

CYBER WORLD



Feature

The Semiconductor Industry and the Machine Tools

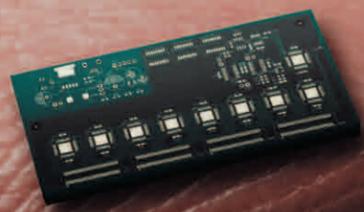
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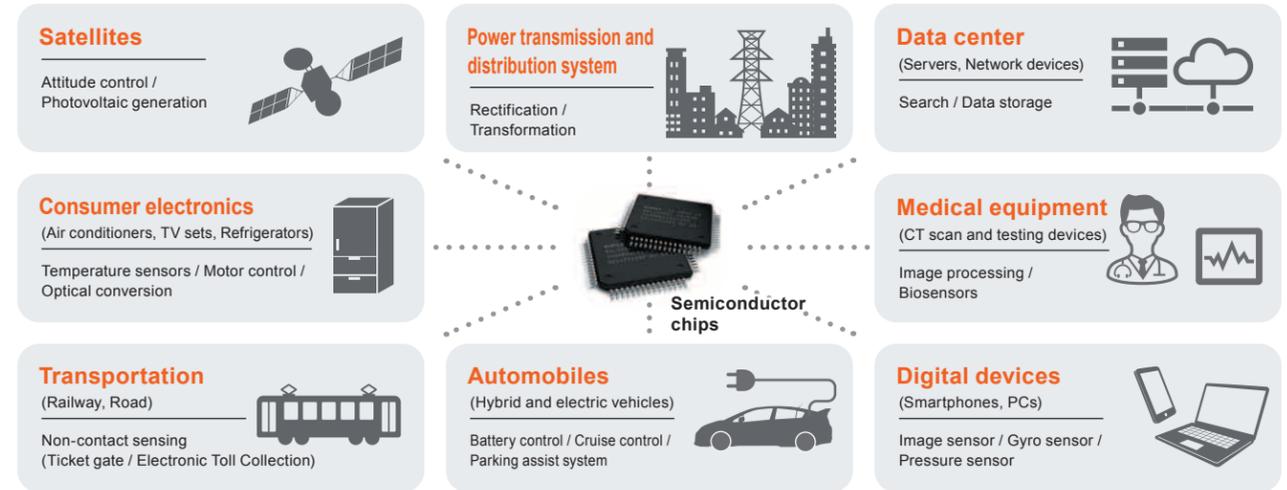
2018
No. 54

THE SEMICONDUCTOR INDUSTRY AND THE MACHINE TOOLS

From LED light bulbs to supercomputers — semiconductors, which are so tiny that they can be placed on your fingertip, are used in such wide-ranging industrial products. Backed by demand growth on a global scale, the size of the semiconductor market reached 400 billion dollars* in 2017 and is expected to continue to increase steadily in 2018 and afterwards (*survey by World Semiconductor Trade Statistics (WSTS)).



Roles of semiconductors in various industries and products



Types of semiconductor devices

Classification (Main types)	Integrated circuits (LSI, CPU, GPU)	Memory (DRAM, NAND)	Power semiconductors (IGBT, MOSFET)	Optical semiconductor (LED, CMOS, CCD)
Typical functions	Computing 	Storage (Writing and reading of data) 	Control (High current rectification, Switching) 	Conversion (Electrical signal ↔ Optical signal)

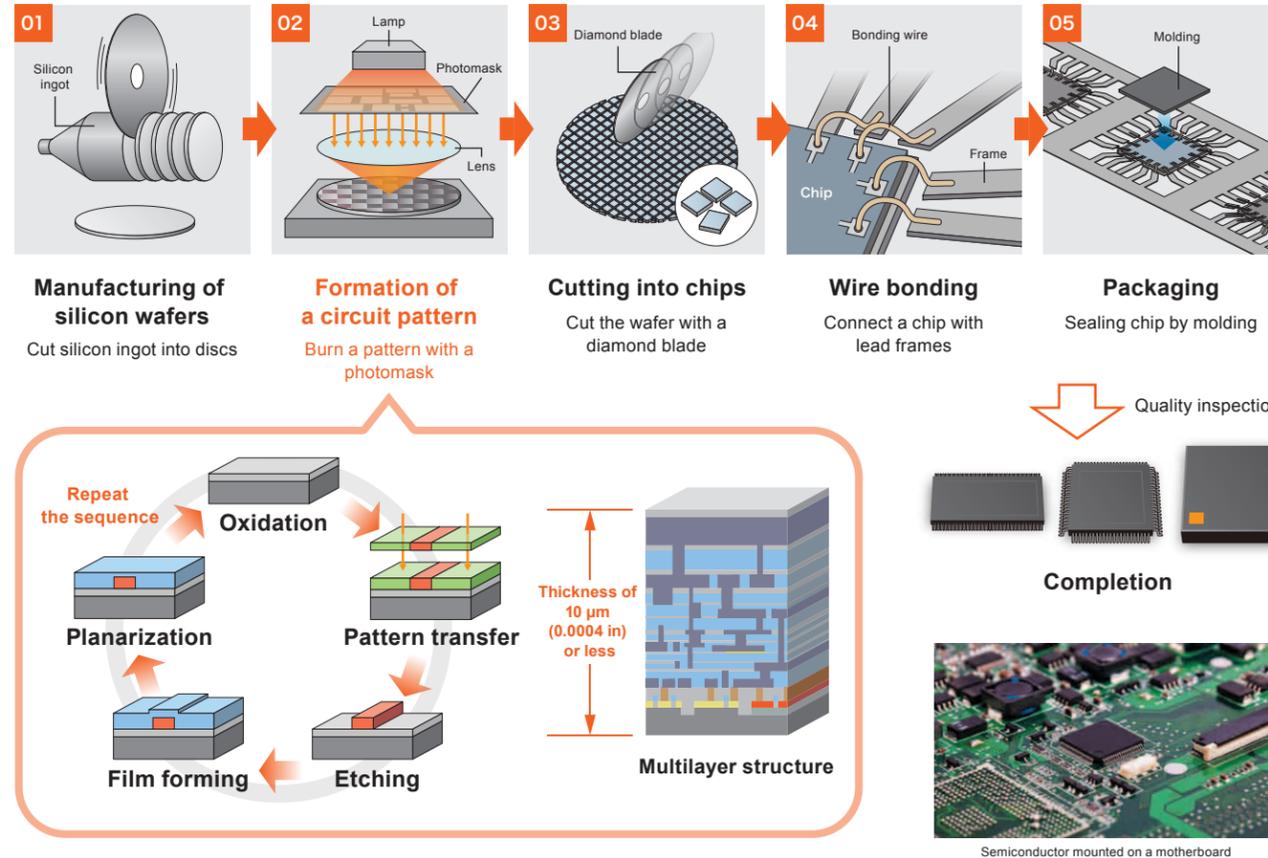
Roles of semiconductors

The growth in demand for semiconductors is supported by the evolution of smartphones and various other digital devices as well as the enhanced capacity of data centers in response to increases in information communication traffic and throughput. In addition, thanks to the development of IoT technologies in recent years, a wide range of products such as transportation equipment, consumer electronics and industrial robots have been made highly functional and started to be connected to the Internet, which has raised the demand for semiconductors to an unprecedented level.

The functions of semiconductors include computing, storage, control and conversion, which are essential for the flexible control of wide-ranging industrial products and infrastructure

systems. In the automobile industry, which is making significant progress in the introduction of hybrid and electric vehicles, semiconductors are indispensable for motor and battery control, safe driving support systems and various other functions. Semiconductors are also closely related to the establishment of various infrastructure systems as they are used for the efficient operation of public transportation systems and power generation systems, for example. While the role that each semiconductor can play is limited, multiple types of semiconductors with improved speed and accuracy are combined and coordinated to achieve various functions of smartphones and other cutting-edge devices. They play the essential role as functioning like the nervous system in an infinite variety of products, both industrial and consumer.

Semiconductor manufacturing process



01. Leading-edge semiconductor plant (clean room) with rows of semiconductor manufacturing equipment (photo courtesy of Toshiba Memory Corporation)
 02. Operation in a glovebox, which blocks oxygen and water
 03. Electric test of a silicon wafer
 04. Schematic diagram of cluster chambers in the manufacturing equipment

Semiconductor manufacturing process

Tens of millions of extremely small circuits are written on just a 1 cm x 1 cm (0.4 x 0.4 in) square semiconductor chip. As the amount of the circuits that can be written on a unit area is approaching its limit, semiconductor manufacturers are now working to achieve 3D (multilayer) chips. A most-advanced 3D NAND flash memory (storage device) of less than 10 μm (0.0004 in) thick contains a 64-layer structure and some say that the structure will have more than 100 layers in the future. To mass-produce such ultrafine semiconductors at low cost, the semiconductor manufacturing process is segmented into as many as 500 phases and handled in an automated line with specialized machines for each phase. The manufacturing process roughly consists of five stages which take place in this order: (1) cutting of silicon wafer into discs (2) formation of a circuit pattern (3) cutting into chips (4) wire bonding and (5) packaging.

As illustrated above, a silicon ingot is sliced into discs to produce wafers first and then a circuit pattern is transferred with a photomask based on the principle of photoetching.

Approximately 500 chips are produced on the surface of a wafer at a time, which is cut with a diamond blade. The chips produced in this manner are then connected with metal wires and sealed with molding to enhance the durability and eventually complete the production of semiconductors.

To increase the number of chips that can be manufactured in a cycle of the process, technical innovations of the semiconductor manufacturing process, such as the enlargement of wafer diameter to improve production efficiency, are continuously sought. The so-called "silicon cycle," which is the investment cycle for manufacturing equipment, is much shorter than the capital investment cycle in other industries and is said to be about four years.

Cleanliness is essential for semiconductor manufacturing productivity

To mass-produce high-quality semiconductors at lower cost, it is essential to improve the yield rate as well as the efficiency of the manufacturing process. It is currently believed that the yield rate is 80 to 90% for semiconductor manufacturing and the improvement of the rate greatly affects the cost competitiveness of semiconductor manufacturers. As a factor that determines the quality of semiconductors, the cleanliness of the air in the manufacturing environment is important. Since a semiconductor contains ultrafine circuits, even a tiny piece of dust on the surface would ruin the circuit pattern to cause a malfunction. Accordingly, an environment with literally no contaminants, whether organic or inorganic, is considered to be ideal. It is difficult to maintain a high level of cleanliness in a whole plant because the semiconductor manufacturing line involves personnel mainly in the inspection process as well as the continuous operation of motors and other power sources. As a result, the manufacturing process is operated in tightly enclosed spaces (chambers) in the semiconductor manufacturing equipment.

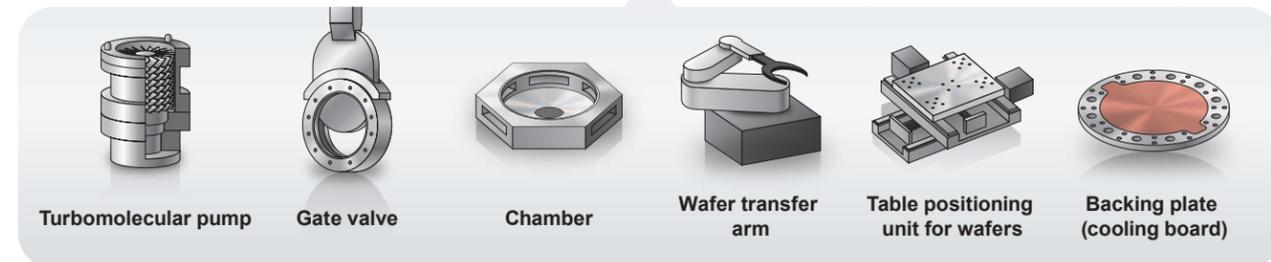
The chambers are always kept in a vacuum state because even the oxygen and moisture in air can have an adverse impact on maintaining the quality of the semiconductors. These vacuum chambers are connected in a cluster arrangement (like a cluster of grapes) and silicon wafers pass through them to proceed with the semiconductor manufacturing process. The air in the chambers are evacuated by turbomolecular pumps and other vacuum pumps and highly airtight gate valves are at the connections.

In fact, it is considered that more than half of semiconductor manufacturing equipment is related to such vacuum-related equipment. Vacuum technology is thus essential for semiconductor manufacturing.

Components of semiconductor manufacturing equipment produced by Mazak machine tools



Components of semiconductor manufacturing equipment



Machining of turbine blades, valves, etc.



Machining of chambers, guides, etc.



Machining of backing plates, etc.

Semiconductor manufacturing equipment and machine tools

The vacuum-related units used in semiconductor manufacturing equipment need to have high durability in addition to functioning at a high level. Many of the parts used in such units are machined and Mazak machine tools are deeply involved in the production process.

A turbomolecular pump has an internal structure of many layers of turbine blades, similar to a jet engine, which has to withstand a rotation speed of tens of thousands of revolutions per minute.

The turbine blade has a complicated shape and its machining takes a long time. To machine it, the VARIAXIS and other 5-axis machining centers are effectively used. Vertical machining centers such as the SVC with a high-speed linear motor-driven X-axis are used to reduce the machining time.

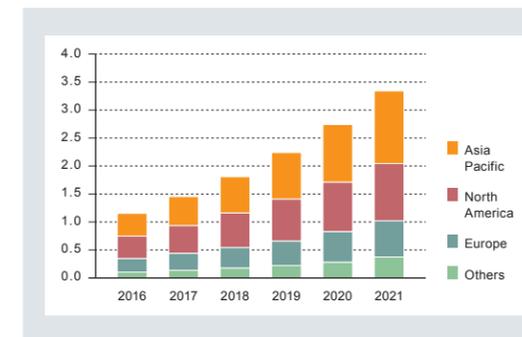
Mazak machine tools are also used to machine parts of the table positioning units for wafers, transfer arms and other units. In addition to metal-cutting machine tools, the Mazak hybrid multi-tasking machine with friction stir welding technology, the FJV-60/80 FSW, can be used to machine backing plates (cooling boards), which contributes to the integration of the process phases.

Mazak products are effectively used to improve not only the machining efficiency of individual machines but also the efficiency of the production process as a whole through the transformation of the plant into a smart factory. Furthermore, the products equipped with Mazak SMARTBOX™ and Smooth Monitor AX contribute to the strengthening of cybersecurity as well as the visualization and analysis of machine operation data.

While semiconductors usually attract attention in many fields, the evolution of their manufacturing process deeply involves mechanical engineering and Mazak's reliable technology to continuously increase productivity.



Expected annual IP traffic volume (in zettabytes)



Source: Cisco VNI, 2017

Factors behind the rise in the annual IP traffic volume

	Increase in Internet users	Increase in network devices	Increase in broadband speed	Increase in video viewing
2016	3.3 billion people	17.1 billion units	27.5 Mbps	73% of traffic volume
2021	4.6 billion people	27.1 billion units	53 Mbps	82% of traffic volume

Source: Cisco VNI, 2017

In preparation for the arrival of a digital society

Thrilling games by athletes attracted the attention of the whole world in the PyeongChang Winter Olympics. Behind it, the demonstration services of 5G, the next-generation communication standard, were provided for the first time in the world to conduct a new experiment for sports watching.

The features of the next generation communication standard include the ultrahigh speed that is likely to greatly exceed the speed of the current 4G, as well as larger data capacity, reduction of delays and an increase in the number of simultaneous connections, which are essential for the establishment of the IoT society. Many of the technologies that are anticipated to become reality, such as self-driving systems and remote control of transportation equipment, the supply of medical services based on virtual reality (VR) technology and artificial intelligence (AI)-based autonomous control of industrial robots, are assumed to be based on this standard. It is said that the realization of 5G will lead to explosive growth of the volume of online information that travels around the world and it is estimated that the annual IP traffic volume in 2021 will exceed 3 zettabytes (1 zettabyte = 1 billion terabytes). While the full-scale implementation of the next-generation communication standard is

awaited, improvement of the communication infrastructure including the development of data centers and base stations on a global scale is urgently required to address the opening of the "zettabyte era" when such an astronomical volume of information flows. In consideration of this trend, some say that the demand for semiconductors has entered the so-called "supercycle," which is different and longer than the conventional silicon cycle, and semiconductor manufacturers are accelerating their efforts for the design of next-generation semiconductors in addition to the ongoing establishment of a system with a larger production capacity. Equipment manufacturers are also promoting the development of the manufacturing process to meet the huge demand for semiconductors.

Connections beyond borders and the arrival of an efficient and comfortable "digital society" — the keys to the realization of them are further evolution of semiconductors and innovations in manufacturing technology. Mazak will continue to contribute to the advancement of semiconductors and other leading-edge technologies and the realization of a flourishing society through the supply of high-quality and high-efficiency machine tools.



Customer Report 01

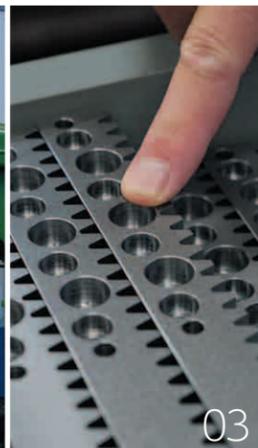
Delivering good products safely, quickly and at low cost

Japan Kohara Gear Industry Co., Ltd.

Kawaguchi is known as a city of foundries. Founded in the city in 1935, Kohara Gear Industry Co., Ltd. has produced gears there as the corporate name suggests. Since cast iron gears are solid but fragile and often break in winter, small factories in neighboring Tokyo have depended on the company, which always stores spare gears. Kohara Gear Industry began producing standard gears in 1957 and maintains a system to meet the demand of customers for immediate delivery.



01



02



03

- 01. Manufacturing of 180 product lines with a total of 17,300 types of standard gears
- 02. Mazak INTEGREX multi-tasking machines have significantly reduced the in-process time for gear machining
- 03. Made-to-order gear racks
- 04. Mr. Toshiharu Kohara, President (far right), Mr. Kenji Kohara, Managing Director (second from left, front row) and employees

COMPANY PROFILE



Kohara Gear Industry Co., Ltd.

President : Toshiharu Kohara
 Address : 13-17 Nakacho, Kawaguchi, Saitama
 Number of employees : 215
 www.khkgears.co.jp



Japan Kohara Gear Industry Co., Ltd.

"Supply the required type and amount of gears when they are needed" — based on this philosophy at the time of its foundation, Kohara Gear Industry established its business model when it started to manufacture KHK standard gears in 1957. The company registered "KHK" as a trademark in 1973. It spun off its Noda plant in Chiba Prefecture, which was machining large gears, into a separate company KHK Noda Co., Ltd. in 1993.



Mr. Kohara, President, talking about his manufacturing policy

The company set up a system to receive orders for modification of standard gears in 2001 and named it "Haguruma Kobo" in 2006. The J series are established as standard gears in 2008. The Noda plant currently manufactures standard gears while the Kawaguchi plant in the headquarters also produces machined standard gears as well as gears ordered to customers' specifications. Today Kohara Gear Industry produces approximately 180 different gear models with a total of 17,300 variations, 75% of which are standard types and 25% are ordered according to customers' specifications with quick deliveries.

Mazak machines' contribution to productivity

"Deliver good products safely, quickly and at low cost in an environmentally responsible manner." Mr. Toshiharu Kohara, who leads the two companies as the president, thus expressed his manufacturing policy. This is the very basic philosophy of the corporate group that has been maintained

since its foundation. To advance this philosophy, a business reform plan was promoted with a focus on the J series. The plan aimed to minimize the amount of machining done by subcontractors, whose numbers are declining, in an effort to show its presence in the industry.

Mazak machines were selected as the equipment that helps realize the plan. "I wanted to try the ease of operation and the performance of interactive MAZATROL programs." Mr. Kohara mentioned this clear reason why he decided to introduce the machines. In line with the plan, QUICK TURN SMART 200M and 300M CNC turning centers were installed in the Noda plant in 2012, immediately followed by the introduction of the INTEGREX j-200 multi-tasking machine into the machining line of the Kawaguchi plant. Just when the machines were delivered to the Noda plant, a documentary TV program was covering the company and the scene of the delivery was aired on TV which drew considerable attention.

"While additional machining is the technical strength of our company, the key to it is the quick delivery of quality products according to customers' requirements. We are satisfied with the performance of the Mazak machines, which support quick delivery in terms of production. The ease of making machining programs has a good reputation among our operators."



Ease of programming and operation with the MAZATROL CNC system

Gear products machined by Mazak machines



High-speed and high-precision machining with Mazak vertical machining centers

In-process time reduced from 80 to 30 minutes

The subsequent introduction of the second and third INTEGREX j-200 machines completed the establishment of the system to produce the J series in Kohara Gear Industry. The setup of a 2-shift system made it possible to ship within three days from the order receipt. In 2016, an INTEGREX i-100S was introduced to handle customer specification orders. In the meantime, the VTC-530/20, VTC-800/30SR and VERTICAL CENTER SMART 430A vertical machining centers were installed in the same year. In this way, the company has also made aggressive investments in equipment for the machining of standard gears. "We achieved the short delivery period for the J series thanks to the Mazak machines. In fact, the use of the INTEGREX reduced the in-process time from 80 minutes to 30 minutes. This has helped us meet the target of 'offering reliability and satisfaction to customers!'"

The company's J series and Mazak's INTEGREX j-series, which both have the letter "J" in the title (one upper case, the other lower), play important roles in enhancing customer satisfaction.



01

Customer Report 02

Contributing to "light" and "sound" with expert skill

Japan OZAWA Precision Industry

In modern dental therapy, X-ray inspection is conducted first to check the conditions of the jaw bone and teeth. While X-ray equipment is used for the inspection, OZAWA Precision Industry, a company located in Hamamatsu, Shizuoka, produces metal components used in the image sensors of this type of equipment. The two pillars of the company are the design and production of optical and medical equipment, including parts of the image sensors, and components of wind instruments such as trumpets and saxophones. In other words, the company contributes to the worlds of "light" and "sound" through its products. Its sophisticated machining technology underpins high-precision and high-quality products that satisfy professionals like musicians and those in the medical industry.



Shizuoka, Japan



02



03



04

- 01. The VARIAXIS i-600 with the MPP performs unmanned operation at night
- 02. Mazak vertical machining centers play active roles in production
- 03. High-precision machining by the VARIAXIS i-600
- 04. Mr. Daisuke Ozawa, President (second from right, second row), Mr. Hideaki Ozawa, Executive Vice President (third from right, second row) and employees

COMPANY PROFILE



OZAWA Precision Industry

President : Daisuke Ozawa
 Address : 657-1 Hirakuchi, Hamakita-ku, Hamamatsu, Shizuoka
 Number of employees : 77
 www.ozawa-seimitsu.jp



Customer Report 02

Japan OZAWA Precision Industry

Aiming to further expand business

A total of eight Mazak machine tools, including the VERTICAL CENTER NEXUS 410A-II and other vertical machining centers, are operated in the plants. "I was surprised at the exceptional ease of operation of the MAZATROL interactive programs, which can be handled instantly by even a new employee," said Mr. Hideaki Ozawa, Executive Vice President. Mr. Tsuyoshi Nishida, Manager of the Hiryu plant, mentioned, "The support system is effective" while Mr. Yosuke Tanaka, Machining Center Section 1 indicated, "Productivity has been doubled." Leaders of OZAWA Precision Industry described in this way the benefits generated by the Mazak machines for the company.

we make large investments in production equipment every year." Mr. Ozawa reflected on the efforts for the new style working environment that he decided to pursue.



Mr. Ozawa, President, talking about his future vision

As a specific measure of the reform, he started to improve the air conditioning in the plants and promoted the installation of mist collectors and other equipment to maintain a clean and healthy working environment. In 2017, the company introduced the Mazak VARIAXIS i-600 5-axis machining center with multi pallet pool (MPP) in order to perform unmanned operation. "I liked the high operation rate of the equipment. When the operation is prepared for night, the unmanned system completes the production of the whole volume by the next morning. It is also attractive in that it can handle low-volume production of a wide variety of parts." Mr. Ozawa described his satisfaction with the performance. The unmanned operation at night tremendously increased the production efficiency and also helped curb long working hours to further improve productivity.



Introduction of automation also reduced the in-process time

Mr. Daisuke Ozawa plans to continuously make capital investments to improve productivity. "With the effective use of the automation systems, employees perform programming and other tasks during the daytime while the machines perform unmanned machining at night. In this way, we aim to eliminate the second and third manned shifts with a hope that this will help us recruit human resources for the future." He also mentioned his wish, saying, "We will review physical distribution between the companies and plan to integrate our sites by 2020 in order to make the next leap." While expanding its business with improved productivity based on automation and improved logistics efficiency through integration of its sites, OZAWA Precision Industry will continue to contribute to the worlds of "light" and "sound."



Mr. Hideaki Ozawa, Executive Vice President, who also highly values the ease of operation of the Mazatrol CNC system

High-precision machined parts for optical and medical equipment



New style working environment

While Mr. Ozawa initially worked for a world-class optical equipment manufacturer located in Hamamatsu, he became the third president of OZAWA Precision Industry in 2013 after the sudden death of his father, who was the second president. "With the philosophy of 'Working in harmony is the greatest of virtues,' I am working to create a good company. I believe that a good company has a corporate culture where people respect each other and freely exchange their opinions and allows the employees to enjoy the benefit of performance improvement of the company. As part of our efforts for this,



01

Customer Report 03

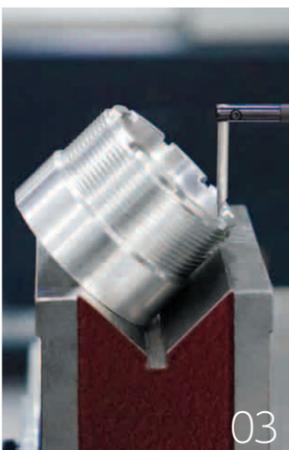
Pursuing precision processing of the highest quality – 100 years from now and beyond

China TianZhong Metal Processing (Shanghai) CO., Ltd.

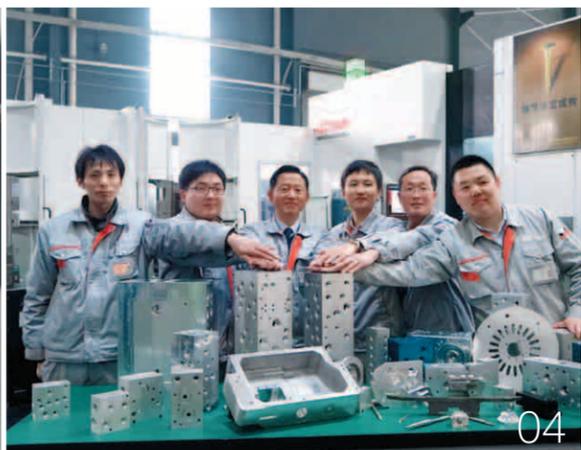
"Jingyi Qiujiing" ("seek continuous refinement for unending progress" in Chinese) is a phrase that represents the business policy of TianZhong Metal Processing (Shanghai) CO., Ltd. (President: Mr. Hongjun Wang), which is based in Shanghai, China. The company manufactures precision machined parts to be used by the medical, railroad, hydraulic machinery, automation equipment, automotive, electronic machinery and various other industries. It has earned enormous trust from major companies in China and other countries due to its sophisticated equipment and technology and strict quality control.



02



03



04

- 01. FMS in operation, composed of four HCN-5000 horizontal machining centers
- 02. Processing of medical components, which requires high precision, is performed by Mazak machine tools
- 03. Continuous and thorough quality control
- 04. Mr. Wang, President (third from left), and employees

COMPANY PROFILE



TianZhong Metal Processing (Shanghai) CO., Ltd.

President : Hongjun Wang
 Address : 2838 BaoAn Road, MaLu Town, JiaDing District, Shanghai, China 201801
 Number of employees : 350



Customer Report 03

China TianZhong Metal Processing (Shanghai) CO., Ltd.

Active investments and enhanced human resource development for business expansion

"We aim to be a company dedicated to ultraprecision machining that will be in business for way more than 100 years. Mazak is an important strategic partner to achieve the target." Mr. Wang has given as a gift a sculpture he made to Yamazaki Mazak (China) Co., Ltd. The phrase carved on it "Jingyi Qiujiing" represents his strong will to continuously pursue the production of high-quality products through cooperation between his company and Mazak.



A sculpture with the characters for "Jingyi Qiujiing" carved on it was given as a gift to Mazak (Mr. Dong Qing Fu, President of Yamazaki Mazak (China) Co., Ltd., on the right)

FMS Introduction led to considerable improvement in profitability

TianZhong Metal Processing, which has two plants in Shanghai and Suzhou, which is near Shanghai, introduced Mazak machining centers for the first time in 2006. A total of 27 Mazak machines are actively operated in the two plants now, including the first FMS manufactured by Yamazaki Mazak (China) Co., Ltd. Since the introduction of the FMS composed of four HCN-5000 horizontal machining centers in 2014, the company has significantly improved its productivity. "The introduction of Mazak machine tools led to the increase in orders for the machining of high value-added parts. In addition, the introduction of the FMS enabled us to produce many kinds in small quantities in an automatic manner and raised the volume produced per person by 16 times." In response to this success, the company also introduced a PALLETECH HIGH RISE with a three-level pallet stoker in 2015 to further expand automation and unmanned production.

The components machined by TianZhong Metal Processing (Shanghai) CO., Ltd. are many, ranging from simple automotive parts to complicated bone prosthetics. With an export sales ratio of more than 70%, the company has more than 100 customer companies in 20 countries all over the world, which include 16 of the largest 500 companies in the world. "All of our top 10 customer companies are from different business categories because we aim to hedge management risk from economic fluctuations as much as we can," said Mr. Wang, President.



Mr. Wang talking about management philosophy

TianZhong Metal Processing, which was established in 1995 mainly for the machining of automotive parts, initially experienced some tough times. Then, after Mr. Wang became the president in 2002, the company started to manufacture components for various industries to diversify its business. In particular, orders for bone prosthetics and other equipment for the medical industry have been steadily increasing in recent years. TianZhong Metal Processing obtained a certificate for medical devices from the US Food and Drug Administration (FDA) in 2016. Mr. Wang proudly said, "The increase in orders from US and European medical equipment manufacturers, which are very demanding, demonstrates that they appreciate the high machining precision and strict quality control of our company." It is not easy to efficiently machine many kinds of complicated and high-precision parts in small quantities for various industries. To address it, a dedicated team in the company is constantly committed to research and improvement of production technology and production management, which is making great contributions to business expansion and revenue growth.



MAZAK PALLETECH considerably improved productivity

Mr. Wang appreciates not only Mazak machine tools but also the support system. "Excellent and fast service before and after sales. I think that Mazak is the only company in the world that can offer such service. When we were struggling to win a bid for machining of bone prosthetics for the first time in 2008, Mazak gave full support for the test cutting of our sample parts with their showroom machines. We won the bid thanks to their support, which led to our current success in the medical industry."

TianZhong Metal Processing is now planning to establish overseas production and distribution bases for further business expansion. In addition to investments in equipment, the company is also committed to human resource development through, for example, the creation of an internal library for education and improvement of employees' skills.

"It is a mission of a company to change the future its employees." Mr. Wang seems to already see the future of the company that has grown together with the employees and will be in business for over 100 years.

High-precision parts produced by Mazak machines for various industries



MAZAK PEOPLE

Mazak Optonics Corporation application engineer

 **Mr. Yuki Takesada**

Continuously trying new cutting techniques for customers

Yamazaki Mazak operates many bases in Japan and other countries for various functions such as production, sales and before and after-sales service and support. MAZAK PEOPLE introduces employees who are active at the forefront of the Group companies.

This issue features Mr. Yuki Takesada, who works as an application engineer at Mazak Optonics Corporation, a US subsidiary that sells laser processing machines. He is a mid-level engineer who keeps trying new cutting techniques.



PROFILE >> Mr. Yuki Takesada

Mr. Takesada joined the company in April 2005 and was assigned to the Optonics Sales Engineering Department. After working in applications for time studies, customer training, etc., he was transferred to the Cutting Evaluation Group to engage in the evaluation of new models and the development of new functions. Mr. Takesada was assigned to Mazak Optonics Corporation in the United States in September 2016.

—What is your current job?

I am working on applications for support of sales such as machine demonstrations and test cuts, as well as other jobs including proposals on development of cutting-related software, training of local staff on cutting techniques and evaluation of new models for cutting.

—How do you feel about working in the United States?

In the United States, where I work now, I learned how to quickly make decisions. When a team has to do something urgently, it is important for each member to make fast and accurate decisions. In the meantime, it is natural that a company in the US has employees of different backgrounds and such diversity generates a wide range of perspectives. Different countries have different cultures and different ways of thinking, which has made me keenly aware that everyone should have an open mind. I have learned that, to do my best job in such an environment, it is significant to not stick only to the experience and way of thinking that I have cultivated but also positively adopt the opinions of local engineers.



Exchanges of opinions with local engineers help develop a global point of view

—What is important to you when you are working?

I work with determination to try anything. However difficult the cutting technique is, I reply, "Let me do it" first. It is because I believe that even if the attempt is eventually unsuccessful, it will give me

experience and lead me to success later. The US culture of tolerating trials and errors based on the idea that it is a virtue to try something has also made me aware that I am in an environment where I can create something new.

I also value the attitude to "Never compromise" when I work. For example, when I make a sample workpiece to be displayed at an international exhibition, I pay attention to details so that the potential of the machine can be seen at a glance with the sample and so that visitors will stop to see it. In fact, techniques of drawing a picture are crucial for working on a cutting sample. So, I have purchased drawing textbooks and design books and study styles of expression, etc. every day. I am making continuous efforts to impress customers and make them highly value Mazak through the display of attractive cutting samples.



A laser-processed sample created by Mr. Takesada, which drew considerable attention at FABTECH 2017

—While you were trying new cutting techniques, you proposed a groundbreaking cutting method.

It is a cutting method called "Multi Magna Pierce", which I developed first after my transfer to the US. In this method, before a metal sheet is cut with a laser processing machine, piercing is done at the starting point of the cutting. I devised a way of controlling the torch and focus to reduce the piercing time for a thick mild steel plate by 80% in comparison with the normal method. A comment from a customer that the long piercing time was a problem motivated me to develop the method. It was a result of my strong desire to meet customers' requirements.

—What task do you want to tackle in the future?

I hope to create applications that our competitors do not have in cooperation with our local staff. In addition, after returning to Japan, I would like to engage in the development of new cutting support functions and other jobs to further improve the operation of laser processing machines.

"Laser processing still has potential that has not yet been explored and I find something new every day," said Mr. Takesada. The cutting samples that he creates with such enthusiasm play an excellent and essential supporting role in Mazak's booth during international trade exhibitions. With the attitude to keep trying to achieve something better and with his view broadened by his time in the US, he will continue to widen his area of accomplishments.

How he spends his days off

The weather is very pleasant in the summer, so I spend my days off playing with my kids on the swings and seesaws in the playground and having a barbecue with my family and friends. I sometimes enjoy taking a boat ride on the Chicago River and shopping while in downtown.



News & Topics

HRH Prince of Wales honours Mazak with Industrial Cadets Top Employer Award

Yamazaki Mazak U.K. has been recognised as the Employer of the Year at prestigious Industrial Cadets Awards for 2018. The YMUK award was presented by His Royal Highness Prince Charles, the Prince of Wales, at an awards ceremony held at the Institute of Engineering and Technology in London. At the ceremony, YMUK received the award certificate from the Prince of Wales, who spoke highly of the YMUK contribution to the scheme.



Chris Morris (center) and Dave Barnett (right) from YMUK with an expression of accomplishment after receipt of the award certificate from HRH Prince Charles

The Industrial Cadets, which was inspired by the Prince of Wales, is an accredited UK Government work experience programme designed to give young people vital engineering skills. The Industrial Cadets Awards recognises students who have completed the program with excellent results as well as the educational institutions and companies that have contributed to the program. YMUK received the award for demonstrating outstanding engagement with young people and the Industrial Cadets initiative, as well as illustrating best practice in employer engagement furthering the STEM agenda. Dave Barnett, Learning & Development Manager, commented: "To be awarded Top Employer by such a prestigious organisation is a real testament to Mazak's commitment to the next generation of engineers. We intend to continue our involvement with the Industrial Cadets and look forward to welcoming our next group of cadets who are the future of manufacturing."

Commemorative logo for Yamazaki Mazak's 100th anniversary

Yamazaki Mazak will celebrate its 100th anniversary in March 2019. For this milestone, we have established a commemorative logo.

<About the commemorative logo "Together-Success">

The slogan Together-Success represents our wish that "Mazak and customers, Mazak and suppliers and managers and employees work together, enjoy what they do together and continue to grow together to be successful." With a desire to continuously progress together with society while valuing a relationship with you once again on the occasion of the 100th anniversary, we are using "Together-Success" as the commemorative slogan.



Commemorative logo

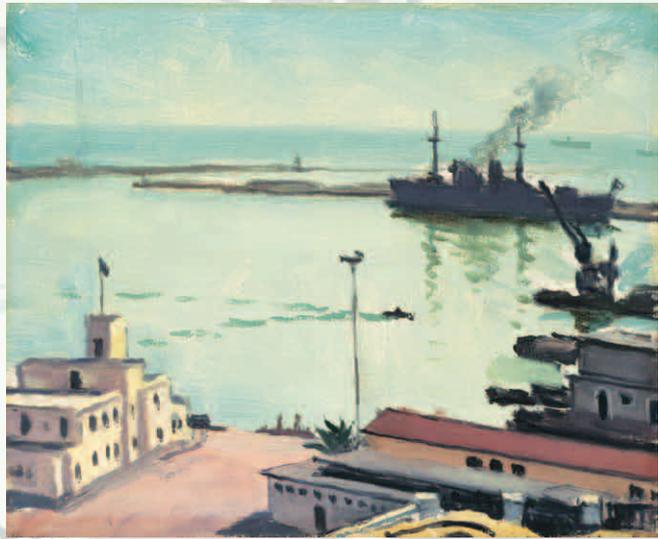
The Yamazaki Mazak Museum of Art was opened in April 2010 in Aoi Higashi-ku, the heart of Nagoya in order to contribute to the creation of a rich regional community through art appreciation and, consequently, to the beauty and culture of Japan and the world. The museum possesses and exhibits paintings showing the course of 300 years of French art spanning from the 18th to the 20th centuries collected by museum founder and first museum director Teruyuki Yamazaki (1928 - 2011), as well as Art Nouveau glasswork, furniture, and more. We look forward to seeing you at the museum.



THE YAMAZAKI MAZAK MUSEUM OF ART
Collection Showcase 1

MARQUET, Albert
“Ship in front of the Customs”

Marquet liked to travel and searched for landscapes to paint near rivers or ocean ports all over France. He liked elevated views of this kind so he always took rooms on the top floor of hotels when he traveled. He lived in Algiers, the capital of Algeria, from 1940 to 1950. Even in this southern location, he chose to paint quiet seascapes and landscapes in the morning light. This work shows the port of that city from a high vantage point, typical of Marquet. From this position, the water surface comes to occupy most of the pictorial space, so this choice is an indication of the great importance he gave to the depiction of water surfaces in his landscapes. The surface of water reflects the sky, and the modulated hues of sky and water are the soul of Marquet's painting. One can see the results of the artist's careful approach in these exquisite colors. Because of the exotic nature of an African scene, older painters might have chosen to depict it in bold primary colors. It is interesting that Marquet has created an atmosphere suited to his personal temperament that does not appear different from that of a French landscape.



MARQUET, Albert [1875-1947]
“Ship in front of the Customs”
1942-43
Panel



DAUM
“Bronze-mounted cameo table lamp in the shape of a flower”
c.1903

DAUM
**“Bronze-mounted cameo
table lamp in the shape of
a flower”**

THE YAMAZAKI MAZAK MUSEUM OF ART
Collection Showcase 2

Daum produced the cloudy glass globe in this electric table lamp, and the bronze mount was designed by Louis Majorelle, who sometimes collaborated with Daum. The glass part takes the form of a slowly opening flower bud. The veins of the leaves are carved with sharp, precise lines that is reminiscent of cabbage leaves. These lines provide a design accent that pulls the whole form together. The bronze mount supports the glass globe with three strong leaf forms that look like lotus or spatterdock leaves. The indentations in the glass where the bronze mount clamps onto it are formed with great skill. An exquisite effect is produced by the combination of the soft and hard textures produced by these two very different materials. The base of the mount is divided into three leaf forms, and there are three frogs on the three projections, raising their bodies so that their throats are visible. The rear legs of the frogs are elongated and merge imperceptibly into flowing water.