



# Maximizing Customer Satisfaction through Unceasing Improvement

Fuji Electric's subsidiary Fuji Electric FA Components & Systems Co., Ltd. (FCS), primarily manufactures electrical distribution and control (ED&C) components essential to the industrial sector, including magnetic switches and circuit breakers mainly used for production lines. To eliminate malfunctions after sale and ensure customers are able to use our products with peace of mind, rigorously building quality into processes is critical. In this section, we focus on the initiatives of FCS's Fukiage Factory, which has greatly improved product yields through project initiatives.

## Passing on the Skill of Veterans to the Next Generation

"We had been steadily implementing improvements at production sites, but the launch of this project gave our efforts a major boost." manager of the production division Tetsuyuki Takahashi recalls the beginning of the initiative. "Realizing high reliability" project, launched in FCS in 2011, aimed to heighten customer trust by having all manufacturing-related divisions—including those engaged in design, production, operational time and motion studies, and quality control—pursue rigorous quality control and improvement.



**Tetsuyuki Takahashi**,  
Manufacturing Section 2  
Fukiage Factory

The so called "2007 problem" prompted us to begin this project. As with other plants, the en masse retirement of skilled technicians belonging to the baby boomer generation affected on-site product quality considerably.

Takahashi explains, "Without a doubt, certain operations need the high skill levels of experienced technicians. However, we can compensate for

these skills using technological capabilities. This involves identifying the experience and skills of technicians and passing them on to the next generation. At the same time, we are also willing to change existing practices based on the viewpoints of younger employees. When we launched the project, this was our approach."

## Recreating Operators' Intuitive Understanding

In April 2011, we selected 13 members for the project, mainly young personnel who will lead the next generation. One such member, Hironobu Suzuki of the Quality Control Section, selected as a theme enhancing furnace-welding yields.

Magnetic switches use magnetism to switch devices on and off. The key components of these switches are placed on carbon trays and welded within furnaces at a temperature of 800°C. In this furnace-welding process, how silver, which is used as a



**Hironobu Suzuki** of the Fukiage Factory's Quality Control Section holding a thermocouple



Components laid out on a carbon tray (top), welding in a high-temperature furnace

filler metal, melts is critical in determining whether or not the resulting components are defective.

Suzuki began by aiming to make furnace temperatures visible. He placed a sensor, called a thermocouple, in a large furnace and for seven months continued measuring heat distribution and changes in temperature due to radiant heat while taking into consideration the effect of seasons.

"The temperature of the tray edges is high." Suzuki incorporated the data he had gathered into a simulation, which provided analytical proof supporting what operators understand directly as a result of first-hand experience. Based



on these results, he deduced optimal temperatures and processing times within furnaces to enable processing that realizes uniform quality.

## Realizing Improvements through Trial and Error

Moreover, Suzuki's analysis revealed that resistance when components come into contact causes irregularity in the way the silver melts, leading to poor welding.

To address this problem, Suzuki came up with the idea of placing weights on components. This occurred to him because analyzing data on levels of defectiveness by model type showed that there tended to be fewer defects among larger, heavier components.

Suzuki immediately put his idea to the test. However, shape emerged as an obstacle. The shadows that the weights cast affected the welding temperature.

He continued with a process of trial and error. During this process, Suzuki came up with an innovative proposal to use springs to hold down components. However, this idea did not see the light of day because of cost considerations. He recalls, "I made prototype



The silver has melted adequately during welding, thereby firmly welding the two components together. Yields are up thanks to on-site initiatives.

weights, placed them in the furnace and measured the results. I kept at it relentlessly to find the best weight and shape."

These efforts produced an optimal solution. The pressure applied improves heat transmission, and the silver spreads uniformly on the welding surface. As a result, poor welding has decreased significantly.

## Preventing Defects through Rigorous Data Control

"This was an area on which predecessors had expended a lot of effort. I was unsure if I would be able to contribute anything. However, it is sometimes precisely because you lack experience that you are more willing to try new things." These were the thoughts that led Hideyuki Ozawa of the Quality Control Section to take part in the project. He explains, "Based on their day-to-day experiences production site operators are able to point out where there are problems. I converted this type of know-how into data."

The products Ozawa sought to improve were thermal relays—devices that detect excessive current flowing



Hideyuki Ozawa of the Fukiage Factory's Quality Control Section holding an inversion spring, an important component

through products. The key to Ozawa's solution lay in "identifying the cause from the mold stage through rigorous data control."

Thermal relays comprise about 30 components. Ozawa continued to collect data about various facets of every component, including contact position, curve angles, and load. By plotting the figures obtained and comparing them in a time series, the degradation and problem points of molds became evident at a glance. He shared these results with the other project members, who used them to enhance yields and realize improvements.

## Improving Quality is Our Mission

Quality is at the heart of manufacturing. Naturally, we conduct strict quality inspections before sending products to market. However, in order to reduce malfunctions, rigorously building quality into processes is essential.

Summarizing the backdrop of the project, Takahashi explains, "Eliminating defects from processes is an absolute must. Nevertheless, we may have fallen prey to the complacent attitude that a certain percentage of defects is unavoidable. The project took on the challenge of breaking through such preconceptions."

For Suzuki, the year spent contributing to the project gave him a real sense of quality as something that is fostered. "It is just like a plant. If you do nothing, it withers. But if you put in some effort, the result is higher quality."

What kind of quality do manufacturers have to realize? Replying on behalf of production sites, Ozawa explains, "The word yield implies defective products. Our mission is to cast off such assumptions and as far as possible remove sources of anxiety for customers."





# Strengthening the Company by Leveraging Diversity

Reflecting one of its management policies, which calls on the Company to “Maximize our strengths as a team, respecting employees’ diverse ambition” Fuji Electric is actively encouraging diversity. Our goal is to ensure mutual respect among employees with different nationalities, genders, values, and lifestyles, while also capitalizing on these differences to create new value. In this section, we provide two examples of workplace initiatives that are giving this policy concrete form in our day-to-day activities.

## Achieving Global Communication

### Stating Opinions Clearly — Non-Japanese Employees

“He says clearly what he is able to do or what the problem is.” This is how Nozomu Takamura, the senior manager responsible for sales at the Global Businesses Group describes Chinese employee Mijiti.

Aiming to expand our business on a global scale, we are accelerating the development of “global personnel.” From fiscal 2011, we introduced global training to our training program for new employees. Also, we are actively deploying motivated employees overseas based on our job posting system and the “Professional ambitions” survey.

At the same time, we are increasing non-Japanese personnel, such as Mijiti, who form the core of our global business in Japan. Takamura’s Sales Department I has 17 personnel, of whom four are Chinese. The department’s target market is quite simply the rest of the world.

Because, as Mijiti stresses, “visiting sites is important,” the department’s personnel are constantly visiting countries to solve customers’ problems.



Mijiti (left) and Nozomu Takamura (right),  
Sales Department I  
Industrial Infrastructure Sales Division  
Global Business Group

### Laying the Groundwork—An Important Opportunity for Communication

The mission of Takamura and his team is to sell measuring instruments, such as pressure gauges, gas analyzers, and drive control systems, which incorporate inverters, motors, and control systems. As part of these efforts, Mijiti’s sales activities focus on Vietnam, South Korea, and other parts of Asia.

According to Mijiti, the Japanese approach of laying the groundwork posed the greatest problem for him when he began working in Japan. “In China, the leader decides, and that is the end of it. Why do we need to coordinate with so many people?” This was the kind of question he asked himself. Furthermore, his direct manner of speaking sometimes caused problems and led to friction with related divisions in the Company. There were days when, along with Takamura,

he went around the workplace apologetically.

Having worked for Fuji Electric for eight years, Mijiti’s views have changed. “It is interesting because each person has a different way of thinking. Explaining to the key people in advance helps things go smoothly. I now see laying the groundwork as an important opportunity for communication.”

### Coexisting through Mutual Respect

Exchanging opinions with Mijiti on a daily basis has given Takamura some insight into the tendencies of different nationalities. “Japanese people tend to be vague. By contrast, Chinese people make things black or white and expect those around them to do the same.” He goes on to explain the benefits of working based on a team with diverse personnel. “Japanese personnel learn a lot by working with other nationalities. This is because being able to understand and adapt to different cultures and customs is a key attribute required of companies expanding their business globally.”

Since May 2011, Mijiti has been concentrating efforts on sales activities targeting a certain company in Vietnam. He received an order for drive control systems from the company after repeated negotiations about specifications and cost with partner companies in Taiwan and contractors



in Vietnam. Through these negotiations he sought to prevail against price competition from competitors that included Japanese companies as well as local companies.

Mijiti stresses that he was able to win the order thanks to cooperation from the technology division and other divisions within Fuji Electric. “I feel Japanese people are considerate. Their eagerness to help others is nice.”

#### Enabling Women to Play Active Roles

### Changing the Workplace—One Person’s Reduced Working Hours

Since it established an office for empowering female employees\*<sup>1</sup> in February 2006, Fuji Electric has been stepping up initiatives encouraging female personnel to play more active roles in the Company. We have made these changes because we need to incorporate new perspectives and approaches into our organization in response to society’s diversification. As well as creating systems and developing appropriate environments, with a view to enabling them to assume greater responsibilities, we are



From the left **Hideaki Watanabe**, **Chizuru Inoue**, **Aki Takigawa**, Analysis Group, Applied Physics Research Department

encouraging female personnel to support as well as compete with each other to hone vocational skills.

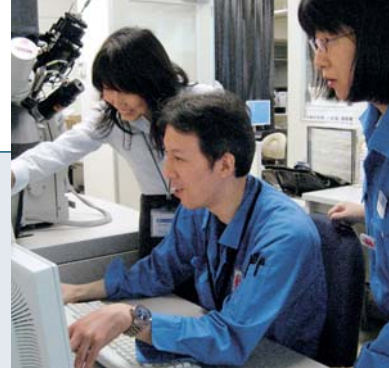
Chizuru Inoue belongs to a department that analyses the performance and the causes of malfunctions for a wide variety of Fuji Electric’s technologies and products. From 2007, she used our reduced working hours system to raise her children for three years. At the time, no one in her workplace used the system, and coworkers were bemused. However, team leader Aki Takigawa provided Inoue with strong moral support.

“I made sure she went home at 4 pm, if that was her leaving time. And, I took over work from her to make sure she finished on time.” Takigawa had experienced combining child-rearing and work. Based on this experience, she took it upon herself to support Inoue. Takigawa’s uncompromising attitude affected other personnel. Gradually, coworkers became supportive and would ask “Are you okay for time?”

\*1 Due to reorganization, this office now promotes diversity as well as active roles for women.

### Achieving Results by Giving Play to Individuality

A coworker responsible for the microscopic observation of products, Hideaki Watanabe, recalls the time, “We made sure to inform her of analysis aims and results.” This was because, even though she was working reduced hours, he did not want her job to descend into “assembly line” work. Inoue elaborates, “While my coworkers tried to lighten my workload, they carefully explained important matters to me. This kept me motivated about work.” Takigawa, responsible for the overall management of the team, explains her outlook. “While, of course, being considerate is important, ultimately the team has to produce results.” One way of getting results is to take advantage of the strengths and personality of each



Fostering teamwork through dialogue

individual. For example, she sees “dexterity and an inquiring mind” as Inoue’s attributes.

As a specialist, Inoue mainly supports other team members and as a result usually works on many different themes simultaneously. However, Takigawa praises Inoue. “No matter how busy, she handles her work deftly and achieves results beyond expectations.” As a natural consequence, she has become the “go-to person” for coworkers when they have a problem.

### Using Diversity as a Driving Force

Currently, at Fuji Electric women account for 12% of employees and 1% of senior managers.\*<sup>2</sup> By contrast, although women are in the minority in the Company, in Takigawa’s team half of the 18 members and two of the managers, including Takigawa, are women. Takigawa and her team are grappling with a large number of critical themes, such as analyzing the structures of semiconductor modules that use the next-generation material silicon carbide (SiC).

Takigawa explains, “When I am tied up with one project, my boss will do work on my behalf.” Because some personnel take child-rearing leave or work reduced hours, we have established a system whereby personnel work alternately on the same project so that we can respond when urgent work comes in.

The three team members agree that “the workplace has a friendly atmosphere.” Despite being under considerable pressure, using diversity as a driving force, they will work as a team to achieve major tasks.

\*2 As of June 1, 2012. Figures for Fuji Electric Co., Ltd., and its main domestic subsidiaries



# Working with Local Communities to Promote “Fe Share an Hour”

Manufacturing semiconductor products, Fuji Electric Philippines, Inc. (FEP), annually conducts its “Fe Share an Hour”<sup>\*</sup> social contribution activities in which employees participate. These activities began in the Philippines, but in the current fiscal year Fuji Electric brought them across the ocean to Japan, where it is advancing them as a companywide initiative. In this section, we provide a close-up on these activities, which are teaching participating employees a great deal.

\* An initiative aimed at enabling Fe (Fuji Electric) and local communities to “share happiness”



## Valuing Exchanges with Local Communities

In 2004, FEP, in collaboration with a local non-governmental organization (NGO), launched Fe Share an Hour in the Province of Laguna in the Philippines, where it has its base. Rose Gerona, who works in FEP’s General Affairs Department, explains the aim of the initiative.

“We value exchanges with local communities. Reflecting a philosophy of ‘sharing blessings with the less fortunate’ this initiative forms part of our CSR activities.”

Fe Share an Hour entails employees donating the equivalent of one hour’s salary, in cash or goods, to orphanages or hospices. Every year, employees visit these facilities to deliver their donations. To date, FEP has supported seven facilities. In fiscal 2011, FEP’s employees made donations to three of these facilities. One of which, Laguna’s House, has been receiving



**Rose Gerona**  
General Affairs Department  
Fuji Electric Philippines, Inc.

the support of FEP since fiscal 2005. The facility currently houses 25 children, aged five through 17, who need protection because their parents have abandoned them or local residents have mistreated them.



Collecting donations through boxes installed at FEP’s cafeteria and other places

## Spreading Smiles at the Orphanage

In December 2011, 20 volunteers from among FEP’s employees visited Laguna’s House, in a suburban area of Laguna. “Every time I see the children’s smiling faces, it really puts my mind at ease.” One of the visitors, Frank Postrero of FEP’s Facilities Department, explains as he recalls spending time with the children.

To welcome the visitors from FEP, the orphanage held a Christmas party. At the event, everyone had lunch together, and the children performed songs and dances. FEP employees played games with the children, and



**Frank Postrero**  
Facilities Department  
Fuji Electric Philippines, Inc.

everyone had a great time. At first, the children were self-conscious, but gradually they relaxed, took the hands of FEP personnel, and ran around enjoying the party.

Postrero is enthusiastic. “As much as I can, I want to take part in this initiative in the future. I want to share my time with them and deepen our exchanges.”



Lots of smiles from the children when they spend time with our personnel



## Contributing to Education through Our Livelihood Training Program

“The aim of this initiative is not just to get to know the children. We also help them prepare for life after leaving the orphanage.”

Gerona explains that as far as possible the aim is to incorporate livelihood training into visits to the orphanage. In fiscal 2011, volunteers and children made chocolate at Laguna’s House. Other projects themed on processing food have taught the children how to make steamed rice, cake, and pastries.

Fe Share an Hour does not only involve financial and material support. For example, it includes such initiatives as personnel taking an hour, outside their working hours, to teach coworkers computer skills. This bank of shared skills and knowledge form part of the livelihood training program that FEP provides to the facilities it supports.



Making chocolate as part of our livelihood training program

## Sharing and Giving

Representing the social workers of Laguna’s House, Erlinda Sune expresses gratitude for FEP’s support. “We have been able to continue livelihood training thanks to the thoughtfulness of FEP’s personnel and their financial and material support. This gives the children a little hope and benefits their physical and emotional well-being. I thank FEP sincerely.”

A participant in the initiative in fiscal 2011, Julie Pearl Gonzales, who belongs to FEP’s Device Engineering Department, says, “It is not just about making the children happy. The initiative gave me pause to think about a lot of things, including what I can do to help solve social problems.”



**Erlinda Sune**  
Representative of the social workers of Laguna’s House

As well as contributing to local communities, FEP aims to instill social awareness in employees through these initiatives. “We want personnel to appreciate the importance of sharing and giving in relation to other members of society. And, we do not want them to forget those less fortunate than themselves.”



**Julie Pearl Gonzales**  
Device Engineering Department  
Fuji Electric Philippines, Inc.

## Thanking the Local Community for Supporting the Company

Apart from the Fe Share an Hour initiative, FEP and its employees continue to provide food aid to NGOs, plant trees locally, and donate blood. In recognition of such efforts, the Department of Labor and Employment of the Philippines conferred an award upon FEP for having the best family welfare program in December 2010.

In the view of FEP’s President, Takeo Kikuchi, “Local communities support companies’ activities. Our initiatives aim to return the favor to local communities. I want to continue Fe Share an Hour and share happiness with even more people.”

In the current fiscal year, Fuji Electric has begun implementing Fe Share an Hour on a companywide basis as part of its contribution to local communities in Japan. We want more employees to appreciate the support of local communities and focus on prospering with them. This is the ideal driving our efforts.



**Takeo Kikuchi**  
President  
Fuji Electric Philippines, Inc.