

MECHATRO+ [PLUS]

ENGLISH EDITION

VOL. 3

Development Story

SV-P Series

Die-sinking Electrical-discharge Machine

Solution Case Study / Interview

Shinyo Corporation

Nagumo Seisakusho Co., Ltd.

Kasyu Co., Ltd.

Simozato Kogyo Co., Ltd.

NAKANIHON CASTING Co., LTD.

Yanagawa Seiki Co., Ltd.



Cover photo : Chicago (America)

Chicago, located on the shore of Lake Michigan in the state of Illinois, is the third most populous metropolis in America, after New York and Los Angeles. The photo on the cover is of downtown Chicago. The building rising up from the middle of the skyline is the Trump International Hotel and Tower. On the right, standing at 527m, is the Willis Tower (formerly the Sears Tower), which boasts the title of the second tallest building in America. The International Manufacturing Technology Show (IMTS 2018) was held in Chicago beginning September 10, 2018.

C O N T E N T S

Development Story

- 3 | **SV-P Series** Die-sinking Electrical-discharge Machine

Solution Case Study / Interview

- 5 | **Shinyo Corporation**
- 7 | **Shinyo Corporation**
Sawayo Hattori CEO & President
- 9 | **Nagumo Seisakusho Co., Ltd.**
- 11 | **Nagumo Seisakusho Co., Ltd.**
Hiroshi Yonemasu CEO & President
- 13 | **Kasyu Co., Ltd.**
- 15 | **Kasyu Co., Ltd.**
Rokujin Teramoto CEO & President
- 17 | **Simozato Kogyo Co., Ltd.**
- 19 | **Simozato Kogyo Co., Ltd.**
Yoshihiro Yasuda CEO & President
- 21 | **NAKANIHON CASTING Co., LTD.**
- 23 | **NAKANIHON CASTING Co., LTD.**
Yoshio Torii President
- 25 | **Yanagawa Seiki Co., Ltd.**
- 27 | **Yanagawa Seiki Co., Ltd.**
Koichi Saito General Manager Production Management Division Sayama Factory
Katsuhiko Shinkai General Manager QCD Manufacturing Technology Department R&D Management Division Sayama Factory

Global Service & Support

- 29 | **Computerized Numerical Controllers**
Processing machines

Die-sinking Electrical-discharge Machine SV-P Series

The new SV-P Series die-sinking EDMs developed by Mitsubishi Electric incorporates an ambitious product lineup that has undergone a full model change for the first time in 15 years. Models feature an all-new design and achieve “visualization of machining” by being equipped with the latest control unit, D-CUBES. SV-P Series EDMs also boast AI to automatically detect optimal machining conditions.



Mitsubishi Electric's new SV-P Series die-sinking EDMs were the first to incorporate AI technology. Exhaustive benchmark testing was performed to ensure the models offer superior performance that rivals competitors' products in all aspects.

Leading the World in Utilizing AI in Electrical-discharge Machining

In April 2017, Keiji Takahashi transferred from another processing machine manufacturing department to the No. 2 Development & Design Section in the Electrical-discharge Manufacturing Department. Although his new workplace was still located in Nagoya Works, the new post caught Takahashi off guard. Moreover, as soon as he transferred, as the Senior Manager, he was appointed leader of the development project for a new model EDM to be equipped with the M8 control unit. “Although die-sinking EDMs are close to but not the same as the processing machines I had worked on previously, commonalities included the mechanical portion, power source portion, and control unit portion. As such, I thought I could tap into my experience to date. I also strengthened my resolve that “being a novice” in terms of EDMs meant I had a similar point of view to customers insofar as doubts and issues.” Takahashi began by instructing all project members to conduct thorough benchmark tests that compared Mitsubishi Electric products to those of rival companies. His idea was to go back to the drawing board and “make a fresh start with an accurate awareness of how Mitsubishi Electric’s products were superior/inferior to rival products.”

Hiroki Hikosaka, a manager in the

same section, could not conceal his bewilderment. This was because the direction for the new model had already been determined as a minor change development based on the current EA-PS Series, replacing the D-CUBSES M8-equipped control unit in order to achieve the “visualization of machining,” and enabling it to support the iQ Care Remote4U, a remote service that enables diagnosis to be performed off-site. The release date for this product had already been finalized as April 2018, one year into the future. Hikosaka, who was in charge of developing the power source and control components (i.e., key technologies for EDMs) honestly admitted, “I was concerned that Takahashi’s approach would mean a significant increase in development elements.”

However, by conducting several months of thorough benchmark tests that included the rival products of overseas manufacturers, an unexpected fact came to light.

“I thought that Mitsubishi Electric’s EDMs were superior in terms of machining speed, machined surface quality, electrode wear, etc. But, based on some comparisons, our machines were in fact inferior,” admitted Hikosaka. For example, in the case of machining with

graphite electrodes, Mitsubishi Electric EDMs were behind others in terms of machining speed and electrode wear. In Japan, the mainstream approach is to use copper electrodes for electrical-discharge machining; however, graphite electrodes are the norm in Europe. For this reason, there is a risk that Mitsubishi Electric’s machines could be seen as having lower performance.

Based on the benchmark test results, Takahashi decided to revise the development concept. He contemplated with himself, “Would customers want to buy the new product if we only change the control unit? If unsure, let’s take a decisive action and do a full model change.”

In this way, in addition to equipping the model with D-CUBES, Takahashi explained the decision-making process, “We introduced a new development concept that ‘accomplishes performance in all aspects equivalent or better than those of rival products,’ and ‘changed the design to adopt Mitsubishi Electric’s FA total design.’ This was accomplished by interacting with customers on a daily basis and proactively harnessing feedback from members with good knowledge of production shop floor needs.”

Kenji Iwasa, the Middle Master



Keiji Takahashi

Senior Manager
EDM Development & Design
Section 2
EDM Manufacturing
Department
Nagoya Works, Mitsubishi
Electric Corporation



Hiroki Hikosaka

Manager
EDM Development & Design
Section 2
EDM Manufacturing
Department
Nagoya Works, Mitsubishi
Electric Corporation



Koichi Iwanaga

Manager
Quality Assurance Section
EDM Manufacturing
Department
Nagoya Works, Mitsubishi
Electric Corporation



Yoshikazu Niwa

Manager
EDM Development & Design
Section 2
EDM Manufacturing
Department
Nagoya Works, Mitsubishi
Electric Corporation



Kenji Iwasa

Middle Master Engineer
Machining Technology Dept.
Mitsubishi Electric
Mechatronics Engineering
Corporation



Full Model Change Complete with New Design and Control Unit

Engineer of the Machining Technology Dept. at Mitsubishi Electric Mechatronics Engineering, a company that provides engineering services for Mitsubishi Electric's industrial mechatronics products, participated in the project. He reflected, "I bombarded the team with customer requests one after another. In that sense, I perhaps made things challenging for the development members, and they all responded with great sincerity." Starting with machining improvements by adopting graphite electrodes, ultimately Iwasa's advice was reflected at every turn.

Yoshikazu Niwa, who was assigned to the section as a manager from Mitsubishi Electric Engineering, the company that engages in design work for various devices, interpreted customers' requests in his own way. Working in Mitsubishi Electric Engineering since 1991, Niwa was a highly experienced hardware design engineer who was consistently involved in EDM design and was well-versed in global needs due to his role supporting design projects while stationed in a factory in Dalian, China. He commented, "In China, there is a high demand for shiny machining surfaces. As such, I requested power source design, etc. that enables mirror finishing."

Niwa also harnessed his experience in China for the design changes he was in charge of. "After going to exhibitions and customers' companies in China, I sensed that Mitsubishi Electric's products were slightly plain in terms of design. Chinese people also place importance on aesthetics. Therefore, a machine with a plain design does not have much appeal, and it impacts sales," he stressed.

With the cooperation of the design lab, Niwa aimed to deliver an impressive design while adhering to Mitsubishi Electric's FA total design. He reflected, "Naturally there were restrictions in terms of both structure and cost, so I prepared dozens of blueprints for

consideration." Of course, at the same time as considering appearance, the new design realized structural enhancements, such as a 150% improvement in rigidity compared to the current model in order to achieve more accurate machining.

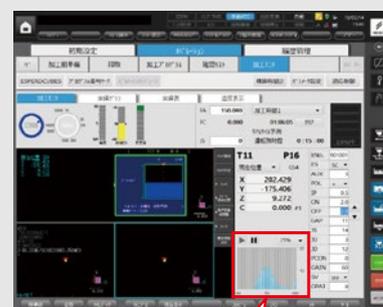
Koichi Iwanaga, a manager in the EDM Manufacturing Department's Quality Assurance Section, was responsible for carrying out third-party evaluation of the technology under development. He explained, "My role was to evaluate technologies objectively from the customers' viewpoint, point out design insufficiencies, and offer ideas when the design division was struggling. Sometimes I may seem a bit ominous to the development team, but this is also because I see things from the customer's perspective."

With the initial concept, because the mechanical elements were practically the same as the conventional model, Iwanaga first thought he'd focus his evaluation on the operation screen area, so he was taken aback when the project suddenly took on a completely different direction. "The direction changed to a full model change incorporating mechanical, power source, and control aspects. Therefore, even though there were no problems with the respective fundamental technologies, sometimes an evaluation of their combinations revealed issues. Consequently, evaluation work took three times as long as I'd initially planned." Moreover, the model had to be fitted with a function to enable stable performance, even in countries with unstable power supply. "Considering the future, I added the necessary evaluation items for stable operation in a global environment," Iwanaga recalled.

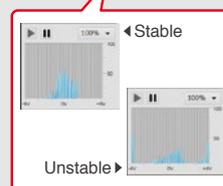
In fact, there is one more appeal point added to the development concept – the adoption of AI. Takahashi believed if they could develop such a machine ahead of others in the industry, they could promote the brand image of "Mitsubishi Electric – an AI savvy company," which

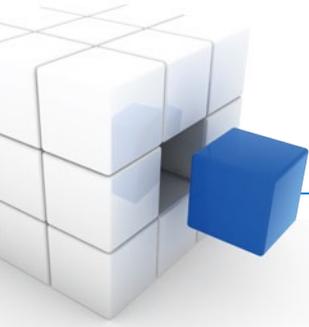
would serve as new means of distinguishing Mitsubishi Electric from its rivals. Hence, Takahashi presented the proposal to obtain internal certification for "Maisart," an AI technology brand being promoted by Mitsubishi Electric since May 2017, and equipping the new model in the SV-P Series. Hikosaka, who was the development leader, had no prior experience with AI development. However, he developed an AI function that increases machining performance by automatically detecting optimal machining conditions during the machining process, and successfully obtained certification for this in January 2018.

Although finishing slightly behind schedule, the development project satisfied all of the initial requirements. Takahashi emphasized, "Moving forward, the key point will be how we promote added-value. Additionally, we want to constantly advance AI technology and produce die-sinking EDMs equipped with highly accurate response control."



The machining status visualization monitor clearly displays stable/unstable machining status and supports optimal adjustment of machining conditions.





SHINYO Shinyo Corporation

Sales activities rely solely on official company website and word-of-mouth introductions. Regardless, the electrical-discharge machining job shop receives a steady, non-stop stream of orders

Shinyo Corporation is an electrical-discharge machining job shop located in Nagoya. Despite carrying out no sales activities whatsoever, Shinyo is never without orders. The secret to this nine-person company securing a steady flow of orders is its unique business model and the latest processing machines.

In 1953, Shinyo Corporation was formed by Shousuke Hattori, grandfather of the current CEO and president, Sawayo Hattori. It began as a family-run store selling metal-cutting saw blades. After incorporating in 1963, it began selling machine tools in general.

The company's turning point was when it installed a wire-cut EDM demonstration model. This move was triggered by a regular customer asking if Shinyo could perform processing using this particular machine. Believing that if it could take on work up to the processing stage, profits would increase, the company maintained its machine tool sales operations parallel to expanding into metalworking.

In 1990, the second CEO and president, Hideo Hattori, further enhanced devices and increased processing work. The company introduced a state-of-the-art 3D CAD/CAM system in 1992, then a machining center capable of precision processing and a large wire-cut EDM in 1993. In 2000, Shinyo withdrew from machine tools sales. It then sold its machining center and became a dedicated electrical-discharge machine machining job shop.

The current CEO and president, Sawayo Hattori, explained the company's business model: "In the metalworking industry, we won't stand out if we simply do the same work on the same equipment as

other companies. As such, we eagerly invest in the latest processing machines and systems to distinguish ourselves from the competition."

Overcoming opposition from the former president to introduce Mitsubishi Electric EDMs

In 1998, President Hattori's fifth year with the company, a customer told her that they would give Shinyo work if it would use Mitsubishi Electric wire-cut EDMs. However, at that time, Shinyo was only using an EDM made by a different manufacturer.

President Hattori consulted with the president at the time, who strongly opposed changing manufacturers. President Hattori reflected, "Back then, the president's reason for opposing the move was because he didn't want to dishonor the manufacturer whose machine Shinyo had been using for many years. I wasn't convinced by this answer, so introduced the large wire-cut FX30 EDM despite this opposition."

"Once we began using the new machine, we realized not only how the performance was great, but also just how fantastic Mitsubishi Electric's after-sales service was. If we faced a problem, our representative would come running immediately, and knowing this gave us genuine peace-of-mind. The former president also acknowledged this merit and



Shinyo Corporation's head office and main factory are lined with rows of EDMs. There is a total of 19 EDMs in operation. They are all Mitsubishi Electric state-of-the-art models.



The employees of Shinyo Corporation. There are only nine, but they work weekends and rotate days off during the week. All employees were not present at the time of this photo.

purchased only Mitsubishi Electric EDMs from that point onward.”

Currently, Shinyo operates 15 wire-cut EDMs, three die-sinking EDMs, and one fine-hole drilling EDM, bringing the total of Mitsubishi Electric machines to 19. Additionally, Shinyo’s head office and main plant are filled with the following: the latest wire-cut EDM MV1200R D-CUBES, which is capable of high-accuracy, a MP4800 large-size high-accuracy processing machine, an FA50V ADVANCE wire-cut EDM capable of processing extra-large workpieces measuring 2000 × 1600 × 39 mm, a FA30V ADVANCE high-column wire-cut EDM capable of accommodating workpieces with a height of 600mm, and much more. Shinyo’s major strength is that, by



FA50V ADVANCE is a wire-cut EDM capable of processing extra-large workpieces with dimensions up to 2000 × 1600 × 395mm.

owning so many types of EDMs, it cannot only offer high-accuracy processing, but also special processing not supported by competitors.

President Hattori explained the company’s aim: “From the customer’s perspective, they aren’t able to invest in equipment for special parts they’d only produce a few times a year, so that’s why they want us to handle it.”

**Quick delivery is another strength
Open for business on weekends attracts work too**

Another of Shinyo’s strengths is its ability to offer quick delivery. President Hattori commented, “Since we quite often get orders the client wants done by the next day,” the EDMs operate around-the-clock. There’s no break even on weekends or national holidays. Shinyo even responds to requests for customers over the New Year’s break, Japan’s spring break (Golden Week), and summer break (O-bon). “We quite frequently get orders on Friday night to be delivered by Monday morning,” commented President Hattori.

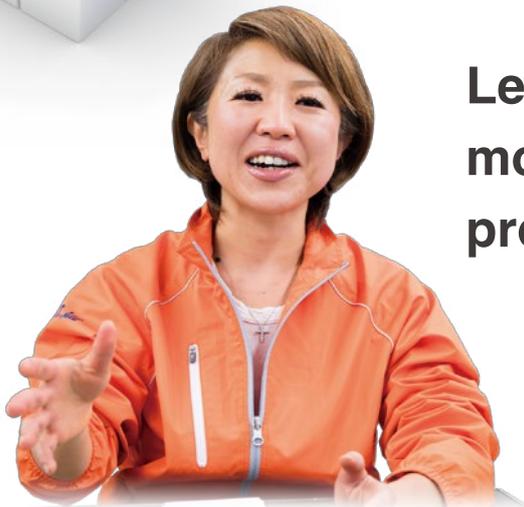
Due to this, the company is promoting automation activities such as introducing the “EMACH,” a

fine-hole drilling EDM with robot arm specifications that enable automatic replacement of electrodes. In 2017, Shinyo introduced “iQ Care Remote4U,” a service that confirms the operating status of EDMs remotely via a smartphone or tablet.

The company pursues no sales activities whatsoever. “The reason is because I don’t like sales work, and there are no salespeople in Shinyo,” laughed President Hattori. Even still, the company has a constant stream of orders solely due to its ability to provide high-accuracy work and special processing in a short delivery time. Its name has spread across Central Japan based on word-of-mouth alone, and today it receives orders from across the nation.



EMACH is a fine-hole drilling EDM equipped with a robot arm capable of automatically replacing electrodes. It can process fine holes as small as 0.2mm in diameter.



Leveraging “iQ Care Remote4U” to monitor EDM operation, increase productivity, and achieve work reform

◀ Sawayo Hattori

CEO & President

Profile

1972 Born Nagoya-shi, Aichi Prefecture
1994 Joined Shinyo Corporation
2012 Appointed CEO and President

— You have many fewer employees than you have EDMs, don't you?

Hattori : There are six full-time workers, including myself (four operators and two programmers). Therefore, the important point is how efficiently we can work with only a handful of people. We are able to keep our number of employees low because we divide responsibilities between operations and programming.

— Do you process parts yourself?

Hattori : When I first joined Shinyo, I didn't want special treatment just because I was “the president's daughter,” so I worked really hard to learn the work my seniors taught me. It was quite difficult to operate a die-sinking EDM while creating a program. Back then, it was rare for a young woman to be working on a manufacturing shop floor. I had many

frustrating experiences, such as customers coming and asking, “Aren't there any male employees?” or receiving unnecessary, lengthy explanations about processing parts because people assumed that I didn't know the first thing about it.

— It sounds as though Shinyo proactively purchases the first machine of new EDMs developed by Mitsubishi Electric, is that true?

Hattori : In order to receive work constantly, we have to be capable doing work that other companies cannot provide. That is why we use Mitsubishi Electric's latest machines. There is some uneasiness about purchasing the very first machine made, but we trust Mitsubishi Electric, and that goes for its after-sale service as well.

— Shinyo has even installed special processing machines, such as the extra-large wire-cut EDM, hasn't it?

Hattori : Regarding special processing machines, in most cases it is the major corporations that install special-purpose machines, including those of large-sized workpieces. We decided to install one in our factory as well, because we believed we could better respond to customers' needs. In reality, we have acquired a considerable number of new customers thanks to this machine. Once we've done a job for a customer, they recognize the high-quality work we can do in a short turnaround time and continue to request work from us afterwards.

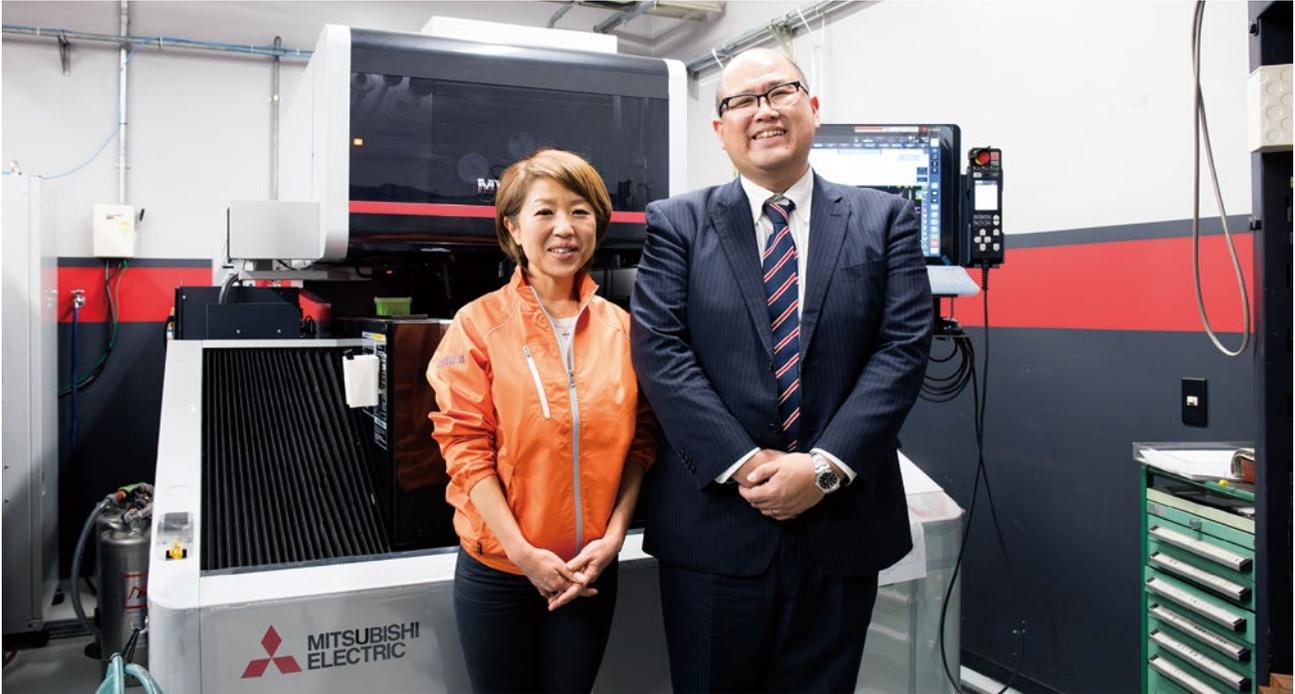
Effectiveness of IoT realized through a newspaper article

— Apparently Shinyo also introduced the “iQ Care Remote4U” remove service for its operations earlier than most, right?

Hattori : Our EDMs are running day and night. Essentially, they can operate unmanned; however, we would be in trouble if we couldn't meet the delivery deadline due to something happening with the machine. So, in the past, an employee would go to the shop floor and check that the machine was working properly every two hours. I was constantly considering how I could alleviate this burden on my employees. Then, I consulted with Mitsubishi Electric, and they recommended their maintenance service. By introducing this to our operations, we eliminated the fatal downtime of our machines, and became able to guarantee accuracy.



50-inch monitors in Shinyo Corporation's administration office and factory. These enable workers to confirm operating status without going to the actual machine, thus eliminating wasteful movement.



Posing in front of a MV1200R D-CUBES, the latest high-accuracy wire-cut EDM. Pictured on the right is Daisuke Chiba, sales representative, EDM Section Manager, Industrial Automation Machinery Marketing Division, Chubu Branch Office, Mitsubishi Electric.

Additionally, just when I was thinking how I'd like to achieve unmanned processing with certainty, I read a newspaper article on the Internet of Things, IoT, and thought to myself, "This is it!" Because, if we can monitor operating status remotely, we don't need to go to the factory in the middle of the night. I consulted with Mitsubishi Electric immediately, and they had just finished developing "iQ Care Remote4U." So, we worked with them to perform a joint verification test. Now, we can check operating status on our smartphones, so there's no longer a need to go to the

factory in the middle of the night, and employees can work with much less mental and physical burden.

— **Today you can see the operating status of machines on the two large monitors installed in your factory and administration office, right?**

Hattori : I had this idea when I did a tour of Mitsubishi Electric's e-F@ctory. There, information obtained by "iQ Care Remote4U" was displayed on a large monitor. I saw that and thought to myself, "That would make it possible for even a small number of employees to work efficiently."

When we actually installed one 50-inch monitor each in the office and factory, rather than walking up to each machine location to check its status, this made it possible to see the operating status of all machines on the monitors literally from anywhere, which eliminated wasteful movement.

— **Were there benefits from a management perspective too?**

Hattori : Previously, if there were machines still powered up but not in operation, either the factory manager or I would go around and turn them off. However, since we have achieved visualization with the monitors, employees have become more cost conscious, and now turn off the power when necessary. This has increased cost reduction benefits accordingly.

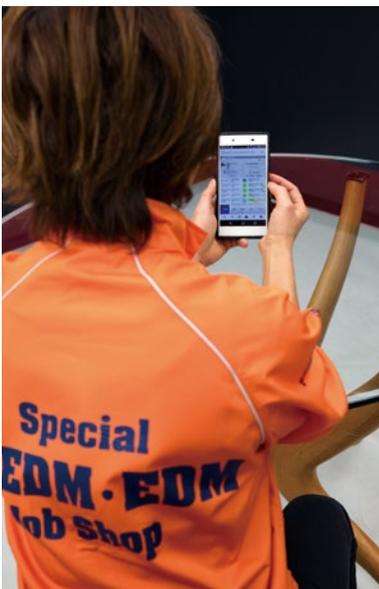
— **Your factory is very clean,**

both inside and out.

Hattori : I think the first impression speaks a lot about a company or factory and the work it can provide. You can leave a job up to a company with peace of mind if it looks neat and orderly, right? That's why all of the employees at Shinyo also work hard to keep things neat and organized. This also has a positive effect on our state of mind towards work and other matters.

— **Please share your future vision.**

Hattori : I'd like to spread our company name even wider and receive work from all across Japan. I'd also like to continue taking on new challenges ahead of others in the industry.



Shinyo uses Mitsubishi Electric's "iQ Care Remote4U" remote service. Now operating status can be confirmed on a smartphone, so it's no longer necessary to go to the factory in the middle of the night.

Corporate Data

Shinyo Corporation

Head Office

17-25 Iwato-cho, Nagoya-shi, Minami-ku, Aichi Prefecture, Japan

No. of employees

9

Main businesses

Wire-cut processing, die-sink electrical-discharge machining, fine-hole drilling electrical-discharge machining

History

1953 Founded as a family-run business
1963 Incorporated as Shinyo Corporation
1998 Introduced Mitsubishi Electric's large wire-cut EDM

2000 Withdrew from sales operations, and became a dedicated machining job shop

2003 Completed new company building in current location

2012 Sawayo Hattori appointed CEO and President



Nagumo Seisakusho Co., Ltd.

“Quality is Nagumo’s lifeline” - Thoroughly pursuing accuracy with the latest EDMs

Nagumo Seisakusho Co., Ltd. is a precision die manufacturer with its head office in Joetsu-shi, Niigata Prefecture. Its main focus is manufacturing progressive dies for automotive parts, die components, etc. The company is highly regarded by its customers for the quality of its products.

Nagumo Seisakusho was established in 1947 as Nagumo Fiber Kakusho. Initially it manufactured paper trays and other components for organizing documents, later began processing stamped sheet metal parts, and was then incorporated to become Nagumo Seisakusho Co., Ltd. in 1958.

In the 1970s, the company expanded into the manufacturing of precision stamping dies for electronic components. Moreover, after the collapse of Japan’s bubble economy, it changed direction to become a dedicated manufacturer of precision dies for electronic components. After the collapse of the IT bubble, it changed direction once again to focus on manufacturing precision dies for automotive parts and continued enhancing its business performance.

Always machining at an accuracy higher than the priority tolerance requirement

At Nagumo’s main factory, Sanwa



MP2400 – Mitsubishi Electric’s leading wire-cut EDM. Currently, Nagumo has three MP2400 units. It is Nagumo’s policy to proactively introduce the latest models.

Factory, there are currently 16 EDMs in operation, including 12 wire-cut EDMs, two die-sinking EDMs, and two fine-hole drilling EDMs. Ten of these are made by Mitsubishi Electric, and three wire-cut EDMs in particular, MP2400s, play a major role. These MP2400 units were introduced one unit every year for three years beginning in 2015.

CEO and president, Hiroshi Yonemasu, emphasized Nagumo’s policy, “Not only in terms of EDMs, but for all of our processing machines, we place the greatest emphasis on machining accuracy when deciding which machines to purchase. It’s not as though we don’t take production efficiency into consideration whatsoever, but we definitely prioritize machining accuracy above all. That’s because quality is Nagumo’s lifeline.”

President Yonemasu added that this uncompromising stance on high accuracy, “means that we can contribute to improving the accuracy of our customers’ products in addition to reducing the time and effort required for shop floor work, as well

as cut costs.”

For example, when replacing die components embedded in a plate, Nagumo’s products have extremely high accuracy. Therefore, they fit perfectly without requiring any on-site adjustment.

Kei Yokoyama, manager of the Manufacturing Department, explained, “In order to make it possible to replace die components without on-site adjustment, stringent accuracy management is important. For example, if the customer requests an extremely high tolerance with a ‘pitch accuracy of $\pm 2\mu\text{m}$ and profile accuracy of $\pm 1\mu\text{m}$ ’, in order to achieve these levels, it’s important to have a high-performance processing machine, as well as adopt an overall approach including processing steps, programs, tools, machining accuracy measurement, etc. Moreover, if we simply manufactured a product as per the design tolerances, the user would not be happy. When one replaces the die components that should have been made to design specs, often they do not fit as snugly as they should. If the dimensions are too close to the design tolerances, components may not fulfill accuracy requirements due to an accumulation of errors or some other matter.”

Yokoyama explained Nagumo’s basic stance to improving machining accuracy to the maximum extent possible, “Nagumo doesn’t believe we’ve done a satisfactory job simply if we get parts dimensions within the design tolerances. Our aim is zero error. To achieve this, we constantly measure machining accuracy, and if we see a trend of accuracy falling, even a little, we feed that information back to the shop floor immediately and make the necessary adjustments.”



Sanwa Factory "EDM Room." Here, a total of 16 EDMs are in operation, 10 of which are Mitsubishi Electric products.

Nagumo has an "Inspection Room" full of various measurement devices, including a CMM and laser microscope, where the accuracy of dies that have been processed is measured according to necessity. Through close communication between this inspection room and the processing shop floor, Nagumo is able to offer a level of processing accuracy even higher than the tolerance requirement.

Highly regarding after-sales service too
Ever-higher accuracy processing machines

In July 2018, Nagumo installed the Mitsubishi Electric SH12, a fine-hole drilling EDM. Up until then, Nagumo had used a fine-hole drilling EDM by another manufacturer that processed parts while submerged in oil. However, the quantity of oil in storage in the factory had reached



A sample of progressive dies for automotive parts. Nagumo's greatest defining feature is its high standard of processing accuracy.

the maximum limit under Japan's Fire Service Act. Therefore, those machines were replaced by Mitsubishi Electric fine-hole drilling EDMs, which process parts while submerged in water.

The reason why Nagumo installed so many Mitsubishi Electric EDMs is, as President Yonemasu revealed, "Not only do they offer excellent processing accuracy, but also, the company provides a high level of after-sales service. When we request repairs, Mitsubishi Electric always responds swiftly, and that is really helpful. There have even been occasions where we've asked them to repair a machine in the middle of the night and they've had it online again by the following morning."

Yokoyama reflected, "We've asked Mitsubishi Electric to customize EDMs in the past, and they proactively responded to those sorts of technical improvement requests."

When Nagumo installed the Mitsubishi Electric PA20M, an ultrahigh-accuracy wire-cut EDM, it would shrink and expand slightly due to the temperature and magnetic conditions on the shop floor, thus on-site pitch offset was necessary. At the time, there was no pitch offset function on the PA20M. So, each time offsetting was required, Nagumo would have to place a request with Mitsubishi Electric service personnel. Hence, Nagumo requested the PA20M be modified so that pitch

could be changed arbitrarily on-site. As the result, Mitsubishi Electric developed software to change the parameters and offered it to Nagumo. This made it possible to easily perform pitch offset adjustment on-site. Incidentally, the pitch offset function is now a part of the standard specifications of Mitsubishi Electric EDMs.

Meanwhile, Yokoyama made a request to increase EDM processing accuracy even more: "Recently, the processing accuracy of cutting machines is increasing, and dies that conventionally could only be manufactured on EDMs can now also be manufactured on cutting machines. Nagumo is exerting efforts to improve processing accuracy with every approach possible. As such, I expressed my earnest desire for Mitsubishi Electric to develop EDMs with even higher accuracy." For Nagumo Seisakusho, pursuit of accuracy is indeed unstoppable.



The "Inspection Room" contains various measurement devices, including a CMM and laser microscope.



Nagumo Seisakusho Co., Ltd.



“Changing tomorrow with meticulously made dies” – Endeavoring to pursue advanced processing that “sticks out”

◀ Hiroshi Yonemasu

CEO & President

Profile

1958 Born in Joetsu-shi, Niigata Prefecture
 1984 Joined Nagumo Seisakusho
 2016 Appointed CEO and president

— Please walk us through Nagumo Seisakusho’s history once more.

Yonemasu : In 1947, we were founded as a manufacturer of document organizing trays that were by stamping plant fiber. After that we focused on sheet metal stamping to make exterior metal plates and other components based on orders from stove manufacturers. However, in 1970, we were approached by a major precision device manufacturer to make components for integrated circuits. At that time, we decided to expand into the production of precision components for electronics devices and semiconductors.

— The company currently specializes in dies, is that correct?

Yonemasu : Up until the 1980s, Nagumo’s performance improved steadily in line with the advancement of Japan’s electronics industry. However, every year we were being demanded to lower the price of our mass-produced components by a certain percentage. So, we were busy but not making a profit.

Afterwards, when Japan’s bubble economy burst in the 1990s, the

electric/electronics products manufacturers who were our customers began aggressively relocating their factories overseas. We could see that the production of electronic components would also shift overseas.

Believing this situation would ultimately result in Nagumo’s orders tapering off if left as is, we stopped manufacturing electronic components using presses, and concentrated solely on the manufacturing of dies for electronic components. Our assumption was that, even if overseas factories were capable of mass-producing electronic components, manufacturing high-accuracy dies would be difficult. For many years, we’d made dies in-house for the purpose of electronic component production, so we’d accumulated a lot of know-how on precision die manufacturing.

However, Nagumo was also hit hard by the collapse of the IT bubble in 2001. Components for electric, electronics, and semiconductor products accounted for around 60-70% of our sales, and the demand for these dropped suddenly.

Accordingly, we began looking for a new field and expanded into dies for automotive parts. Currently, Nagumo’s primary focus is manufacturing die components and dies for automotive parts.

— Meanwhile, the price competition for automotive parts is growing quite fierce too, isn’t it?

Yonemasu : Nagumo has steadily built a reputation for itself in the world of dies for automotive parts due to our long-standing and thoroughly uncompromising stance on accuracy.

While automotive parts require durability and reliability, they don’t need to have the high accuracy require for semiconductor parts. However, a movement emerged to improve fuel efficiency and extend the service life of automobiles through the sophistication of vehicle performance, and raising the accuracy of engine parts and other components. With the request for parts with higher accuracy parts coming from our customers, accuracy, Nagumo’s precision die technology began attracting attention. For this reason, so far, we’ve been able to avoid the need to compete on price.

A deeply rooted corporate culture of pursuing high accuracy

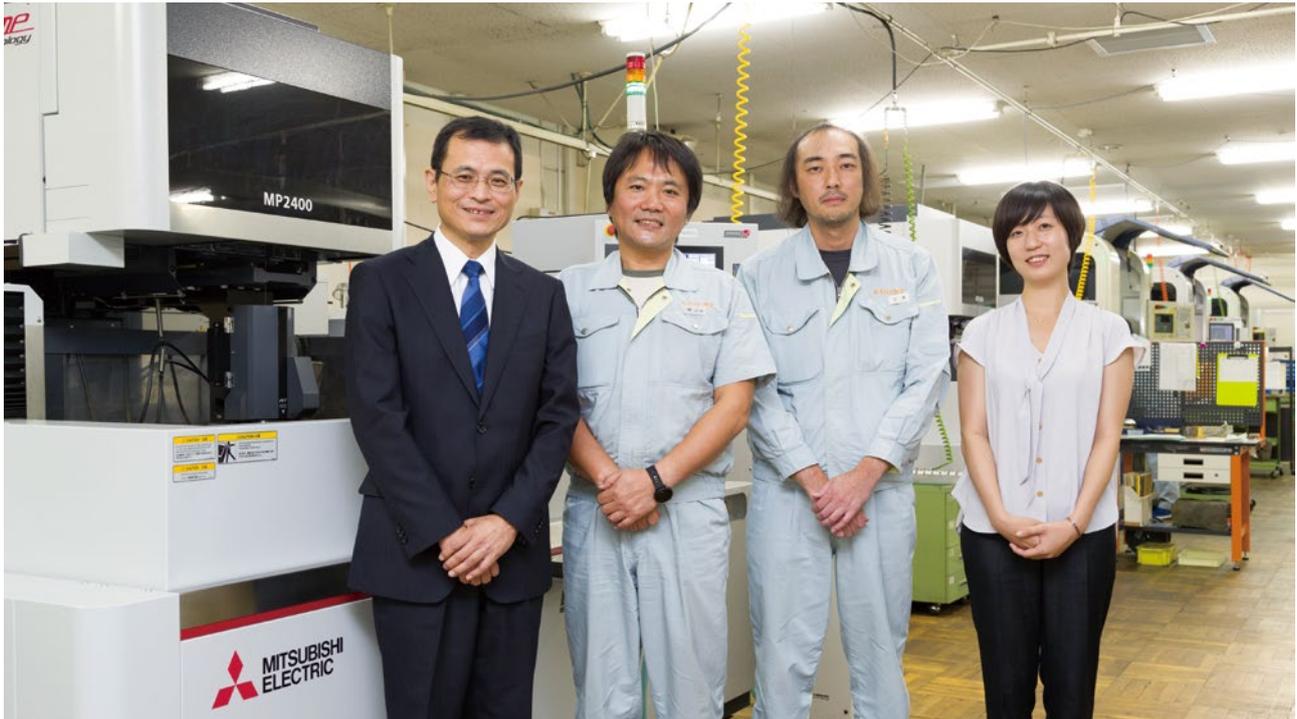
— So Nagumo’s uncompromising stance on accuracy is its strength?

Yonemasu : We have always been a company focused on quality. Our corporate culture of “Aim for zero error” is deeply rooted.

When a new employee starts on the production line, they get a real sense of how their senior colleagues aim for zero errors in all aspects, and



SH12 – Mitsubishi Electric’s fine-hole drilling EDM delivered to Nagumo in July 2018. Here, an operator is making adjustments prior to processing.



Second from left) Kei Yokoyama, manager of the Manufacturing Dept., to his right is Takehiko Yazawa and on the far right is Ideno – sales representative of Mitsubishi Electric.

this becomes the natural way of doing things. By nurturing new employees in such an environment, they ultimately contribute to the zero error philosophy themselves. Of course, Nagumo also promotes various activities to increase production efficiency. However, the premise of this is still “aiming for zero error.” At Nagumo, there is no such thing as “over specification.” We will never lower our quality standards simply to increase production efficiency.

— **Nagumo even proactively introduces high-cost processing machines to its operations, doesn't it?**

Yonemasu : For a certain period of time, we had to be careful about equipment investment. But, essentially, new processing machines offer high accuracy and efficiency, so adding these to our operations increases the amount of work we

receive. This generates profit, so we can buy the latest model again, thus increasing work even more, and creating a virtuous circle.

— **Please share Nagumo's future direction with us.**

Yonemasu : Moving forward, Nagumo's theme will be “Changing tomorrow with meticulously made dies.” I don't think our technologies stick out compared to those of other companies. However, I believe that, in order to progress further, it will be necessary to both further strengthen our design capability and devote our resources to pursuing advanced processing that “sticks out” and is extremely difficult for others to perform well.

The theme of “Changing tomorrow with meticulously made dies” contains the message that “Nagumo's thorough, uncompromising processing will help your company generate profit and

change tomorrow.” We want to be a company that does not simply do the work our customers request of us.

Rather, we would like to travel down a unique path by engaging in development-type work so that we can be a company that “sticks out,” and can present proposals to customers, making them think that we are the only ones they want to entrust their work to.

If a company merely continues to do the same thing, it will eventually wither away. We must constantly change. Therefore, development-type work is necessary. As such, we set up a new organization to respond to such work.

Corporate Data

Nagumo Seisakusho Co., Ltd.

Head Office

5823-1 Sanwakuno, Joetsu-shi, Niigata Prefecture, Japan

No. of employees

Approximately 100 employees

Main businesses

Manufacturing precision dies for automotive parts and electronic components

History

1947 Founded as Nagumo Fiber Kakoshu
1958 Reorganized as Nagumo Seisakusho Co., Ltd.

1970 Migrated to fabrication of precision stamping dies

1991 Newly constructed Sanwa Factory
2008 Selected as one of the “Best 300 of Energetic Small and Medium-sized Enterprises in Japan” by the Small and Medium Enterprise Agency

2016 Received the “Good Company Award” sponsored by the Medium and Small Business Research Institute



Sanwa Factory's “Big Factory” packed from floor to ceiling with various processing machines, including machining centers, grinders, and lathes.



First company in the Kyushu region to introduce laser processing machines and respond to the demand for high-mix, low-volume orders with integrated production

Kasyu Co., Ltd. was the first company in the Kyushu region to introduce laser processing machines. Currently, the company supports high-mix, low-volume orders with integrated production, including sheet metal, machining, welding, painting, and assembly.

Kasyu was established in the city of Kita-Kyushu in 1969 as “Kasyu Kogyo,” a company selling secondary steel products and casting products. The company name changed to its present-day state in 1971, and precision welding of steel plate began. In 1984, the company established a laser processing laboratory, introduced Mitsubishi Electric CO₂ laser processing machines, and began precision laser machining.

CEO and President, Rokujin Teramoto, commented, “Those were early days for laser processing machines, and various companies had started to enter the business. If we were going to invest in expensive machinery, I wanted a product we could trust and that also offered after-sales service. That’s why I chose Mitsubishi Electric’s laser processing machines.”

“Back then, we carried out cutting

trials for anything and everything, from ceramics to plastic. When we tried to cut PVC, chlorine gas was emitted, causing the sheet metal and machine to corrode and throwing us into chaos. When we tried cutting brass, the laser lens broke due to reflection, and so forth,” laughed President Teramoto. Even though Mitsubishi Electric had only just launched its laser processing machine business, we gradually gathered machining know-how through regularly communicating with our Mitsubishi Electric representative.

At that time, there were few other companies in the Kyushu region that owned laser processing machines. So, many people visited us just to see it, and that led to good publicity for Kasyu. Until then, steel plate and stainless plate machining had depended on the skill of the individual operator. But it became widely recognized that laser

processing machines were capable of not only high-speed, but also high-accuracy machining, which led to an inundation of orders. Due to such high demand, just a year later, we decided to purchase and install our second laser processing machine.

Initially it was a job shop performing laser processing based on orders received from corporate clients. But requests such as bending and machining gradually increased, so we introduced various processing machines to meet the demand. In 1989, we opened a precision sheet metal factory. Presently, this factory is equipped with an integrated production system covering everything from cutting, to sheet metal working, bending, welding, and painting. President Teramoto shared his company’s management policy: “In the past, we have had several painful experiences due to significant economic downturns. Because we have felt the deep impact of only dealing with clients in a particular industry sector, we now receive orders equally from a broad variety of industries.”

Kasyu currently does business with around 600 companies west of the Kanto region, and 200 or so of these place regular monthly orders. In addition to high-accuracy machining, the company’s strengths are the fact that it can machine large-sized products, special materials and products requiring special machining methods, as well as respond to high-mix, low-volume production with as many as several tens of thousands of varieties each month.



Mitsubishi Electric delivered a ML3015eX-F60 6kW fiber laser processing machine to Kasyu in March 2017. It features a zoom head that significantly reduces set-up changeover time.



The NO.1 Company factory that oversees the processing of ferrous, non-ferrous, and non-metal materials. In addition to three laser processing machines, the company also owns a waterjet processing machine.

After-sales service is an important factor when selecting a manufacturer

To date, Kasyu has introduced 16 laser processing machines, the majority of which are made by Mitsubishi Electric. Keisuke Shimohata, who serves as a general manager at No. 1 Company, which oversees the processing of ferrous, non-ferrous, and non-metal materials, says one of the reasons he prefers Mitsubishi Electric is because its after-sales service is superior to other companies: “Mitsubishi Electric’s service personnel respond immediately when I contact them with an issue. Some rival companies have a shortage of service personnel, so it can be hard to get a hold of them.

Much of my work is on a very tight schedule, so swift after-sales support is an important factor when selecting a processing machine manufacturer. Another reason we have introduced a number of Mitsubishi Electric products to our line is the fact that we can consult with experts about processing methods.”

Currently, there are three Mitsubishi Electric laser processing machines in operation at NO. 1 Company. The latest model is the ML3015eX-F60, a 6kW fiber laser processing machine introduced in 2017. At the same time, the company introduced a 15-step stocker system capable of automatically loading/unloading workpieces. It has a two-station type system featuring two workpiece loading/unloading docks, enabling unmanned

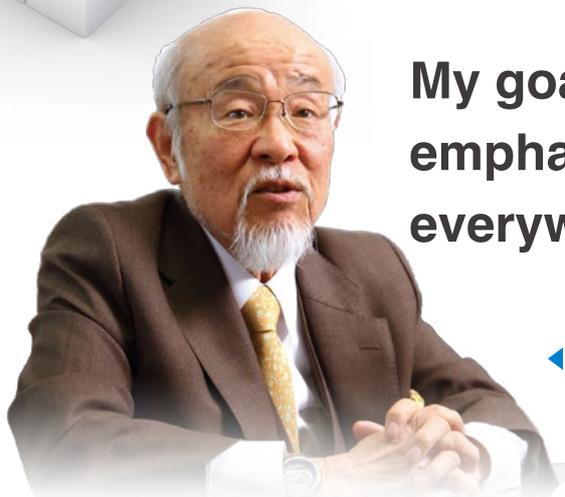
machining of a large-volume of workpieces. Shimohata explained, “We selected this laser processing system because it offers high-speed and automatic processing.”

President Teramoto added, “Our policy when introducing new processing machines is ‘strategic machines.’” His definition of a “strategic machine” is a processing machine capable of processing workpieces previously not possible, combined with being able to do so with high accuracy on a whole new level and with a high efficiency that conventional machines could not even begin to compare with. He emphasized, “By using strategic machines capable of processing workpieces that other companies can’t imitate, we can run our company unaffected by price competition.” Shimohata spoke of the benefits of introducing the ML3015eX-F60: “We can offer high-speed processing up to ten times faster than conventional models depending on the steel plate type.”

The ML3015LZP, a 3.6kW CO₂ laser processing machine introduced in 2001, and the ML3015LV40CF, a 4kW CO₂ laser processing machine introduced in 2004, are both still in active service. The ML3015LZP is ideal for processing products not requiring relatively high accuracy, while the ML3015LV40CF is used for processing express-order products and one-off products.



The 15-step stocker system introduced at the same time as the ML3015eX-F60. It automatically supplies sheet metal to the laser processing machine, and then automatically unloads the machine once processing is complete.



My goal is a “Shinkansen-type” company that emphasizes “business opportunities exist everywhere” during employee training

◀ Rokujin Teramoto

CEO & President

— **Kasyu upholds a unique management philosophy, “Be Moved, Have Pride, and Prosper,” doesn’t it?**

Teramoto : People have a right to happiness. It is a company’s duty to bring such happiness to its employees. It takes money to raise employee benefits and enrich welfare schemes. As such, the company must increase its profits and prosper.

We often talk about customer satisfaction, but employees who are not happy cannot satisfy customers. Making employees happy leads to customer satisfaction, which in turn leads to profitability for the company.

Of course, money isn’t the only important factor. In order to sense happiness, moments when we are moved to the extent it reaches our very souls through interaction with the essences of goodness, truth, and beauty, are also important. Just how we are moved when we watch a good movie, we are also inadvertently moved when we meet a senior worker in the workplace who

we can respect.

When we are moved in this way, we are also inspired to be better ourselves and strive to grow. We sense pride as we hone our capabilities. If individual employees’ capabilities increase, the company will prosper, we can contribute to society through paying taxes, purchasing things, and employment, and this will lead to prosperity of the region. That is what Kasyu’s management philosophy embodies.

— **I’ve heard that Kasyu exerts great effort to emphasize this in employee training.**

Teramoto : My aim is a “Shinkansen-type” company that advances with the combined strengths of each employee, rather than a locomotive-type concept where one person pulls everyone else. That is why we exert so much our efforts to train employees.

For example, I have some employees complete external management training over the course of six months. I believe “reading,

Profile

1948	Born in Kita-Kyushu-shi, Fukuoka Prefecture
1973	Joined Kasyu Kogyo
1976	After company name change to Kasyu Co., Ltd., appointed Senior Managing Director
1988	Appointed CEO & President

writing, and arithmetic” are the fundamentals in acquiring the ability to think. During this six-month training, participants must read 100 books and submit book reports. I am quite the book reader, myself. That’s because I believe our knowledge is not sufficiently broad if we only learn from experience. Knowledge is the driving force of activities.

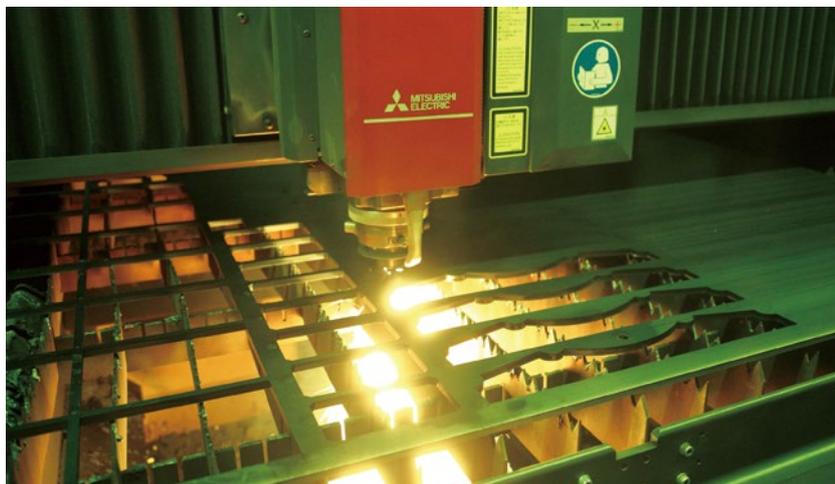
I also have employees participate in management role-playing training. This is a management simulation game where each employee pretends they are the president of a company, and cannot win unless they master marketing, R&D, training, IT/equipment investment, balance (BL) sheets, profit & loss (PL) statements, cashflow calculation sheets, and so forth. By participating in this game, employees can see the dividing line between profit and loss in their own work and learn to work autonomously.

This training is mandatory for management-level employees, but also open to any employee who expresses interest. Ultimately, I’d like all employees to participate.

Avoid the “Red Ocean,” head toward the “Blue Ocean”

— **Kasyu introduced the first laser processing machine to its lines in 1984. That’s very early days considering Mitsubishi Electric released its first laser processing machine in 1982.**

Teramoto : That is because my late father, a former company president who passed away in 1983, told me, “Laser processing is the future.” I



ML3015eX-F60 processing sheet metal. Provides high-speed processing up to ten times faster than conventional models depending on the type of steel plate.



Keisuke Shimohata, general manager at No. 1 Company is pictured on the left. Hiroyuki Tominaga, Senior Manager of the Kyushu Industrial Automation Machinery Marketing Division, Mitsubishi Electric, is pictured on the right.

consulted with my mother, our second president, and plunged into the field with the decision to purchase a laser processing machine.

At first, it was a lucrative business to be in because hardly any other companies were offering laser machining. However, after a while, we began to develop a sense of crisis. At first, we could attract work at the prices we requested as there was no competition. But our competitors began introducing laser processing machines and price competition began. Moreover, the processing machines our rivals purchased at a later stage were the newest products, and therefore superior in terms of performance and user-friendliness, and relatively less expensive.

With an impending sense of crisis, I visited customers, and over half of them voiced their desire for us to take on downstream processes too. Believing this to be a golden opportunity, we began precision sheet metal processing in 1989. We



Removing a sheet metal workpiece that has been processed. The company processes sheet metal with thicknesses of 3.2-16mm in the ML3015eX-F60. It can also process material up to 25mm thick.

also began receiving requests for making stands, painting, and so on. So, we purchased a 5400-tsubo (approximately 18,000m²) block of land in Usa-shi, Oita Prefecture, and built Usa Factory which housed a 5-face processing machine, and a painting machine to offer customers the services of machining, painting, and so on. This plant began operation in 1998. Because we then had the capacity to perform machining, after some time we began making the manufacturing machines we used ourselves in-house.

Nowadays, we also make electronic components and manufacturing equipment as an OEM. We also make freeze-dry units, etc. in-house for products of our healthcare business. As an OEM, we also produce electronic doors for plant factories to prevent water penetration in to building at the time of flooding.

— In closing, please tell us your future plans.

Teramoto : Our aim is to be a major player in the general health industry.



Mitsubishi Electric ML3015LZP, 3.5kW CO₂ laser processing machine introduced in 2001. Still actively being used 17 years later.

The metalworking and healthcare departments have joined forces to develop new products one-after-another and sell these via mail order.

By obtaining the ability to make anything, we want to avoid the “Red Ocean” of desperate, cutthroat competition where we are busy but not profitable, and instead do work in a “Blue Ocean,” where we don’t need to compete on price. I believe that business opportunities exist everywhere.

■ Corporate Data

Kasyu Co., Ltd.

Head Office

2-24-10 Minami-futajima, Wakamatsu-ku, Kitakyushu-shi, Fukuoka Prefecture, Japan

No. of employees

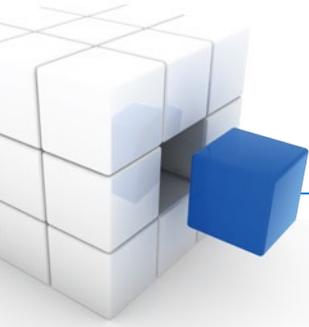
44 (as of May 2017)

Main businesses

Metalworking, health care

History

- 1969 Established as Kasyu Kogyo, a dealer of secondary steel products and casting products
- 1971 Changed company name to Kasyu Kogyo and began precision welding of sheet metal
- 1976 Incorporated and name changed to Kasyu Co., Ltd.
- 1984 Established a laser processing laboratory and began precision laser processing
- 1989 Built a precision sheet metal working factory and began precision sheet metal working
- 1996 Significantly expanded company's precision laser processing division
- 1998 Built Usa Factory in Usa-shi, Oita Prefecture and began cutting/painting operations
- 2017 Introduced a fiber laser processing machine



SIMOZATO Simozato Kogyo Co., Ltd.

A long-standing company boasting a 100-year plus history as a one-stop service provider for storage, processing, and delivery of section steel and steel plate

Located in Kobe-shi, Simozato Kogyo Co., Ltd is a long-established company providing one-stop services including cutting, bending, machining, welding, 3D measurement, and delivery of section steel and steel plate. Simozato operates three Mitsubishi Electric laser processing machines equipped with automation systems.



Simozato Kogyo is a company backed by a century of history specializing in the processing and sales of section steel and steel sheets. It opened its doors in Kobe-shi as a section steel wholesaler in 1913. Later, as the city of Kobe became increasingly involved in shipbuilding and heavy industry, Simozato began dealing in steel plate, and in the 1960s, expanded into the processing business. Currently, its flagship business is the canning of medium-thickness steel plates for construction and other applications, and steel sheet processing and sales, and is exerting efforts to expand business leveraging its strengths as a one-stop service provider of storage, cutting, bending, machining, welding, inspection, and delivery of section steel and steel plate.

processing machine in 2000. The fourth CEO and president, Yoshihiro Yasuda, explained, "At the time, our one-and-only method for cutting steel plate was gas cutting. But then we saw a high-output laser processing machine capable of cutting medium-thickness plate enter the market, and our former president/present-day chairmen, Osamu Yasuda, made the decision to purchase one believing that laser precision processing using laser technology would be essential in the future."

The company installed a ML13030-5036D, Mitsubishi Electric's 3.6kW CO₂ laser processing machine. President Yasuda explained the reason why his company chose this machine: "Mitsubishi Electric doesn't simply manufacture the processing machine unit itself, but the laser oscillator as well. So, if any issues arise, they always respond swiftly and with a sense of duty." Afterwards, Simozato added a total of five laser processing machines to its operations, and all were made by Mitsubishi Electric.

President Yasuda stated the

reason for this: "We have a high regard for these machines due to their performance and the after-sales service of the laser processing machine itself. But the most significant factor for us is that Mitsubishi Electric presented a proposal for an automation system that was ideal for our factory."

Simozato's head office and main factory, which spans a broad area of approximately 6,300m², is filled from floor to ceiling with equipment to enable one-stop integrated production, including processing machines, machining centers, press brakes, welding robots, and CMMs. In order for steel plate to be cut efficiently night and day without taking up too much space, automation systems that automatically load and unload steel plate into laser processing machines are essential.

At the time of introducing the second laser processing machine in 2004, the ML3015LVP-40CF, a 4kW CO₂ laser processing machine, President Yasuda commented, "When we made the request that we wanted a system able to load as many steel plates as possible, Mitsubishi Electric responded with such sincerity, and proposed a 12-step pallet sheet changer that was not standard specification at the

Introducing an automation system for effective utilization of factory space

Simozato installed its first laser



ML3015eX-F60, the 6kW fiber laser processing machine installed at Simozato in 2017. It features Japan's first twin tower-type pallet changer (10-steps + 12 steps).



The staff members in charge of laser processing. Third from the left is CEO and president, Yoshihiro Yasuda. To his left is shop floor leader, Naokazu Takimoto, section manager of Manufacturing Sections 1 & 2 of the Manufacturing Department.

time.”

Currently, there are three Mitsubishi Electric laser processing machines in operation at Simozato’s head office and main factory, and all are equipped with automation systems. The ML3015LVP-45CF-R, a 4.5kW CO₂ laser processing machine introduced in 2010, features a 15-step pallet changer. The ML6030XL-45CF-R, a 4.5kW CO₂ laser processing machine introduced in 2012, can handle large steel plates up to 6100x3050mm and is equipped with a 12-step pallet changer. The ML3015eX-F60, a 6kW fiber laser processing machine introduced in 2017, offers Japan’s first twin-tower pallet changer combined system (10-step + 12-step).

Introduction of a fiber laser processing machine to reduce power consumption and minimize oxide film

As explained by President Yasuda, “Simozato introduced a fiber laser processing machine to its line with the aims of “reducing power consumption and minimizing the occurrence of oxide film on the cut surface.” This was because, if an oxide film forms on cut surfaces, it has to be removed manually, which requires time and effort. If nitrogen is used as the assisting gas, oxide film can be minimized as well. However, in addition to this, the high-output fiber laser machine facilitates

high-speed processing. This significantly reduces power consumption compared to that used by a CO₂ laser processing machine.

Moreover, as Naokazu Takimoto, section manager of Manufacturing Sections 1 & 2 of the Manufacturing Department, stressed, “Another major reason we chose this processing machine was due to its zoom head, which eliminates the need for head replacement, and D-CUBES, the new control unit enabling touch-panel-like operations.”

In line with installation of the ML3015eX-F60, Simozato also introduced “iQ Care Remote4U,” a remote service making it possible to confirm the operating status of processing machines from an off-site location. This increased the level of assurance as workers could monitor equipment operating status from

anywhere. Furthermore, President Yasuda commented, “If we incorporate remote service data into our production control system, for example, we can potentially understand the trends of what kind of problems occur when a particular type of processing is performed. Moving forward, I’d like to see this remote service help improve our operating ratio.”

One outstanding issue identified is the automation of downstream processes. With the introduction of an automation system, the processing work itself has been automated; however, it is still necessary for a human worker to perform disassembly. President Yasuda voiced his earnest desire, “I would really like Mitsubishi Electric to offer a solution that automates disassembly work.”



ML6030XL-45CF-R, a 4.5kW CO₂ laser processing machine capable of handling large steel plates up to 6100 x 3050mm. This machine is also equipped with a 12-step pallet changer.

State-of-the-art equipment is essential to accurately meet the diversifying needs of customers



◀ Yoshihiro Yasuda

CEO & President

Profile

1974 Born in Kobe-shi, Hyogo Prefecture
 2001 Joined Simozato Kogyo Co., Ltd.
 2007 Appointed Senior Managing Director
 2017 Appointed CEO & President

— **Is it true that when Simozato was founded, it was a steel wholesaler?**

Yasuda : These days, processed steel plate accounts for the greater percentage of our sales, but we still value our wholesale business for shaped steel and steel plate. By continuing our role as a wholesaler, we have materials in our inventory, meaning that we can deliver orders with a short turnaround. I believe this is one of the strengths Simozato offers.

— **Later on, Simozato installed various processing equipment and became a one-stop service provider. What was the motivation behind this?**

Yasuda : I'd worked at a trading company prior to that. At the time, I gained a real sense of how much time and effort was required to arrange different service providers for everything from various processing to delivery. It made me think to myself that if there was one company that could do it all, that's who I would place my orders with. Because this

would mean a shorter turnaround time too. Based on that experience, I really wanted to establish a one-stop service. So, when we built the new head office and main factory in 2007, we installed various equipment.

Rather than having to issue steel plate orders, cutting orders, bending work orders, and welding orders to multiple specialized companies, customers could now ask Simozato to provide an integrated, all-in-one service; meaning they could receive their order with a short turnaround. We even have our own truck for delivery, so we offer the flexibility of quick delivery of orders, even if requested to do so after-hours.

— **Your head office and main factory truly do have a lot of equipment in operation. Not just the laser processing machines, but also a lot of other equipment is state-of-the-art.**

Yasuda : Simozato has a history spanning more than 100 years, and it may be slightly conservative due to that fact. However, if we simply maintain the status quo, we will lose

customers and that's a scary thought.

Customers' needs are diversifying. Our main focus is being able to accurately meet customers needs swiftly when they ask us if we can do something. For that reason, state-of-the-art equipment is essential.

— **I hear Simozato is also proactive in terms of environmental initiatives, is that correct?**

Yasuda : Energy savings and resource savings are our basic focuses. One of the reasons we installed fiber laser processing machines was because they reduce power consumption, and we thought that would contribute to the environment as well.

Of course, there are also benefits from a management perspective. At the same time as introducing fiber laser processing machines to our production line, we changed all of the lights in our factory to LED. Consequently, the combined energy-saving effect of the fiber laser processing machines and LED lighting was a 20-30% reduction in the power consumed by the factory.

Advancing galapagosization with the hope of acquiring status as a "200-year-old company"

— **What do you think of Mitsubishi Electric's after-sales service?**

Yasuda : When we installed our laser processing machines, Mitsubishi Electric prepared a number of maintenance contracts tailored to our company specifically. These clearly showed which services were free and which required a fee, so we could



Simozato's head office and main factory is full of laser processing machines, machining centers, press brakes, welding robots, and CMMs.



From the left: Manager Takimoto and President Yasuda. To their right is Yukitoshi Shimamura, manager of the Laser Marketing Section, Industrial Automation Machinery Marketing Division, Kansai Branch Office, Mitsubishi Electric. To the far right is Hideki Taniguchi, general manager of Sales Department 2 of Hishii-Shoji Company Ltd.

enter the contract with a sense of reassurance. When trouble does arise on the processing machines, Mitsubishi Electric always swiftly comes to our aid.

— **Simozato is a long-established company with a history of more than 100 years. What is the future aim for the company?**

Yasuda : Simozato has always been a company dealing in the processing and sales of steel plate for various industries, such as construction, shipbuilding and heavy industry, as well as the processing and sales of steel plate for construction machinery, and we have constantly expanded our business fields to keep up with the times. Moving forward, our aim is to become a company that also provides parts prototyping services to customers.

Moreover, in a good sense, we'd

like to aim for “galapagosization.” Galapagosization means a product is positioned in a place set apart from world trends, and therefore tends to be portrayed in a negative light. However, if we look at it from a different angle, we could perhaps say that a company's strength could be possessing multiple galapagosized products. Galapagosization would mean an area where our company is overwhelmingly strong because we firmly meet all of our customer's elaborate requests and leave no room for other companies to enter. By listening carefully to our customer's voice, we want to increase these so-called “galapagosized” business areas where other companies can't follow. That's the vision I have for our company. In addition, I'd like to see us become a company that customers can rely on and think to

themselves, “If I leave the job in Simozato's hands, they'll do it right for me.”

I think Simozato is a sincere company. We don't say, “Yes, we can do that,” until we actually can do it. I think this frankness is the reason we have survived over a century; however, speed is also important.

Because we've been fortunate enough to last 100 years, we'd like to one day reach the ranks of a “200-year-old company.” That's because only a company that has lasted 100 years could aim to last 200 years. As the fourth company president, I do sense pressure. But, by combining sincerity and speed, I'm determined to keep pushing Simozato forward into the next 100 years.

■ Corporate Data Simozato Kogyo Co., Ltd.

Head Office
2-1-6 Murotani, Nishi-ku, Kobe-shi, Hyogo Prefecture, Japan

No. of employees
Approx. 90

Main businesses
Sale of general steel materials and secondary steel products, cutting, bending, welding, etc. of steel plate and various strip steel

History
1913 Founded a steel wholesale business in Kobe-shi
1948 Reorganized from sole proprietor to incorporated company as Simozato Kogyo Co., Ltd.
1968 Established Akashi Factory 1
2007 In line with the construction of the head office and main factory, relocated the head office and Akashi Factory's factory division to current location and integrated wholesale division in Akashi Factory



Utilization of CAD is essential in achieving a one-stop service. The company aims to hone its development and design capabilities so it can also offer prototyping services in the future.



NAKANIHON CASTING Co., LTD.

Production of high-quality, high-precision parts for automobiles and construction machinery by adding machining technologies to casting technologies



Based in Nishio City, Aichi Prefecture, for more than 70 years since its establishment, Nakanihon Casting Co., Ltd. has been manufacturing automobile parts and hydraulic parts for construction machinery as a manufacturer that conducts integrated production, from casting to precision machine processing. Approximately 40% of the machine tools used in its machining centers are equipped with Mitsubishi Electric computerized numerical controllers (CNCs).

One of the local industries in Nishio City, Aichi Prefecture, where Nakanihon Casting is headquartered, is "tristate casting". Starting in 1943 during World War II, it will celebrate its 75th anniversary next year.

Nakanihon Casting has been involved in the casting of shipbuilding parts since its establishment. Following the end of the war, it began producing daily necessities such as pots and rice kettles to make up for shortages. In 1946, it began producing parts for electric motors and sewing machines as a collaborative factory working with the Nagoya Works of Mitsubishi Electric Corporation. In 1961, it was listed on the Second Section of the Nagoya Stock Exchange as one of the first companies headquartered in

Nagoya. In 2007, the company newly constructed its Head Office Factory in Minato-cho, Nishio City, and moved in it from a building in front of Nishio Station on the Nishio Line of the Nagoya Railroad.

The company has been confident in its casting technologies since its establishment. In 1967, it constructed its Kira Factory in the town of Kira and began working on machining.

"The Kira Factory began machining parts for the electric motors manufactured at Mitsubishi Electric's Nagoya Works. At present, the Head Office Factory is in charge of casting and the Kira Factory is in charge of machining cast parts," explained Mr. Yoshio Torii, President, when discussing the roles of each factory.

Executive Managing Director Toshiya Kato explained, "Our company has only one casting plant. It basically operates 24 hours a day, and is reaching maximum production volume. However, will cost several billions of yen to expand the plant. At the scale of our company, having only 100 employees, it is difficult to make such a large investment." Accordingly, the company has recently been focusing on machining at the Kira Factory. About 20% of the cast metal products manufactured at the Head Office Factory, mainly hydraulic parts for construction machinery, is processed at the Kira Factory and delivered to suppliers.

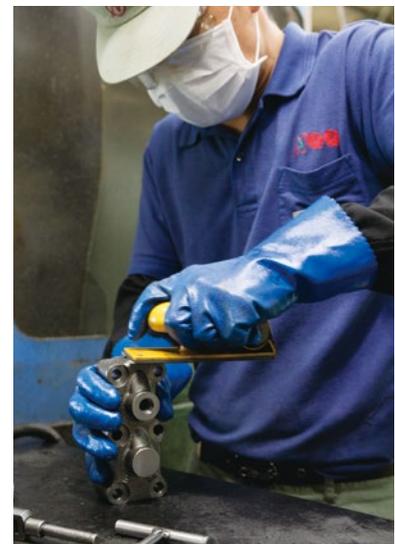
"Few foundry manufacturers the size of our company can provide everything from casting to machining.

Strengths of Integrated Production Systems – From Casting to Machining

Currently, the company's main products are automobile-related parts and parts for construction machinery. It supplies cast parts such as water pumps, exhaust and hydraulic components, camshafts, and differential gear cases to automobile parts manufacturers, which accounts for about half of the company's total production. Construction machinery manufacturers mainly procure hydraulic components from it. The company said its earnings have been brisk recently due to the strong demand for construction machinery parts in China.



Nakanihon Casting has been a user of Mitsubishi Electric CNCs for 30 years. The photo shows a CNC purchased and installed in a machining center about 20 years ago. The CRT has been replaced by a LCD.



The finished product is completed after manual deburring and rust prevention processes.



The Kira Factory of Nakanihon Casting has a line of lathes and machining centers. About 80 machine tools are in operation. About 30 of them are equipped with Mitsubishi Electric CNCs.

We have heard from customers that it is more efficient to deliver products after machining. This can be said to be our company's strength," commented Yoshihiko Torii, Director, Corporate Planning Dept..

About 80 machining tools, including lathes and machining centers (MCs), are in operation at the Kira Factory. About 30 of them are equipped with CNCs made by Mitsubishi Electric. "It has been almost 30 years since we started using machining tools equipped with Mitsubishi Electric CNCs," Torii added.

Mitsubishi Electric Mechatronics Engineering Co., Ltd. (MMEG), a Mitsubishi Electric group company, is in charge of after-sales service for the company's CNCs. Nakanihon Casting has an annual maintenance contract with MMEG for all machine tools used with Mitsubishi Electric CNCs. Under the contract, MMEG technicians visit the company immediately to replace or repair parts in the event of mechanical problems.

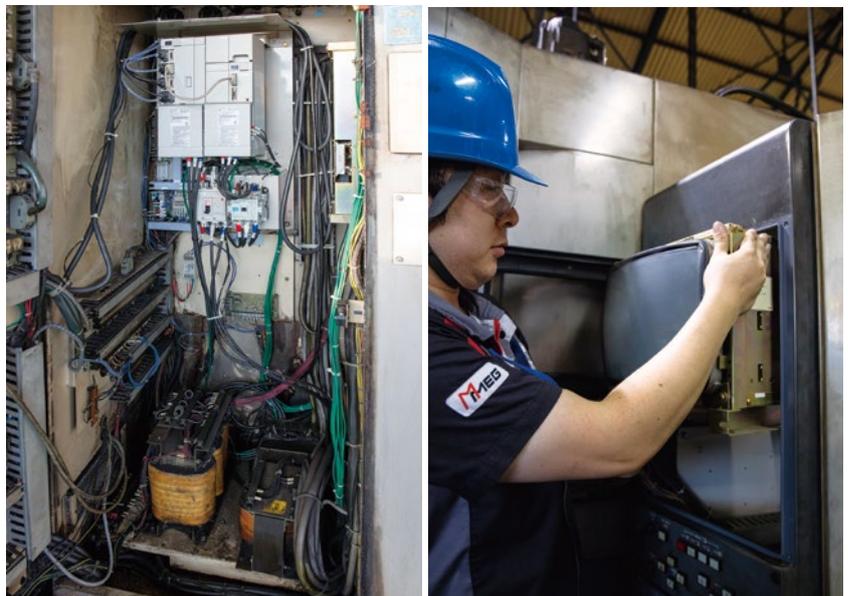
Evaluation of quick response for older model maintenance and after-sales service

Kenji Miyachi, Maintenance Section, Machining Dept., Fabricated Products Department, praised

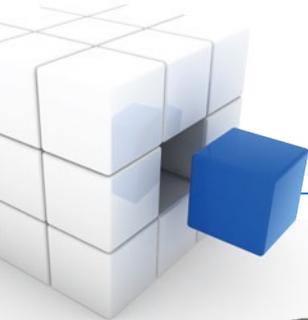
MMEG's services, stating, "They are faster than our competitors. They have been taking care of issues on the day it happens for a long time. Since we have known each other for a long time, it is easy to ask them anything, and they will listen to me even if I say something unreasonable. Additionally, since we have accumulated past repair history data, it is convenient that we can understand a machine's condition, such as when we CNC maintenance is needed."

Mr. Kato commented, "I am grateful that MMEG is actively responding to the renewal of old machine tools.

MMEG offers renewal plans, such as "NC Replacement", "Main Spindle Replacement" and "Machine Overhaul". Up until now, Nakanihon Casting had the main spindle motor of a machine tool and its controller replaced about 20 years ago. Recently, the company is actively using MMEG services to replace the CRTs on its CNCs with LCDs.



Many machine tools have been revived by MMEG through renewal. On the left is a machine tool that had the spindle and controller replaced. On the right, the CRT of a CNC was replaced by a LCD.



Our aim is to further increase the added value of our products by expanding the processing division, thereby contributing to the growth of the company.

◀ Yoshio Torii

President

Profile

1979: Entered NAKANIHON CASTING Co.,LTD.
 1983: Corporate Auditor
 1991: Director and General Manager of the Purchasing Department
 1995: Director and General Manager of the General Affairs Department
 1997: Managing Director and General Manager of the General Affairs Department
 2001: Assumed his current position

— I heard that your company is particular about the quality of casting. What is the difficulty of casting?

Torii : “The quality standards that customers require for castings are much stricter than before. Casting is made by pouring iron melted at a high temperature of about 1,400~1500°C (hereafter, ‘molten metal’) into a sand mold and cooling it. While the casting shrinks during solidification, it must still be manufactured to an accuracy of within ±1mm, taking the shrinkage into account.

Therefore, while the hardness and strength to receive molten metal when it is poured into a sand mold are required, the softness required to remove sand cleanly is also needed when the mold is separated. The quality also varies greatly depending on the ingredients of the iron scrap used as the raw material.

In addition, when hot molten metal enters the mold, the resin and moisture contained in the mold burn or evaporate, generating gas. If the

gas does not escape from the molten metal, bubbles remain in the product, producing what is called a “nest”, and the product becomes defective. It is impossible to do these things just by calculating. It requires skills and experience.”

— Employee education is important for casting, isn’t it?

Torii : “Regarding casting, there are some things that are taught and others that you have to learn through your own experience. For example, the result will change even if the difference in temperature is only 10°C. You have no choice but to take time to learn from your work. That’s why we focus on OJT, but of course, it is necessary to learn well from the basic courses too.

We provide opportunities to learn together with workers of the same age of other casting companies through outside training while actually engaging in work. There is an industry certification system called ‘Casting Engineer’, and we like our employees to acquire such a qualification and be trained

thoroughly.

— Then, how do you teach machining?

Torii : “Although casting and machining technologies are completely different, the importance of employee training of machining skills remains unchanged. While OJT is still the main activity, we are making efforts to actively participate in external courses offered by public institutions and the private sector.

Compared to casting, machining is easier to understand by looking at the contents and results of the work. So, it is easier to teach in that respect. However, advanced tasks such as designing jigs and programming are not immediately taught. Experience is necessary.”

Our goal is to increase sales by 25% and become our customer's partner as a parts manufacturer

— Business seems to be good these days.

Torii : “As a result of our efforts, net



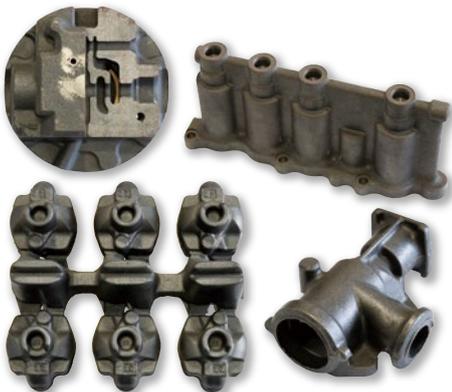
The Head Office Factory is responsible for casting. On the left is the pouring process and on the right is the cooling process. About 20% of the parts cast at the Head Office Factory are transported to the Kira Factory where they are processed with precision before being shipped.



Toshiya Kato (Managing Director) and Yoshihiko Torii (General Manager) of the Corporate Planning Office, are at the center and right, respectively. On the left is Seiichi Saito, Senior Engineer, NC Department, TOKAI Service Center, CENTRAL-JAPAN Branch Office, Mitsubishi Electric Mechatronics Engineering Corporation, Mitsubishi Electric Mechatronics Engineering Corporation, Mitsubishi Electric Mechatronics Engineering Central-Nippon Branch in charge of support, and on the right is Naoyuki Harada, Manager, NC Department, TOKAI Service Center, CENTRAL-JAPAN Branch Office, Mitsubishi Electric Mechatronics Engineering Corporation

sales for the fiscal year ending March 2017 increased approximately 16%, to 3.998 billion yen. Furthermore, we achieved better than expected results in the current fiscal year. Our mid-term plan is to increase sales to 5 billion yen. To this end, we must use machining to further increase the number of products with added-value.

It takes time and cost customers money to ask different companies to do casting and machining. We enable the entire process, from casting to machining, to be carried out at the same time, improving the efficiency for customers. This is our company's advantage.



An example of a finished cast part. The company specializes in automotive parts and hydraulic parts for construction machinery.

At present, most of our products, including machining, are parts for construction machinery, but we hope to expand this to include automobile parts.

Our most recent figures show annual sales of about 3.3 billion yen for the casting division and about 700 million yen for the machining division. In the future, we hope to expand our machining operations to 1 billion yen. If that happens, we can attain sales of 5 billion yen. In the future, we will be involved in the assembly of parts manufactured by casting and machining to further increase product added-value and grow the company."

We would like to utilize the advantages of being a listed company to regularly hire new graduates.

— To do so, it is important to secure human resources.

Torii : "Casting is a technique that is difficult to learn using only a manual. Recently, manufacturers in China and other countries have been improving their business performance, but we are confident that we are still technically competitive. However, in the future, it is essential to secure excellent human resources that

enable us to grow the company across the board.

This is why we began hiring university graduates in 2017. Three people joined the company this year. Recruitment is becoming more difficult these days. But being a listed company seems to have a great impact on job seekers as a reassuring factor. Taking advantage of this, we intend to continue to hire at least two college graduates every year.

Corporate Data

NAKANIHON CASTING Co., LTD.

Head office
6-6 Minatocho, Nishio-shi, Aichi Prefecture, Japan

URL
<http://www.nakachuko.co.jp/>

Annual sales
3.998 billion yen (Year ending March 31, 2017)

No. of employees
Approximately 100 employees (full-time employees)

Main business

Manufacturing, processing and assembly of cast parts such as automotive parts, hydraulic parts and power tool parts

History

1943 Founded as Nishio Casting Co., Ltd.
1961 Changed name to Nakanihon Casting Co., Ltd.
1961 Listed on Second Section of the Nagoya Stock Exchange
1967 Kira Factory constructed
2007 New Head Office Factory begins operations



Yanagawa Seiki Co., Ltd.

Taking up the challenge of a new manufacturing technique to offer both high-quality and low-cost automotive parts

Yanagawa Seiki supplies Honda, Nissan and other major automobile manufacturers with engine parts, transmission parts, and other components. The company is a long-standing customer of Mitsubishi Electric, and has been using Mitsubishi Electric computerized numerical controllers (CNCs) for 30 years.

Yanagawa Seiki is an automotive parts manufacturer that produces engine parts, transmission parts, differentials, suspension systems, and other automotive components. The company was founded in Fuchu-shi, Tokyo, in 1952. It initially focused on producing motorcycle parts; however, it opened a new factory in Suzuka (Mie Prefecture) in 1960, and began machining automotive parts there in 1963.

In 1965, the company built the Sayama Factory (Sayama-shi, Saitama Prefecture), which is one of its main factories, and began full-scale volume production of automotive parts. Moreover, in 1982, a new building was completed at the Sayama Factory, and began the mass production of manual

transmissions for automobiles. In the following year (1983), an aluminum die-cast factory was built on the same site.

The current flagship products of the Sayama Factory are automotive parts made from aluminum such as transmission cases and chassis frames, as well as transmission gears, front-wheel hubs, discs, and other components. General Manager, Production Management Division, Sayama Factory, Koichi Saito, described the current status: "Originally, Sayama Factory focused on manual transmission production. But due to a drop in domestic demand, it has now become the production hub of aluminum parts."

Yanagawa Seiki has used Mitsubishi Electric's FA devices for a

long time. Naohiro Ootani, Manager, Facilities Maintenance Section, Production Management Division, Sayama Factory, explained, "We highly regard the user-friendliness of Mitsubishi Electric's products, and its programmable controllers and graphic operation terminal (GOT) displays are designated parts of our equipment specifications. So, Sayama Factory has many of them in operation."

Moreover, Yanagawa Seiki has been using Mitsubishi Electric CNCs for 30 years. Sayama Factory has 12 CNC lathes made by FUJI (formerly Fuji Machine Manufacturing) that it purchased over 20 years ago, and these are still used for processing various front hubs of chassis systems.



First Honda's BT#40 Turret Center combined processing machine is used for machining the hollow aluminum subframe. It is equipped with a Mitsubishi Electric M70 CNC.



No. 1 Sayama Factory oversees manufacturing of aluminum die-cast parts.

The CNC introduced for controlling the lathes is Mitsubishi Electric's 320L. A company in the Mitsubishi Electric Group, Mitsubishi Electric Mechatronics Engineering (MMEG), oversees the after-sales service for CNCs.

Eiji Jinkubo, Assistant Manager, Facilities Maintenance Section, Production Management Division, Sayama Factory, commented, "It's not acceptable for an automotive parts production line to stop. As such, as preventive maintenance, we consulted with MMEG around 10 years ago, and had them carry out a full overhaul including inspection of all printed circuit boards and spare parts, and then make the necessary replacements. I think that measure was really effective because our line still operates today without any problems."

However, it simply isn't possible to avoid small-scale problems. As such, rather than seeking the help of MMEG, which always responds swiftly, the members of the Equipment Management Section perform simple repairs themselves. When doing so, "If we communicate the symptoms to MMEG over the phone, they immediately give us advice on which part we need to replace. Our CNCs are old, so it really helps to get precise answers on how to deal with them," said Jinkubo, praising MMEG's after-sales service.

Rising to the challenge of new monozukuri Praising the "error-proofing" function of CNCs

Yanagawa Seiki is currently challenging itself to achieve new monozukuri. Katsuhiro Shinkai, General Manager, QCD Manufacturing Technology Department, R&D Management Division, Sayama Factory explained the background of this move: "Yanagawa Seiki established a production base subsidiary in Thailand in 1992. However, recently some of our competitors are relocating to Vietnam to cut costs even further. Automobile manufacturers are expecting parts made in Japan to be competitive with parts made overseas in terms of cost. That's why we are constantly thinking creatively about how we can change manufacturing methods, materials, etc., in order to achieve both high quality and reduce cost."

The hollow aluminum subframe, for which volume production began in 2016, is a prime example of new



A FUJI-made CNC introduced by Yanagawa Seiki over 20 years ago. Overhauled Mitsubishi Electric 320L CNC.

monozukuri. The hollow aluminum structure is made using a thin integrated die and high-pressure die casting, offering the benefits of weight reduction and lower cost. This technology was highly praised, and consequently, as stated by Shingo Wakutsu, Manager, Corporate Administration Section, Administration Department, Administration Management Division, Sayama Factory "Together with Honda R&D Co. Ltd., Yanagawa Seiki received the Toyota Award from the Japan Foundry Engineering Society in 2017."

First Honda's BT#40 Turret Center, a combined processing machine, is used on the production line to machine the hollow aluminum subframe. In order to assemble the subframe components onto this part, which is completed using a high-pressure die casting process, holes must be drilled, tapped, and then milling performed to finish the surfaces. The BT#40 Turret Center accomplishes all of these processes, with the help of a Mitsubishi Electric CNC. Shinkai commented, "The people in charge of the Production Engineering Division highly regard this CNC due to its reliable error-proofing function. For example, if the program is changed mid-way through, sometimes the offset values memorized by the CNC change, and that can lead to processing mistakes. However, production personnel say that this kind of mistake is avoided when using a Mitsubishi Electric CNC."

Responding to environmental changes by making company's strength in aluminum technology its core business

◀ Koichi Saito ▶

General Manager
Production Management Division
Sayama Factory

Profile

Born 1964. Joined Yanagawa Seiki in 1983. Appointed president of Yanagawa Techno Forge Thailand in 2008, president of Thai Yanagawa in 2013, and now General Manager, Production Management Division, Sayama Factory since 2015.

▶ Katsuhiro Shinkai ▶

General Manager QCD Manufacturing
Technology Department R&D
Management Division Sayama Factory

Profile

Born 1966. Joined Yanagawa Seiki in 1990. Assigned to Yanagawa Techno Forge Thailand in 2011, and now General Manager, QCD Manufacturing Technology Department, R&D Management Division, Sayama Factory since 2016.

— I've heard Yanagawa Seiki's policy is to focus even more effort on aluminum automotive parts from here on.

Saito : In our mid-term management plan "Yanagawa Growth 10" announced in FY2017, we stated one of our goals as being "Making our core business aluminum technology that realizes reliable quality and uniqueness." Presently, the waves of hybrid vehicles (HVs) and electric vehicle (EVs) are washing over the automobile industry. In line with this, we are seeing changes occur related to engine parts and powertrain parts.

Until now, Yanagawa Seiki has manufactured manual transmission gears and cases, chassis parts, and other components at the request of automobile manufacturers, and assembled transmissions. However, due to changes over time, the

production volumes of some of these parts have fallen. In order to continue growing our business, we must advance monozukuri that corresponds to future needs.

The appealing point of HVs and EVs is that they are environment-friendly, and there is strong demand for reducing their weights so that they can travel longer distances. In response to such needs, we believe the best approach is to aggressively enter the aluminum field in order to leverage company strengths.

Shinkai : A prime example of this is the forming of a hollow aluminum subframe made using high-pressure die casting. In order to make this part hollow, a sand core is placed inside the die cast, and then the sand is completely removed after casting to leave a hollow center.

The conventional subframe was made by welding steel-pressed parts together; therefore, it weighed 12-13kg, and more manufacturing processes were involved. However, with our hollow aluminum subframe, not only is the design integrated as the result of die casting, but it also offers the merit of weight reduction due to weighing 5kg less than the conventional subframe.

Some cars use aluminum subframes; however, these are either open-type or made using a welding process. The advantage of hollow center integration is that the part maintains strength at the same time as being lightweight; making it the lightest subframe in the world at this point in time.

The die-cast manufacturing method is also different. Aluminum subframes manufactured by other companies are made using gravity casting. However, Yanagawa Seiki's hollow aluminum subframe uses the highly productive method of high-pressure die casting to enable production in a short period of time. This technology is our strength, and all of our aluminum parts are made using this high-pressure die casting method. Even the production of hollow aluminum subframes at the Sayama Factory utilizes a high-pressure die casting machine.

In terms of making aluminum technology our core business, apart from the hollow aluminum subframe, as shown by our inverter cases and battery cases, we are challenging ourselves with products that are extremely difficult to manufacture using the high-pressure die casting



A hollow aluminum subframe made in a high-pressure die casting machine. After this, the part is machined on a turret center.



From the left: Wakutsu – Manager, Corporate Administration Section, Administration Department, Administration Management Division; Jinkubo - Assistant Manager, Facilities Maintenance Section, Production Management Division; Ootani – Manager, Facilities Maintenance Section, Production Management Division; Shinkai - General Manager, QCD Manufacturing Technology Department, R&D Management Division; and Saito - General Manager, Production Management Division. Pictured on far right: Atsuya Suzuki – support representative of Yanagawa Seiki and Manager, NC Section, KANTO Service Center, EAST-JAPAN Branch Office, Mitsubishi Electric Mechatronics Engineering Corporation (at the time).

method due to their complex shapes, such as making internal waterways and heatsinks. Mass production of such parts has already begun at the Kameyama Factory.

**Adoption of PHVs following the wave of FCVs
Aiming to expand vehicle models built with our products**

What kind of vehicles are hollow aluminum subframes found in?

Saito : This part was first used in the production of Honda Motor’s “Clarity Fuel Cell,” a mass-production fuel cell vehicle (FCV) released in 2016. After that, it was also used in the production of the Clarity Plug-in Hybrid” a plug-in-hybrid vehicle (PHV) pre-launched by Honda in the U.S. in 2017. Initially, the production volume for the aluminum hollow subframes was limited because it was only being



A hollow aluminum frame being machined in a turret center. This machine performs drilling, tapping, and milling.

used for FCVs, but then it began being used in the production of PHVs as well, leading to a rapid increase in production volume. Moving forward, we aim to continue effective cost-cutting through mass production and increase the number of vehicle models equipped with hollow aluminum subframes.

Human resource development is essential to succeed at new monozukuri. What is your approach to personnel training?

Saito : Our basic approach is on-the-job training (OJT), where senior employees teach subordinates throughout their everyday activities in the workplace. In the monozukuri field, through the accumulation of achievements, recognition by coworkers and other means, employees come to sense the joy of monozukuri and feel inspired. That’s one of the goals of OJT.

Aside from OJT, we have an annual training plan at our plant, and this consists of several challenges in various fields for the purpose of developing workers’ capabilities. For example, one goal incorporated in the annual plan is passing public examinations, such as casting personnel taking an exam to become a skilled casting technician, and personnel in charge of machining taking an exam to become a skilled machinist. The company covers all training costs incurred.

Up until now, our company creatively thought up manufacturing methods and manufactured goods in line with the requests of automobile manufacturers. Moving forward, however, we need to strengthen our human resources, develop a unique manufacturing method that we excel at and other companies cannot imitate, and offer products based on this. Otherwise, I don’t believe our company can grow.

Corporate Data

Yanagawa Seiki Co., Ltd.

- Head Office**
KDX Fuchu Bldg., 1-40 Miya-machi, Fuchu-shi, Tokyo, Japan
- Net sales**
54.4 billion yen (consolidated, as of March 2017)
- No. of employees**
526 employees, Total group employees 2,541 (as of March 2017)
- Main businesses**
Manufacture of automotive parts such as aluminum die-cast products (engine parts, transmission parts), manual transmissions, differentials, and other components
- History**
 - 1952 Established company in Fuchu-shi, Tokyo, Japan
 - 1960 Built Suzuka Factory
 - 1963 Began machining automobile parts
 - 1965 Built Sayama Factory
 - 1977 Completed die-cast factory at Kameyama Factory
 - 1983 Completed die-cast factory at Sayama Factory
 - 1988 Established YSK Corporation in Ohio, U.S.A.
 - 1992 Established Thai Yanagawa Co., Ltd. in Thailand
 - 2011 Built new factory for Thai Yanagawa Co., Ltd.

Product

Computerized Numerical Controllers

For customers to use Mitsubishi CNC with confidence, Mitsubishi Electric offers the service from the three points of view : Technical support, Training, and Service parts/repair.
With Mitsubishi CNC global service network, Mitsubishi Electric is ready to support the customers who have production bases around the world.



Mitsubishi CNC Lifecycle Management

For the customers to use their familiar machines for many years, Mitsubishi Electric continues to offer services:

Whenever Wherever Forever

We provide the best service to support customers' production environment indefinitely

Technical Support **Minimizing Downtime with Professional Support**

Need to know how to cancel CNC alarm immediately!

Our call centers in various regions around the world can support customers quickly.



We have call centers in each overseas base to respond quickly to customers having trouble with the CNC. Our skilled engineers support customers to accurately resolve problems over the phone. We ship out service parts or send field engineers as needed to ensure a timely recovery of your machine.

Need support to recover the machine quickly!

Our field engineer visits customers' site to repair the CNC system.



Our specialists who acquired high skills on CNC system repair visit the site immediately based on the customer's request. We make full use of measuring instruments, etc. to precisely understand the machine state, and then adjust the faulty items or replace the parts. As a result, the machines are recovered quickly

After machine restoration we are also making efforts to prevent machine failures, suggesting preventive solutions by measuring the battery voltage of CNC and drive units and the insulation resistance of motors.



Our call centers and field engineers around the world are working hard day to day to enable our customers to safely use their machines. Please feel free to contact the nearest service center with any tiny issue.



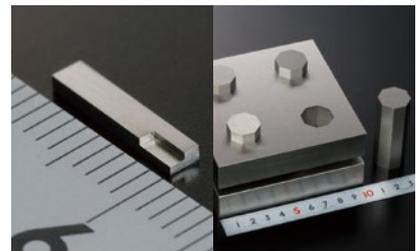
Product

Processing machines

We offer worldwide support for Mitsubishi Electric's state-of-the-art Industrial Automation Machinery



Our rich lineup of EDMs cater to diverse processing needs ranging from parts processing to ultra high precision processing. Utilizing our advanced laser technologies, our laser processors deliver high productivity, stability, and low running costs. Service and support of these Industrial Automation Machines is available worldwide through Mitsubishi Electric's extensive global network. Our local staff will provide a prompt response to your various needs from inquiries about processing applications to requests for training and repair.



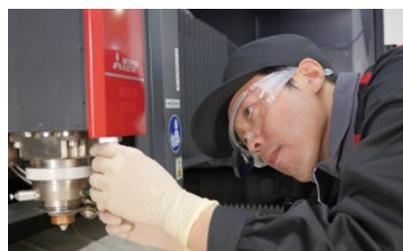
Applications

We can propose optimum processing applications to cater to your needs before and/or after installation. If you have any questions about processing applications, please feel free to contact us.



Showrooms

EDMs, laser processing machines, and various other Mitsubishi Electric mechatronics products are displayed in our showrooms. Our dedicated engineers are always ready to help you.



Service and Repairs

We offer repair services, dispatch of engineers to the field, replacement parts sales, and technical support in close cooperation with our local distributors. In case of a malfunction, we will promptly assist you to fix the problem.



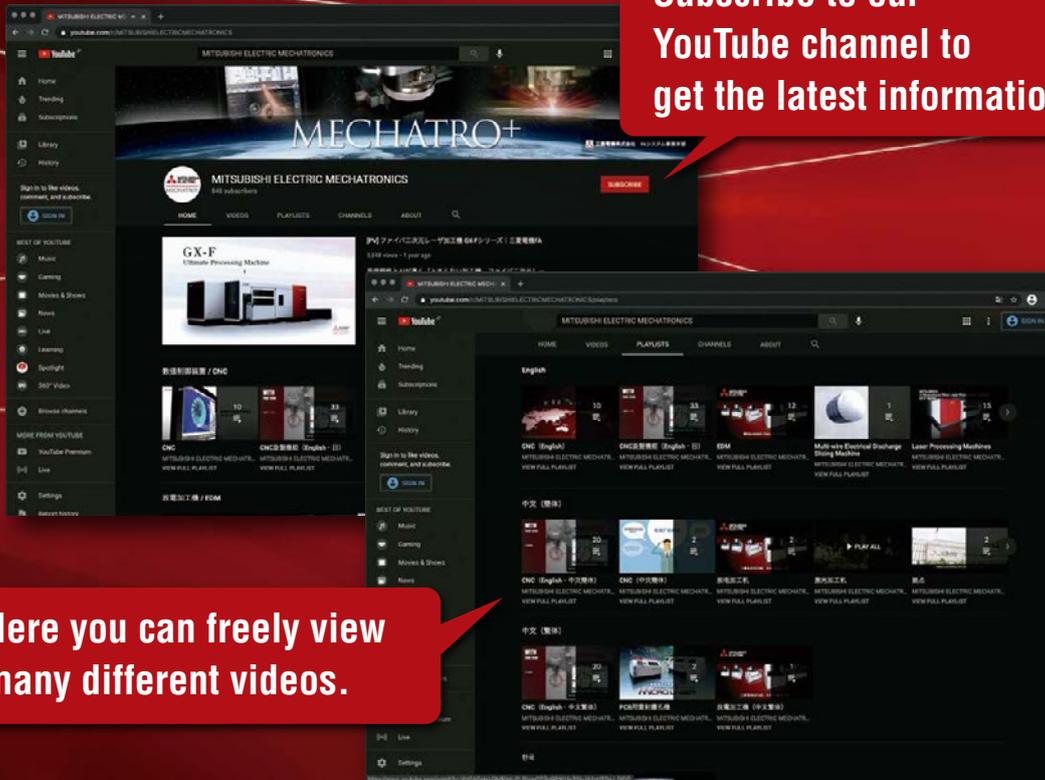
Training

We offer wide variety of regular training courses to give engineers the ability to use our products quickly after purchase. We offer basic operations to applied programming using actual products.

Official YouTube channel

MITSUBISHI ELECTRIC MECHATRONICS

Subscribe to our
YouTube channel to
get the latest information.



Here you can freely view
many different videos.

MITSUBISHI ELECTRIC MECHATRONICS is the official YouTube channel for our Industrial Automation Machinery products.

The channel offers an array of information on product information for CNCs, electrical discharge machines (EDMs), laser processing machines, etc., as well as machining examples, and much more.

Access the below URL to watch numerous videos that look unbelievably realistic.

www.youtube.com/c/MITSUBISHIELECTRICMECHATRONICS

Visit us on
 **YouTube**



[YouTube] [YouTube logo] is a trademark or registered trademark of Google Inc.