate our offerings. It also enables our customers to readily select products with a reduced environmental impact.

We have established two product tiers for our certified Eco Products: Eco Products and Super Eco Products.

○ Unique industry-leading environmental performance
○ Eco product assessment points total at least 300

○ Eco product assessment points total at least 225



○ DAIHEN Group Green Labeling

Super Eco Product　Eco Product

Note: Among the various green labeling schemes, the DAIHEN Group has chosen Type Ⅱ, the self-defined type. The International Organization for Standardization (ISO) has specified that this type of green label indicates that the labeled item is an eco-friendly product manufactured according to the manufacturer's own standards.

○ Examples of product eco-evaluation criteria

Energy efficiency	● Low power consumption ● Increased energy efficiency in production processes
Resource conservation	● Compact design and reduced weight ● Rationalized packing
Recycling	● Use of recycled materials ● Improved ease of sorting and disassembly
Long service life	● Improved durability ● Improved ease of maintenance
Controlled use of chemical substances	● Reduced use of hazardous chemical substances
Information disclosure	● Proactive disclosure of environmental information

The DAIHEN Group adopted a target sales ratio for certified green products and focused on expanding our selection and sales promotion of certified products. Our net sales ratio for certified green products in fiscal 2016 was 51% overall.

○ Green-label-certified products added in fiscal 2016

Super Eco Product

Division	Product Name	Model	Major Environmental Performance Criteria
No products were newly registered.			

Eco Product

Division	Product Name	Model	Major Environmental Performance Criteria
Power Distribution System Division	Automatic voltage regulator for distributed power supply [5000 kVA]	RST211VI	● Reduced environmental impact during use (energy-efficient), compact design
	Power transformer for remote-controlled air switch (5 kVA)	QCS044	● Reduced environmental impact during use (low noise), reduced weight
	Bypass air switch with built-in lightning arrester	BPL3—4B	● Promotion of adoption of renewable energies, easier pole mounting, improved esthetics
	Digital multifunctional relay for SVR	DSRY-H010U, DSRY-H010V	● Promotion of adoption of renewable energies, reduced environmental impact during use (energy-efficient)
	Digital relay for high-capacity TVR	HCTVR-HNE	● Promotion of adoption of renewable energies, reduced environmental impact during use (energy-efficient)
	Optical unit substation	SVL3-TRO	● Reduced environmental impact during use (improved work efficiency), long-lasting
Power Transformer Division	100 MVA extra-high voltage transformer for power companies	—	● Reduced environmental impact during use (energy-efficient by way of reduced loss, extended maintenance interval)
	10 MVA and 15 MVA transformer for power companies	—	● Reduced environmental impact during use (energy-efficient by way of reduced loss), compact design
	10 MVA transformer for residential customers	—	● Reduced environmental impact during use (energy-efficient by way of reduced loss, extended maintenance interval)
Industrial Electric Division	Step-up transformer for 22 kV Disola Pack 3φ 50/60 Hz 1000 kVA	—	● Compact design, improved esthetics
	Standard oil-immersed transformer for both motive and illumination power 3φ 50/60 Hz 60 kVA	—	● Top-runner transformer, elimination or reduced use of hazardous substances to less than regulatory levels*
Dispersed Power System Division	500 kW air-compressor-less power conditioner DC collection box for [P500JJL2-B01]	W500J-A01	● Promotion of adoption of renewable energies, reduced environmental impact during use (energy-efficient)
	500 kW air-compressor-less power conditioner	P500AHL2-A01	● Promotion of adoption of renewable energies, elimination or reduced use of hazardous substances to less than regulatory levels*
Welding Products Division	Power supply unit for AC/DC pulsed MIG welding	WB-W350 (S-1)	● Reduced environmental impact during use (energy-efficient, enhanced welding management support) ● Elimination or reduced use of hazardous substances to less than regulatory levels*
	Power supply unit for AC/DC pulsed MIG welding	WB-W400 (CE), (CSA)	
	DC power supply unit for plasma welding	WB-F300P (CE), (CSA)	
FA Robot Division	Manipulator NA20	FD-A20	● Reduced environmental impact during use (energy-efficient) ● Elimination or reduced use of hazardous substances to less than regulatory levels*
	FD-QT laser sensor	FD-QT	● Reduced weight, improved operability, elimination or reduced use of hazardous substances to less than regulatory levels*
Plasma System Division	High-frequency power supply unit for plasma generation	Some models	● Reduced environmental impact during use (energy-efficient, compact design, reduced weight)
Clean Robot Division	Aligner	OFH-4100	● Reduced environmental impact during use (energy-efficient) ● Elimination or reduced use of hazardous substances to less than regulatory levels*
	Aligner with peeling detection capability	OFH-4100i2	
	Aligner with chipping detection capability	OFH-4101i	
	Transfer robot for medical and pharmaceutical fields	FDCL-V4M	● Reduced weight, elimination or reduced use of hazardous substances to less than regulatory levels*
	4-axis FPD transfer robot for vacuum environment	SPR-8555, SPR-8557, SPR-8560 SPR-8561, SPR-8565, SPR-8566 SPR-8567	● Reduced environmental impact during use (energy-efficient) ● Elimination or reduced use of hazardous substances to less than regulatory levels*

*Compliant with the RoHS Directive.

Please visit the following website for all Eco Product Accredited (Green Labeling) products of the DAIHEN Group, including our green products certified before fiscal 2015.　www.daihen.co.jp/csr/eco/

Environmental impact data for fiscal 2016

Juso Plant

Location: 2-11-1 Tagawa, Yodogawa-ku, Osaka 532-8512 Japan

Principal business: Planning, development, and production of small and medium-size transformers, power supplies for plasma generators used in semiconductor manufacturing, clean robots, and other products

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.9	6.0	7.32	20
BOD	600	130	0	18.6	20

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	50	0	8.76	20
Oil	Mineral oil: 5, animal & veg. oil: 30	28	0	5.8	20

Numerical data on discharge of animal and vegetable oils (limited to 30) applies to the Juso Plant.

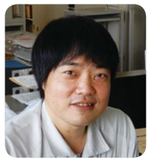
○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	149	3	—	37	112
	80	Xylene	624	-53	—	112	566
	186	Dichloromethane	161	161	—	—	—
	265	Tetrahydromethylphthalic anhydride	11088	—	—	480	10608
		1,2,4-trimethylbenzene	51	51	—	—	—
	297	1,3,5-trimethylbenzene	41	25.9	—	—	15.1
	300	Toluene	1278	339	—	112	828
	349	Phenol	25	25	—	—	—
	384	1-Bromopropane	457	45.7	—	—	422
Specified as Class 1	400	Benzene	38	1.6	—	—	36.4
	411	Formaldehyde	5	5	—	—	—

In the Transformer Manufacturing Section, we make mostly pole-mounted and pad-mounted transformers, which causes us to use a great deal of power and generate a very large amount of waste. So, as environmental preservation activities in fiscal 2016, the whole section made a united effort to efficiently operate batch drying ovens and annealing furnaces, outsource the manufacturing of iron cores, and reduce waste from the wood, silicon steel sheets and copper wires we use. Thanks to those efforts, we attained our annual target with which we measure our activities intended to help reduce our impact on climate change.

Moreover, within our activities aimed at reducing our use of PRTR substances, we are exploring ways to lessen our dependency on Solcoat (dichloromethane) for stripping sheathing off copper wire and ultimately replace it and other chemical substances with environmentally safer alternatives, which has included repeated improvements to production equipment and verifications thereof in cohort with the Manufacturing Technology Section.



Going forward, we will continue improvement activities aimed at reducing the environmental impact of our operations with a focus on decreasing our power consumption.

Harumasa Kawaguchi
Transformer Manufacturing Sect., Manufacturing Dept., Power Distribution System Div.

Rokko Plant

Location: 4-1 Koyo-cho-nishi, Higashinada-ku, Kobe-shi, Hyogo 658-0033 Japan

Principal business: Planning, development, and production of various arc welders, resistance welders, welding torches, welding robots, and automatic welding systems

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.6	6.8	7.45	6
BOD	600	240	17	141.5	6

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	150	16.8	57.05	6
Oil	Mineral oil: 5, animal & veg. oil: 30	26.3	4.3	19.25	6

Numerical data on discharge of animal and vegetable oils (limited to 30) applies to the Rokko Plant.

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	263.1	223.9	—	70.8	—
	80	Xylene	281.2	239	—	42.2	—
	185	Dichloropentafluoropropane	2465.1	2465.1	—	—	—
	300	Toluene	41.8	35.6	—	6.2	—

At the Rokko Plant, we emphasized reducing CO_2 emissions and waste in our fiscal 2016 environmental preservation activities.

Prior to that, we had rearranged our robot manufacturing and inspection lines in order to operate on the concept of "manufacturing robots with robots," which moved the inspection line to the center of the building from the window side where natural light had been used to supplement lighting. However, the ceiling lights alone did not provide adequate illumination for inspections and additional lighting had to be brought in. But, the inspection line also requires that light be evenly distributed, so we improved the ceiling lights last year. That included replacing the fluorescent tubes with LED lights and repositioning the fixtures, which enabled us not only to ensure adequate illumination with just the ceiling lights (no supplemental lighting) but also to reduce power consumption by 15%.

In fiscal 2017, we will share this improvement with other departments in an effort to make our plant "bright and energy-efficient."

Tsuneo Takeda
Quality Control Sect., Quality Control Dept., FA Robot Div.

Mie Plant

Location: 800 Higashiikebe, Taki-cho, Taki-gun, Mie 519-2155 Japan

Principal business: Planning, development, design, production, and servicing of power transformers and regulators

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.7	7.7	7.7	2
BOD	600	2	1	1.5	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	4	0	2	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	156.8	156.8	—	—	—
	80	Xylene	832.8	832.8	—	—	—
	83	Cumene	18.9	18.9	—	—	—
	186	Dichloromethane	37.2	37.2	—	—	—
	296	1,2,4-trimethylbenzene	135.6	135.6	—	—	—
	297	1,3,5-trimethylbenzene	66.9	66.9	—	—	—
	300	Toluene	851.3	851.3	—	—	—
	349	Phenol	0.5	—	—	—	0.5

At the Mie Plant, we are taking steps to reduce our impact on climate change, waste and emissions of chemical substances, but in particular our CO_2 emissions have been increasing because of rises that have come along with ramped-up production.

To address the increases in emissions, we upgraded motors to more efficient models during scheduled equipment overhauls, installed LED lighting and reduced power consumption in product testing. And, to reduce waste, we simplified packaging and started using returnable shipping containers for transporting purchased parts and materials, and product distribution.

However, we underestimated the impact that the increased turnout would have on our environmental impact and fell short of our fiscal 2016 targets.

Learning from this lesson, we have decided to be more aggressive with reducing our environmental impact by boosting our production efficiency and taking other measures that will eliminate the fluctuations in our environmental impact caused by changes in production turnout.

Koji Shozu
Manufacturing Dept., Power Transformer Div.

Chitose Plant

Location: 770-7 Kitashinano, Chitose-shi, Hokkaido 066-0075 Japan

Principal business: Production, repair and servicing of transformers for power distribution

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.3	5.3	6.48	2
BOD	600	12	2.5	6.35	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	4	1	2.75	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	1.5	1.5	—	—	—
	80	Xylene	2.83	2.83	—	—	—
	132	Cobalt and its compounds	1.002	—	—	—	1.002
	186	Dichloromethane	173.63	173.63	—	—	—
	297	1,3,5-trimethylbenzene	5.68	5.68	—	—	—
	300	Toluene	15.71	15.71	—	—	—
	349	Phenol	28.7	28.7	—	—	—
	354	Di-n-butyl phthalate	1.34	1.34	—	—	—
	413	Phthalic anhydride	0.099	—	—	0.099	—

At the Chitose Plant, we have all sorts of production equipment for making our big-selling pole-mounted transformers, so as our fiscal 2016 environmental preservation activities, we replaced aging equipment that was scheduled for updating with new models that consume less power in order to decrease the amount of CO_2 generation that results from energy consumption. That included introducing inverter-driven motors for our overhead cranes and oven fans, which see a high rate of operation, and LED lighting for emergency exit signs that stay on 24 hours a day. Moreover, to reduce waste, we promoted a number of activities that got everyone at the plant involved, such as reducing copper wire waste by optimizing the length of coil lead wire, and reducing paper waste by replacing the cardboard boxes used to ship parts and materials with returnable shipping containers, and cutting back on printing.

Moving forward, we will continue our environmental preservation activities as a united effort of all employees in order for us to be an environment-friendly plant.

Wataru Murakami
Manufacturing Sect., Chitose Plant, Power Distribution System Div.

Kanehira Plant

Location: 6-2-10 Noda, Fukushima-ku, Osaka 553-0005 Japan

Principal business: Maintenance and repair of pole-mounted transformers for power distribution

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.78	6.63	7.19	51
BOD	600	68	1	7.5	12

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	4	1	1.42	12
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	0	<1	72

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	528.6	371.1	—	157.5	—
	80	Xylene	2792.8	1965.9	—	826.9	—
	300	Toluene	63.6	42.7	—	20.9	—
	349	Phenol	14.4	14.4	—	—	—

At the Kanehira Plant, we service pole-mounted transformers at the requests of power companies or, in other words, we are in the refurbishing and reuse business.

We sought to reduce our VOC emissions and subsequently attained our annual target by adjusting the settings of a new line of coating robots we introduced in fiscal 2015 to optimize conditions in casing coating operations, and by standardizing and training subcontractors in those operations.

Moreover, we took constructive steps to reduce waste as a plant by outsourcing cover cleaning (required before coating) in fiscal 2016 and then dedicating time at the turn of the fiscal year to making preparations to contract out the servicing (restoration) processes for primary and secondary bushings, which involved quality and safety training, and managing the work performed by subcontractors.

Going forward, we plan to move from paper-based check system by introducing tablets, and get everyone at the Kanehira Plant, including our on-site subcontractors, involved in steady environmental activities.

Masahiro Oiwa
Power Distribution System Div.

Tottori Plant (DAIHEN Industrial Machinery Corporation)

Location: 1041 Azo, Mochigase-cho, Tottori-shi, Tottori 689-1227 Japan

Principal business: Production of welding machines, control system equipment, power supplies for semiconductor manufacturing, and PV inverters

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.6	6.8	7.43	4
BOD	600	30	1	8.58	4

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	2.3	1	1.58	4
Oil	Mineral oil: 5, animal & veg. oil: 30	<0.5	0	<0.7	4

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	33.6	33.6	—	—	—
	80	Xylene	40.3	40.3	—	—	—
	82	Silver and its water-soluble compounds	20.5	—	—	12.3	8.2
	87	Chromium and chromic compounds	0.1	—	—	—	0.1
	151	1,3-dioxolane	6.3	6.3	—	—	—
	296	1,2,4-trimethylbenzene	83.2	83.2	—	—	—
	297	1,3,5-trimethylbenzene	25.9	25.9	—	—	—
	300	Toluene	161.8	161.8	—	—	—
	302	Naphthalene	57.9	57.9	—	—	—
	392	n-hexane	1.9	1.9	—	—	—
Specified as Class 1	305	Lead compounds	538.3	—	—	322.9	215.4

The Tottori Plant focused heavily on reducing CO_2 emissions. Though there was a moment where it seemed unlikely for us to reach our CO_2 reduction target as lines at our Kunugiwara Plant were running day and night to keep up with rising orders for semiconductor equipment products in the first half of the year and monthly turnout plans early in the second half of the year going from twice the normal level to triple, we not only attained our target but topped it by about 37%, by replacing plant lighting with LEDs in every department, updating cooling and heating systems that relied on aged compressors and cooling towers with packaged air conditioners, and changing out cup-style vending machines that run all-day long with new low-power-consumption models.

Moreover, everyone was careful and conscious about conserving power wherever they could.

We will continue looking for ways to reduce our energy consumption going forward and promote environmental preservation activities so that, as a plant, we can be a better friend of the environment.

Minoru Ota
Engineering Dept., DAIHEN industrial Machinery Corp.

Environmental impact data for fiscal 2016

Oita Plant (DAIHEN Technology Institute)

Location: 1660-7 Mizoi, Kitsuki-shi, Oita 873-0025 Japan

Principal business: Development, production and repair of semiconductor ACT clean transfer robots; development of software for arc welding robots

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	5.7	5.6	5.45	6
BOD	600	3.1	2.6	2.8	6
SS	600	4.6	2.8	3.2	6
Oil	Mineral oil: 5, animal & veg. oil: 30	No measured result for fiscal 2016			

Oita Plant did not handle any substances subject to the PRTR Law.

Day-in day-out, at the Oita Plant, we diligently strive to be a business of choice by developing technologies and supplying products that earn society's trust for the way they value people and resources, and by contributing to environmental protection and a better and brighter future under the corporate philosophy of "Reliability and Creativity" of the DAIHEN Group.

The Materials Group to which I belong procures materials to manufacture clean robots, AI transfer robots, power conditioners and wireless charging systems. As a critical component of our green procurement efforts, we survey chemical substances contained in procured materials used with clean robots and obtain SDSs.

We want to keep playing our part in manufacturing environment-friendly products by tenaciously collecting survey replies and SDSs from suppliers.

Shuichi Murakami
Materials Group, Management Dept.
DAIHEN Technology Institute

Matsudo Plant (DAIHEN Stud Co., Ltd.)

Location: 6-8-12 Minoridai, Matsudo-shi, Chiba 270-2231 Japan

Principal business: Stud welding and the design, manufacture, and sales of studs

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	6.25	6.25	6.25	2
BOD	600	26.9	26.9	26.9	2
SS	600	38.6	38.6	38.6	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

Matsudo Plant did not handle any substances subject to the PRTR Law.

One thing we did to reduce our energy consumption at the Matsudo Plant in fiscal 2016 was to change how we operate and manage energy-efficient compressors (changed pneumatic parts with electrical parts) by setting pressure 0.1 MPa lower. In fiscal 2017, we have replaced production equipment in order to improve productivity by speeding up operations and shortening equipment stops.

At the Tokyo Sales Department at the Matsudo Plant, we set out to increase sales of our environment-friendly irregular-shaped studs used for our pile head stud joining method like in fiscal 2016, but demand fell after it was discovered that pile data for an apartment building in Yokohama had been falsified, and we came up short of our target. Therefore, to attain target figures in fiscal 2017, we will conduct PR activities with design companies and general contractors that will hopefully lead to better sales.

Kenta Watanabe
Tokyo Sales Dept.
DAIHEN Stud Co., Ltd.

Eniwa Plant (Daihoku Industry Co., Ltd.)

Location: 347-11 Toiso, Eniwa-shi, Hokkaido 061-1405 Japan

Principal business: Manufacture of transformer case cans, sheet-metal processing, application of coatings, and surface treatments

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.6	0	3.9	2
BOD	600	110	0	52.5	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	20	0	5.75	2
Oil	Mineral oil: 5, animal & veg. oil: 30	2	0	0.63	2

○Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	1	Water-soluble zinc compounds	704	–	–	704	–
	7	N-butyl acrylate	8.8	8.8	–	–	–
	30	Linear alkylbenzene sulfonic acid	7.7	–	–	7.7	–
	53	Ethylbenzene	281.1	281.1	–	–	–
	71	Ferric chloride	3135.8	–	–	3135.8	–
	80	Xylene	1368	1368	–	–	–
	132	Cobalt and its compounds	3.4	–	–	–	3.4
	186	Dichloromethane	18	18	–	–	–
	239	Organic tin compounds	212	–	–	42.4	169.6
	240	Styrene	13.7	13.7	–	–	–
	275	Sodium dodecyl sulfate	1	–	–	1	–
	296	1,2,4-trimethylbenzene	3.9	3.9	–	–	–
	297	1,3,5-trimethylbenzene	151.1	151.1	–	–	–
	300	Toluene	413.1	413.1	–	–	–
	302	Naphthalene	8.9	8.9	–	–	–
	349	Phenol	3.7	3.7	–	–	–
	354	Di-n-butyl phthalate	8.8	8.8	–	–	–
	405	Boron compounds	88	–	–	88	–
	407	Poly(oxyethylene) alkyl ether (alkyl C=12-15)	107.3	–	–	107.3	–
	409	Sodium poly(oxyethylene) dodecyl ether sulfate	4.1	–	–	4.1	–
	412	Manganese and its compounds	176.3	–	–	176.3	–
	420	Methyl methacrylate	8.8	8.8	–	–	–
Specified as Class 1	309	Nickel compounds	88	–	–	88	–
	411	Formaldehyde	28.3	28.3	–	–	–

I have been in charge of the coating process since December 2016 and, as an environmental activity, tasked with reducing VOC emissions. Because of the wide difference in temperatures where we are, properly adjusting the viscosity of coatings with thinner both improves quality and reduces VOC emissions. Therefore, we have been introducing articulated coating robots, 2-liquid mixing systems, paint heaters, thinner regenerators and paint killer, to reduce paint consumption, wasted paint, the amount of thinner we purchase and the discharge of paint refuse, as well as stabilize quality by improving coating efficiency.

In addition to properly dosing thinner, we will continue with our daily maintenance responsibilities in order to reduce VOC emissions and industrial waste, and work as a team in promoting environmental preservation activities.

Takafumi Endo
Coating Group
Daihoku Industry Co., Ltd.

Hirosaki Plant (DAIHEN Aomori Corporation)

Location: 1-5-1 Iwaka, Hirosaki-shi, Aomori 036-8073 Japan

Principal business: Manufacture of various fuses and production of power distribution parts

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.0	7.4	7.7	2
BOD	600	63	51	57	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	130	87	108.5	2
Oil	Mineral oil: 5, animal & veg. oil: 30	2.6	<0.5	1.25	4

○Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	80	Xylene	0.08	0.08	–	–	–
	134	Vinyl acetate	1.18	1.18	–	–	–
	186	Dichloromethane	79.2	79.2	–	–	–
	300	Toluene	195.22	195.22	–	–	–
	405	Boron compounds	598.04	–	–	1.79	596.24

Continuing along the lines of fiscal 2015 efforts to reduce our impact (CO_2 emissions) on climate change, we automated more manufacturing processes in fiscal 2016.

In order to accommodate changes in product specifications and more efficient production, we planned to unman the full series of processes from parts feeding to silicon coating by introducing and linking our first-ever automatic silicon coating machine and a welding and sleeve-crimping unit.

Though we got the automatic silicon coating machine up and running at mass-production capacity, the welding and sleeve-crimping unit had to be carried over to fiscal 2017, so we did not achieve the results we were hoping for. In addition, due to a significant shortfall in planned turnout, we missed our CO_2 reduction target. Nonetheless, we expect the delayed unit to commence mass-production in the first half of fiscal 2017 and, from there, we should be able to produce the CO_2 reduction results we are all anticipating.

In the next and subsequent terms, since we will have completed automation of our manufacturing processes, we are going to focus our attention on replacing the last workplace heating system to run on kerosene with a new system.

Megumi Miura
Administration Group
DAIHEN Aomori Corporation

Kagawa Plant (Minami Electric Co., Ltd.)

Location: 15 Nishi-minatomachi, Tadotsu-cho, Nakatado-gun, Kagawa 764-0017 Japan

Principal business: Manufacture of transformer case cans, sheet-metal processing, application of coatings, and surface treatments

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.4	6.2	7.15	12
BOD	600	387	23.1	90.65	12

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	506	8.5	77.05	12
Oil	Mineral oil: 5, animal & veg. oil: 30	2.4	<1	0.8	12

○Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	1	Water-soluble zinc compounds	1099.9	–	–	–	1099.9
	53	Ethylbenzene	3459.4	3459.4	–	–	–
	80	Xylene	3893.3	3893.3	–	–	–
	235	Water-soluble salts of bromic acid	48	–	–	48	–
	296	1,2,4-trimethylbenzene	820.3	820.3	–	–	–
	297	1,3,5-trimethylbenzene	154.5	154.5	–	–	–
	300	Toluene	2817.6	2817.6	–	–	–
	302	Naphthalene	198	198	–	–	–
	354	Di-n-butyl phthalate	0.1	0.1	–	–	–
	392	N-hexane	3.3	–	–	3.3	–
	405	Boron compounds	98	–	–	98	–
	407	Poly(oxyethylene) alkyl ether (alkyl C=12-15)	179.2	–	–	179.2	–
	412	Manganese and its compounds	29.4	–	–	–	29.4
Specified as Class 1	88	Hexavalent chromium compounds	0.4	–	–	–	0.4
	305	Lead compounds	1.8	–	–	–	1.8
	309	Nickel compounds	69.1	–	–	–	69.1
	411	Formaldehyde	1.9	1.9	–	–	–

At the Kagawa Plant, we manufacture and coat various types of transformers for industrial and consumer use. In fiscal 2016, we again worked with reducing our impact on climate change, chemical emissions and waste generation like the year before. As for reducing CO_2 emissions, we continued last year's activity of replacing lighting with LED sources but did so not only with plant ceiling lights but spot lights as well. Additionally, we stepped up our management practices by checking compressors for air leaks and reducing wasteful uses of electricity.

Moreover, we reduced our VOC emissions by about 1.5 tons by changing the thinner we use for cleaning and painting corrugated cases to a PRTR-free product. With regard to waste reduction, we implemented activities through posters, patrols and education. Moving forward, we will continue to raise environmental awareness and work to reduce our environmental impact through the concerted efforts of a united workforce.

Taiki Yabe
Manufacturing Dept.
Minami Electric Co., Ltd.

Izumiotsu Plant (DAIHEN Fuse Corporation)

Location: 2-39 Shikinai-cho, Izumiotsu-shi, Osaka 595-0035 Japan

Principal business: Manufacture of various fuses and production of power distribution parts

○Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.7	7.3	7.5	6
BOD	600	170	10	51.5	6

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	5	1	1.83	6
Oil	Mineral oil: 5, animal & veg. oil: 30	Not measured in FY2016			

○Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	134	Vinyl acetate	0.35	0.35	–	–	–
	186	Dichloromethane	122.76	122.76	–	–	–
	281	Trichloroethylene	810	810	–	–	–
	300	Toluene	19.78	19.78	–	–	–

In fiscal 2016, we made the "reduction of water consumption" a new environmental activity at the Izumiotsu Plant since the "preservation of biodiversity" was added as an environmental goal. Since a review of past water usage revealed year-on-year increases in consumption, we set our target on reducing our water consumption by 1% from the level consumed in fiscal 2015 and took action in areas that had not been considered or addressed before, such as by raising awareness to conserve water and replacing faucets with water-saving types. As a result, we easily cleared our target with a 15% reduction in water consumption and came away thinking that the Izumiotsu Plant made a significant contribution to newly added environmental goal of "preservation of biodiversity."

We also continued regular plant-wide activities to reduce our "impact on climate change," "waste generation" and "emissions of air pollutants" and achieved our targets. Going forward, we will continue working with the environmental committee at our plant to take the initiative in promoting sustainable activities to protect the environment.

Hisao Aihara
Quality Assurance Dept.
DAIHEN Fuse Corporation

Initiatives in fiscal 2016

Mudanjiang OTC Welding Machines Co., Ltd.

Location: No.18 Xingye Road, Yangming, Mudanjiang, Heilongjiang 157013, China

Principal business: Manufacture of welding machines and parts, etc.

Welding fume purifier

Welding fume purifier

Awareness of the importance and need for environmental protection has grown in China alongside economic development and prompted the government and many businesses to look at the hazardous substances generated in CO_2 welding as a problem. We, too, in order to protect the health of our employees, installed 3 welding fume purifiers.

Welding fumes contain large quantities of hazardous substances and particle matter that can seriously impact the health of welders. The purifiers remove 99.7% of these substances and particles, and, because they easily and quickly purify the fumes generated in welding, they improve the workplace environment and greatly reduce the release of air pollutants into the atmosphere. In the 3 processes where the purifiers were added, 480 kg of wire are used annually and, since 8 g of fumes are generated per kg of wire, we reduced welding fume by 3,840 g a year and did a great service to employee health and the environment. We feel pretty good about our achievement and are eager to find other ways to both fulfill our environmental policy and develop our company.

Tan Wujun
Production Engineering Dept.
Mudanjiang OTC Welding Machines Co., Ltd.

OTC Industrial (Qingdao) Co., Ltd.

Location: 588 Sanjiang Road Economic & Technical Development Area, Qingdao 266555, China

Principal business: Manufacture of welding machines and parts, high-frequency power supply units, etc.

Powdered coating line

Screen

Since our inception, we have been using a solvent-based coating line at the Qingdao Plant. Because a coating solvent is used, only a portion of the coating adheres to workpieces of sheet metal, while the rest is collected via a circulated water curtain and must be periodically treated by an outsourcee. Besides that, the coating solvent contains a high quantity of VOC that is seriously bad for the atmosphere.

For those reasons, we started exploring the introduction of a powder coating line at the end of 2015 and introduced the line in October 2016.

As a result, in terms of emissions and waste discharge, we reduced VOC emissions by 400 kg a year and industrial waste by 26 t a year (paint and water mixture by 22 t, paint refuse by 2 t and discarded organic solvent by 2 t), while from energy and manpower perspectives, we reduced our electricity consumption by 66,000 kWh and manhours by 1,800 hr.

We also took action with our screen printing ink by considerably scaling down the baking temperature and drying time (from 150℃ × 13 min to 80℃ × 10 min), which saved us 2,100 kWh in electricity consumption for the year, thus adding to our energy-efficiency efforts.

Looking ahead, we will direct further efforts at reducing our environmental impact, starting with studies into introducing systems for recovering and reusing effluent and treating gas emissions in order to more effectively utilize water resource and reduce emissions of air pollutants.

Liu Songyan
Manufacturing Dept.
OTC Industrial (Qingdao) Co., Ltd.

OTC DAIHEN Asia Co., Ltd.

Location: Tambol Klongnueng Amphur Klongluang, Pathumthani 12120, Thailand

Principal business: Manufacture and sales of welding machines, cutting machines and parts in Southeast Asia, Oceania and India

LED lighting introduced

Outside view of the plant

Our company is located 50 km north of the Thai capital of Bangkok and produces everything from parts to products for welding and plasma cutting torches, wire feeders, robot peripherals and more.

As part of our effort to reduce CO_2 emissions in 2016, we kept with an ongoing activity started in 2014 of switching out more lighting fixtures from fluorescent lamps to LED compatible models. We converted a total of 1,140 fluorescent lamps to LEDs and reduced our electricity consumption by about 3% from last year.

Moreover, in another activity ongoing since 2015, we replaced more disposable waste cloths with reusable rental cloths, and reduced waste by about 8% from last year.

This year, we are looking into replacing the large-scale air conditioners at the plant with inverter-driven units.

At OTC DAIHEN Asia, we will promote more activities to reduce our power consumption and waste this fiscal year by raising environmental awareness in all departments, in line with the environmental policy of the DAIHEN Group.

Deuan Pansongnam
Project Dept.
OTC DAIHEN Asia Co., Ltd.

DAIHEN Electric Co., Ltd.

Location: Thamboon Thasa-an, Bangpakong Chachoengsao, 24130 Thailand

Principal business: Manufacture and sales of large transformers in Thailand

Outside view of the plant

Transformer coil in front of an insulated wall

Sawatdii khrap. This is the 27th year since we first started producing large transformers in Thailand. Thailand is also calling on businesses to reduce their environmental impacts and we are taking constructive steps to do that. After expanding the plant in 2012, we increased production of extra-high voltage transformers, which caused us to run the air conditioning in the internal parts assembly room longer and consequently increase our power consumption. As a countermeasure to that, we improved the efficiency of our air conditioning system this fiscal year. Thailand is in the tropics, so it is hot and humid. This requires us to run the air conditioner in the assembly room so that assembly work is not affected by the weather. So, in order to reduce cooling loss through the walls, we replaced the thermal insulation with a high performance product. In combination with other measures, we reduced our CO_2 emissions by about 9% from fiscal 2010 levels.

For the coming fiscal year, we are looking for ideas to reduce VOC emissions. We will continue to implement ways to reduce our environmental impact.

Ausawin Roshom
Maintenance Sec.
Manufacturing Dept.
DAIHEN Electric Co., Ltd.

DAIHEN OTC (Beijing) Co., Ltd.

Location: No. 5, Leyuan South Znd Road, Yangi Economic Development Zone, Beijing 101407, China

Principal business: Manufacture and sales of pad-mounted transformers in China

Energy-efficient lighting

Fume filter

Ni hao!

At DAIHEN OTC (Beijing), we have seen momentum toward environmental issues in China grow over the past few years and have sought to reduce our CO_2 emissions and waste, and boost our energy efficiency.

As activities in fiscal 2016, in addition to ongoing efforts to change plant lighting to more energy-efficient products and more scrupulously managing cooling and heating system temperatures, we decreased energy consumption of our production processes by thoroughly reducing the number of steps it takes to make our various products, and reduced emissions of hazardous substances by installing fume filters in our soldering processes.

In fiscal 2017, we will continue promoting environmental preservation activities by reducing the number of transformers used for power distribution at our plant in order to lessen our power consumption, by remodeling the steam system in our heat supply room in order to lower our use of hot water, and by carefully sorting waste.

Zhu Zi Wen
Human Resources General Affairs Section
DAIHEN OTC (Beijing) Co., Ltd.

DAIHEN Advanced Machinery (Changshu) Co., Ltd.

Location: No.17 Maqio Factory Area, Riverside Industrial Park, Jiangsu Changshu Economic Development Zone, Changshu City, Jiangsu 215513, China

Principal business: Manufacture, sales, and service of production machinery for semiconductors, LCDs and photovoltaic cells as well as welding robots

Eco-friendly air conditioning system

Loaded truck (After)

Loaded truck (Before)

Changshu is in the southern part of the Yangtze River basin that is known for its nostalgic waterfronts. The beautiful lakes and rivers found amongst the green hills have instilled in the local residents the feeling that it is their responsibility to protect the natural environment, which they care for day-in day-out. At DAIHEN Advanced Machinery (Changshu), we share this feeling and want to use our expertise and what efforts we can for the environment.

In fiscal 2016, we increased the shipping load per truck by 15% from before, by expanding local procurement for FA robot production and improving how we package parts. These efforts upped our transportation efficiency and reduced our use of packaging materials. Besides that, we replaced the plant air conditioning system with an eco-friendly system. All together, we were able to reduce our CO_2 emissions by 10% from the previous year.

This fiscal year, we have begun a review of the parts packaging used for clean products. We strongly believe that small steps like this add up to strides of progress that prevent environmental destruction. We will continue working hard so that all of the tiny steps we take translate into big contributions to society.

Huang Jianlin
Planning Section, Manufacturing Dept.
DAIHEN Advanced Machinery (Changshu) Co., Ltd.

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● Please direct all inquiries concerning this report to the General & Judicial Affairs Department.