

CYBER WORLD

Feature

The Medical Industry and Machine Tools



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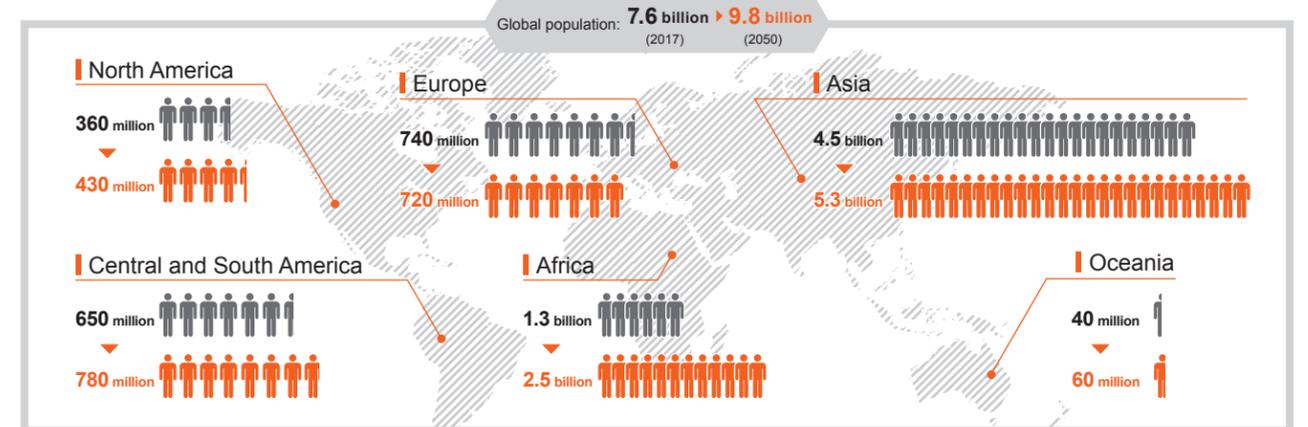
MEDICAL INDUSTRY

The Medical Industry and Machine Tools

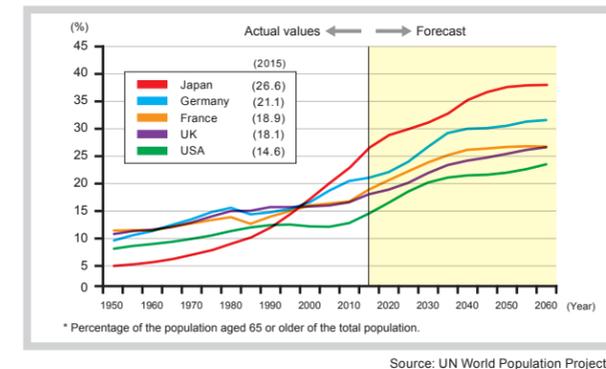
Medical care cures diseases and injuries and supports our healthy and prosperous lives. In response to growing medical needs on a global scale, the market for the medical industry is continuously expanding. At present, the total spent on medical care in the world is estimated to exceed 7.5 trillion dollars per year and is expected to further increase in the future.

Medical care environment

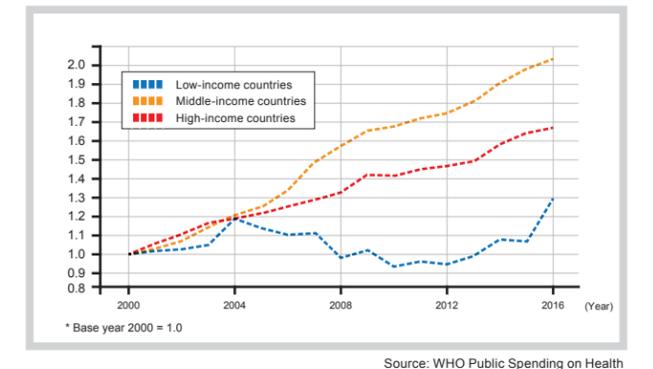
Forecast of world population



Forecast of aging population percentage in developed countries



Growth of per capita medical spending



The continuously growing medical industry

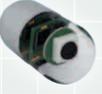
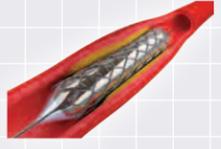
In the background of the increase in medical spending on a global scale, we can see 'rising per capita medical spending' due to income level increases in developing countries and the aging population in developed countries. In Asian countries, which are continuing economic development, more people are becoming able to receive medical services thanks to higher income levels and the development of the medical infrastructure. At the same time, people have become more health conscious and even travel overseas to seek high quality medical treatment. Meanwhile, in the US, Europe and Japan, more people suffer from cancer, heart disease and other diseases that require expensive and long-term treatment due to the progressive aging population. In addition to such an increase in per capita medical spending, population growth in developing countries is another reason for rising medical spending.

With an increase in medical spending, demand for medical equipment used for the diagnosis and treatment of diseases is also growing. It is estimated that the annual value of the global market for medical equipment is approximately 350 billion dollars and the market is forecast to keep growing at an annual rate

exceeding 5% over the next several years.

The heart of the medical equipment market with growth potential is the United States. About 40% of medical equipment in the world is consumed in this country while more than half of the top 30 medical equipment manufacturers in terms of sales are US companies. 'Medical-engineering collaboration', namely cooperation between the medical and engineering fields, is active in the country with the establishment of a system where medical institutions, universities and private companies collaborate to create products that respond to the requirements of medical practice. There are several thousands of medical equipment companies started by entrepreneurs. The new technologies developed by these companies are adopted actively and promptly put on the market by major companies. While the market for the medical equipment industry is expected to expand in developing countries, it is forecast that the growth will be continuously led by the US.

Main categories of medical equipment

For diagnostics	For treatment	Others
 MRI	 Surgical instruments	 Dental chair
 Capsule endoscope	 Syringe	 Surgical gloves
 Ultrasound diagnosis unit	 Intravenous needle	 Contact lens
 X-ray unit	 Stent	 Wheelchair
	 Artificial joint	
	 Surgical robot	
	 Cardiac pacemaker	

Evolving medical equipment

Ranging from bandages to leading-edge surgical robots, the types of medical equipment used at home and medical fields are diverse and it is estimated that there are more than 500,000 kinds of items. Medical equipment can be classified by application into three categories - diagnostics, treatment and others. The typical products of the respective categories include X-ray units, endoscopes and MRI units (for diagnostics), artificial joints, cardiac pacemakers and syringes (for treatment) and dental materials, contact lenses and operating tables (others). Among them, the market for equipment for treatment is considered to be the largest and has the highest growth rate. In comparison with equipment for diagnostics and others, many kinds of equipment for treatment are consumed in large amounts and the pace of technological innovations is extremely rapid. For this reason, the market is projected to grow at an especially high rate. In the technological development of equipment for treatment, the reduction of the impact on patients and unique designs for patient requirements have been

important goals in recent years.

Many items of equipment for treatment are used by inserting or embedding them into patients, such as catheters and stents used for vascular treatment as well as artificial joints and cardiac pacemakers. Accordingly, these products have to be developed in a way to minimize the impact on patients. There are also growing demands for product designs finely tuned for the environment in which they will be used as well as individual patient requirements.

The demands for such equipment for treatment are increasingly sophisticated due to the growing health awareness on a global scale. Research is continuously promoted to develop products that can help patients recover quickly while minimizing any physical effects.

Artificial hip joint

Structure



Stem production process

 Design and strength analysis The optimal shape and strength are calculated.	 Precision casting Materials such as titanium alloy are cast.	 Cutting and surface treatment High precision machining. When required, serrations are machined in the surface.	 Inspection and sterilization Special gas and radiation are used for cleaning and sterilization.
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Structure of an artificial hip joint and production process

The artificial hip joint has become the most widely used bone prosthetic over the last several years. In the US, it is estimated that one in every 600 people has undergone hip joint replacement surgery. In the future, with an increase in the number of the elderly population, it is predicted that artificial hip joints will also become more common in countries other than the US.

An artificial hip joint is mainly composed of four components, which are the stem, head, insert and cup. For the stem and the cup, which have direct contact with bones, titanium alloy is mainly used as the material because the alloy will fuse with bones over time. The head is made of cobalt-chromium alloy, which is highly abrasion resistant, while corrosive-resistant materials such as ultrahigh molecular weight polyethylene are used for the insert. An artificial hip joint is required to be durable and compatible with the patient's bones. Especially for the stem, hundreds of shapes and sizes are needed for the bone thickness and angles that are different between patients. Standard stems are produced through four major steps of (1) design and strength analysis, (2) precision casting, (3) cutting and surface treatment and (4) inspection and sterilization.

Among them, cutting and surface treatment is an important step that determines the quality. Very strict accuracy is required for the treatment of the stem. In particular, the upper part of the stem has to be highly accurate because it is press-fit into the head for assembly. When necessary, the surface of the stem is treated to have serrations in order to strengthen the connection with the thighbone. Recently, the use of 3D printers has been attempted for the production of artificial hip joints including the surface treatment.

While it is said that the basic structure of an artificial hip joint has not greatly changed for about 50 years, research and development by manufacturers have resulted in the extension of the service life and consequently reduced the need for replacements, which imposes a physical burden. The service life of artificial hip joints is currently estimated to be approximately 20 years and the improvement of the shape, machining method, materials and other factors further enhance durability.

Wide variety of medical equipment produced by Mazak machines

Implants	Radiotherapy equipment	Surgical instruments	Syringes	Wheelchairs
				
Bone connecting plate, bolts, artificial joint	Bolus, collimator	Surgical files, forceps	Plastic injection mold	Hub
				
INTEGREX i-150	HCN-4000	VARIAXIS i-300 AWC	UD-400/5X	QUICK TURN 100MSY



Mazak machine tools support the medical industry

For the manufacturing of medical equipment, which is estimated to be more than 500,000 products, high-mix/low-volume production is predominant. Since the products can affect patients, high safety and strict quality control are required. In particular, sophisticated production technology and stable quality are required for implants such as stems of artificial hip joints because they could have a high risk for the patient in case a problem occurs. Many implants are produced by machining of materials to achieve both precision and durability and the production process deeply involves Mazak machine tools, which can perform low-volume production of a high variety of components with high precision and high efficiency. In addition to stems, implants include orthodontic anchors, bone connecting plates and spinal fixation rods, which are all made of biomedical materials such as titanium alloys and have complex surfaces machined as required for each application. Since most implants are small with a weight of several to several hundred grams (0.1 oz. – 0.5 lbs.), machining of them requires

high-rigidity and compact multi-tasking machines and 5-axis machining centers. Mazak machines such as the 'INTEGREX' and 'VARIAXIS' are used for such machining operations. In addition to implants, Mazak machines are also used to machine bolus and collimator (components attached to radiotherapy equipment to control the radiation according to the tumors' shape), various surgical instruments, plastic injection molds for medical tubing and frames of operating tables.

While research on the treatment of intractable diseases is carried out around the world, the evolution of medical equipment, in addition to drugs and therapeutic techniques, is also essential for the development of medical care. Mazak provides high-precision and high-efficiency machine tools and leading-edge machining technology to support the evolution of medical equipment.

Diversification of medical care

In recent years, as people live longer thanks to improvements in medicine, the goal of medical care is to take the 'quality of life' into consideration. More people are paying attention to 'healthy life expectancy', which is the length when people can live an independent life without health problems. Even if people need some sort of medical treatment or nursing care by the time of later stage in life, they can hold the hope for keeping quality of life. This would be regarding the cure for a serious illness and the patient's life after recovery. Also, as people approach the end of their life, the target is to have persons lead an independent life. To realize such life, it is necessary to extend the healthy life expectancy to the maximum extent possible through the provision of preventive care and to establish diverse treatment measures customized to how patients want to spend time after recovery.

In order to realize the diversification of medical care, medical equipment needs to be further evolved. Research and development to achieve this are performed in collaboration with

not only medical equipment manufacturers but also IT and other companies in different industries. Cross-industrial development of medical equipment to realize next-generation medical care, such as IoT wearable equipment to be attached to the skin or eye to visualize body conditions, AI image diagnostic systems that increase the accuracy and speed of diagnosis and 3D bio printers that create artificial organs, is actively promoted.

To enable people to receive the best medical services tailored to their respective requirements, the keys are the further evolution of medical equipment and innovation of production technology. Mazak will continue to help developments in the medical industry through the supply of state-of-the-art machine tools.



Customer Report 01

Deliver the satisfaction and excitement to customers with the harmony of the Orchestra Factory

Japan Ishii Machinery Co., Ltd.

'Contrabass' is a machining section using large machining centers while 'violin' is a machining section using general-purpose machines. The sections of the factory have names of musical instruments in Ishii Machinery Co., Ltd., which calls itself the 'Orchestra Factory.' Conveying a corporate message 'Play harmony in manufacturing,' the company engages all employees in the practice of rhythmic manufacturing as professionals. The harmony of the Orchestra Factory delivers the satisfaction and excitement to customers.



Tochigi, Japan



02



03



04

- 01. 'VERSATECH' and other large Mazak machines are installed in the 'M Factory'
- 02. Two horizontal machining centers equipped with a 6-pallet changer have also been installed to establish a flexible production system
- 03. Titanium automotive components machined with high precision
- 04. Mr. Taiyo Ishii, President (third from left, front row), Mr. Hiromitsu Shindo, Managing Director (fourth from left, front row) and employees

COMPANY PROFILE



Ishii Machinery Co., Ltd.

President : Taiyo Ishii
 Head Office : 726 Fukutomi-shincho, Ashikaga, Tochigi
 Number of employees : 85

www.iks-web.co.jp

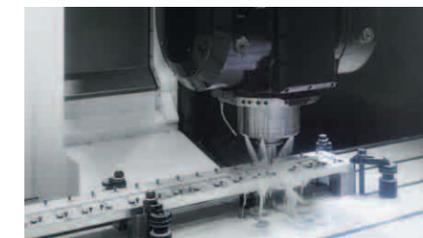


Customer Report 01

Japan Ishii Machinery Co., Ltd.

Moving to the next stage with the 'M Factory', where Mazak machines are installed

Mazak's latest 5-axis machining centers and multi-tasking machines play active roles in machining at Ishii Machinery. "While it previously took a total of 20 hours to produce hubs to be used as car parts by two machines including manufacturing of fixtures - a machining center and an NC lathe, we can now complete the machining in 14 hours with one INTEGREX i-630V and have shortened the total production time by 30% through efforts including the integration of the process for fixture production and the reduction of the setup time." Mr. Hiromitsu Shindo, Managing Director, mentioned an example of the effects of introducing Mazak machines. He also praised the user-friendliness, saying "Programming of machines is easy with the interactive input of the Mazatrol CNC system and many operators want Mazatrol to be selected again next time."



High-precision parts machining by a Mazak machine tool

introduction of the laser tracker, which is a high-precision 3D measuring machine, in 2009 especially greatly helped us receive new orders from the aerospace industry," said Mr. Ishii, looking back on those days. It enabled 3D measurement of large aerospace parts that cannot be measured with the Coordinate Measuring Machine, and exemplified the determination for entering the aerospace industry. "During the first three years, we were mostly ignored even when we visited potential customers for sales. However, their response started to change immediately after we posted the laser tracker, which was rarely purchased in this prefecture in those days, as our equipment on our website. We obtained an order from our first customer in the industry, which was followed by a series of inquiries from other companies that learned this information." He talked about an episode when the company entered the aerospace industry. "There was another obstacle. Many of our employees were concerned about the entry because jobs for the aerospace industry require sophisticated equipment such as 5-axis machining centers and advanced machining techniques such as those for hard-to-cut materials." In response, Mr. Ishii, who believes in taking on challenges, kept inspiring the employees with a strong determination, saying "It is not whether we can do it or not, the question is whether we will go ahead and do it." Ishii Machinery has steadily achieved results including the production of assembly jigs for fuselages of domestically produced passenger jets in 2013, as well as recent achievements such as the machining of jet engine components made of titanium alloy and other hard-to-cut materials, and also improved its technological capabilities.



The Mazatrol CNC system is well liked by the operators

Ishii Machinery newly constructed the 'M Factory,' where Mazak machines are installed, on its property in June 2018. A total of four Mazak machines, including the VERSATECH V-100N, a multiple-surface, 5-axis double-column vertical machining center, as well as the HCN- 6800 horizontal machining center, and the INTEGREX i-630V multi-tasking machine, are in operation in the factory. "While we now machine large parts for semiconductor production equipment in a highly efficient manner, we also consider the machining of large parts for aerospace in the future," stated Mr. Ishii. He seems to be already composing the next symphony to be played by the M Factory.

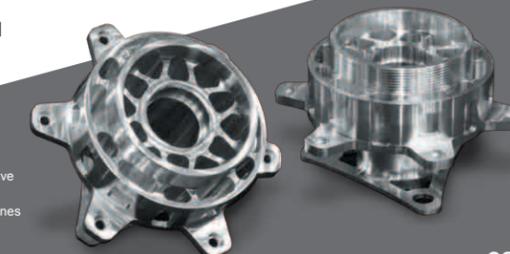


Mr. Taiyo Ishii, President, serves as the 'conductor' of the Orchestra Factory

Experienced difficulty in entering the aerospace industry

Mr. Ishii newly determined that the company would make a full-scale entry into the aerospace industry when he became the president. "I aimed to expand the business foundation and also raise the spirits of employees with this new undertaking." He explained the reasons for the decision. The entry into the aerospace industry has been his dream since he joined the company in 1997. Including the certification of JISQ9100 (comparable to AS9100/EN9100) obtained in 2008, which is a quality management system required by the aerospace industry, Ishii Machinery has made steady efforts to prepare for its entry. "The

▶ Productivity of machining automotive hubs has been improved by the introduction of multi-tasking machines





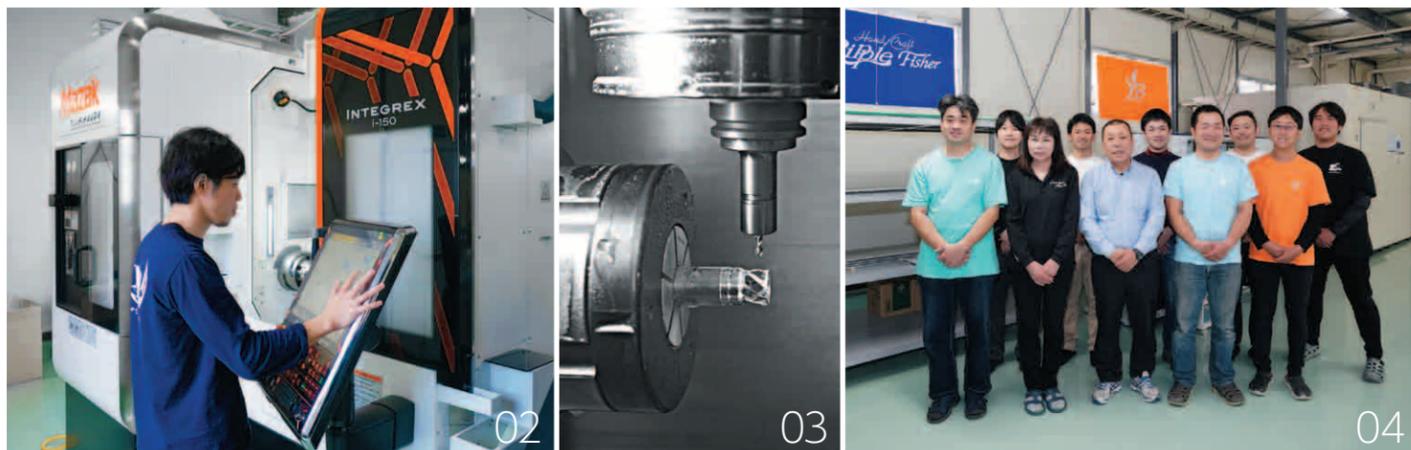
01

Customer Report 02

Proud to be "Made in Japan"

Japan YAMAGA TSURIGU Co., LTD.

"By carefully listening to the requirements of anglers, we want to keep producing 'the dream fishing rod'," said Mr. Shuichi Nakamiya, CEO of YAMAGA TSURIGU Co., LTD., about the commitment of the company to manufacturing. Producing high-end fishing rods under the slogan of quality first, YAMAGA TSURIGU consistently pursues domestic production while many fishing tackle manufacturers shift production bases to foreign countries for lower costs. With no compromise in the quality of the rods from the tip to the grip, the company's products enjoy an enduring popularity among many fishermen.



- 01. Fishing rods manufactured by YAMAGA TSURIGU, which capture the hearts of anglers
- 02. INTEGREX i-150 was installed to accelerate the development of new products
- 03. Each of the decorative components is machined with high precision
- 04. Mr. Shuichi Nakamiya, CEO (center, front row), Mrs. Chizuru Nakamiya, his wife and vice-president, Mr. Toshiro Nakamura, who is in charge of planning and development (left, front row), and employees

COMPANY PROFILE



YAMAGA TSURIGU Co., LTD.

CEO : Shuichi Nakamiya
 Head office : 945 Obaru, Yamaga, Kumamoto
 Number of employees: 49

yamaga-blanks.com



YAMAGA TSURIGU was founded by Mr. Shuichi Nakamiya, CEO, in Yamaga-city, Kumamoto in 1989 with the goal to develop products under its own brands. The company has established two brands: 'Ripple Fisher', which was launched in 1994 and is specialized in rods for large sea fishing, and 'YAMAGA Blanks', which was launched in 2008 to offer rods for a wide range of types of fish. Both brands commonly reflect the desire of Mr. Nakamiya to produce the fishing rods that satisfy the demands of anglers. As he also enjoys fishing, Mr. Nakamiya is committed to manufacturing products that reflect his ideas as both a producer and a user. The company started to sell products abroad on a full scale around 2010. The fans of the high-quality fishing rods reflecting his ideas are also increasing in the US, Europe, the Middle East and Southeast Asia.



Mr. Shuichi Nakamiya, CEO, talking about his domestic production policy

Decision to introduce a CNC machine tool for higher quality

The policy of YAMAGA TSURIGU that focuses on quality is also adopted in the production of metallic decorative components to be incorporated into the rod grip, such as 'spacers' and 'rings'. The grip is the "face" of a fishing rod because it attracts the most attention of anglers. The parts that decorate the grip are significant as proof of a high-quality fishing rod. "While we used to import these decorative parts, we found them unsatisfactory with variations in quality. Then, we thought that we should machine the parts

in-house to complete the whole rod in detail and decided to introduce machine tools," said Mr. Nakamiya. Then, the company installed its first CNC machine tool in 2016 to start in-house production of decorative parts. The machine tool selected as the first one was a Mazak QT-PRIMOS CNC turning center.



Two QT-PRIMOS are in full operation

"A trading company dealing with us recommended Mazak machines, which are known for their ease of programming and operation, and we decided to purchase one," Mr. Nakamiya said. Mr. Toshiro Nakamura was appointed as the person in charge of the first CNC machine tool for YAMAGA TSURIGU. Mr. Nakamura emphasized that Mazak machines are easy to use, living up to their reputation. "I was almost a layman when I started to operate the machine, but I was able to handle it just a week later thanks to the ease of operation of the Mazatrol CNC and Mazak's support system that provided machining training." He also indicated the effect of the introduction on quality, stating "It was another great advantage that the need for additional machining for fitting was eliminated by the high precision machining." The company installed another QT-PRIMOS in 2017 to establish a system where the craftsmanship of skilled employees who completely devote themselves to attention to detail is supported with high-quality



Spacers and rings that decorate the grip of a fishing rod

Customer Report 02

Japan YAMAGA TSURIGU Co., LTD.

machining technology. "The shift to in-house production led not only to better quality but also to quicker delivery," said Mr. Nakamiya. In fact, with the introduction of Mazak machines, the lead time for the production of spacers is approximately 70% shorter than it was when the production was outsourced.

Multi-tasking machine for increased added value

Mr. Nakamiya analyzed the trend of the industry and said, "Further overseas development will be needed in the future as the population of anglers in Japan has been on a downward trend lately partly due to the impact of the declining birthrate." The company has set a new business strategy to achieve targets including the development of fishing rods for fly fishing, which is very popular in the US and Europe. Under these circumstances, YAMAGA TSURIGU installed a Mazak INTEGREX i-150 multi-tasking machine that can process complex shapes, as an investment in 2018. With 5-axis machining, the company can now produce prototype spacers of various designs.



Prototype parts machined by the INTEGREX i-150

"We will accelerate trial production and development in the future and further increase the added value of fishing rods by including decorative parts machined with high quality."

The policy to keep production activities in Japan, as well as the commitment to manufacturing for the demands of anglers, will be consistently maintained as the basic policies of the company in the future.



01

Customer Report 03

Aiming for further growth through the promotion of automation and IoT



Korea CAM TEC KOREA

Cam units are important parts of press dies, which are used to form steel sheets for automobiles. Located in Daegu, South Korea, CAM TEC KOREA manufactures cam units and has a market share of 90% in Korea. A cam unit converts the vertical force of a press die into horizontal force through a slide mechanism. "While the principle of the action is simple, it is not easy to achieve the quality that meets customer demand because the parts require high precision machining. Our company enjoys a high reputation thanks to the machine tools and automation systems of Mazak," said Mr. Hong Dal Kim, President of CAM TEC KOREA. He emphasized that the company has a predominant market share because of Mazak machines.



02



03



04

- 01. PALLETECH performs high-mix / low volume production with high efficiency
- 02. About 1,000 kinds of cam units are produced
- 03. Parts are machined with high precision for enhanced durability
- 04. Mr. Hong Dal Kim, President (center, front row) and employees

COMPANY PROFILE



CAM TEC KOREA

President : Hong Dal Kim
 Head office : 72-25 Seongseogongdan-ro, Dalseo-gu, Daegu, Korea
 Number of employees : 32



CAM TEC KOREA was founded by Mr. Kim, who previously was an engineer at another cam unit manufacturer, in 1998 under the original name of TAE BAEK PRECISION, which was changed to the current name in 2004. "The company name TAE BAEK was taken from a scenic site in Korea, but only Korean people know the meaning. Thus, we adopted a new name that can be used for the global market," said Mr. Kim. As planned, the company has steadily extended its sales network to cover Japan, the US, Europe and Southeast Asian countries in addition to South Korea.



Mr. Kim talking about how he first met Mazak machines

CAM TEC KOREA started to export products to Japan on a full scale in 2013 as a result of an increase in transactions with Japanese trading companies that appreciate its abilities to deliver products in time even when the deadline is so tight that other companies give up the order. The company introduced Mazak simultaneous 5-axis machining centers, the VORTEX i-630V and VARIAXIS i-800, in 2015. The machines were then integrated into a PALLETECH in order to operate continuously for 12 hours. The operation system was shifted to 24-hour continuous operation in 2016. At present, 21 machines and three PALLETECH systems are in full operation.

According to Mr. Kim, roughly 90% of the cam unit parts are machined by Mazak machines, making them indispensable for the manufacturing the company products.

Productivity increased by 50% with the introduction of Mazak machines

"I was impressed when I saw Mazak machines at SIMTOS 2014 (The 16th Seoul International Manufacturing Technology Show) and in the Mazak Minokamo plant and decided on the purchase with no hesitation. Learning the concept of high-mix/ low volume production, I wanted to use it as a reference. I was sure that we would never fail if we learn Mazak's approach." Mr. Kim looked back on how he decided to introduce Mazak machines. "The rigidity of the machines, as well as the exceptional ease of use of the Mazatrol, was also a deciding factor. In addition to high machining precision that eliminates the need for correction work, it was also an advantage that even new employees can easily make programs with the Mazatrol."

CAM TEC KOREA has periodically expanded the PALLETECH systems since 2015.

"It is perfect for our factory to produce a wide variety of parts in small quantities and it is also helpful that an addition or line extension can be easily made with an increase in the machines. In addition, it is beneficial that the operation can be carried out day and night and high precision can be maintained. While 20 operators had to work before the PALLETECH introduction, the number has decreased to three and production has also increased by 50%."



Production line of 21 Mazak machines

To further increase productivity of the plant, in October 2018 CAM TEC KOREA also

▶ Cam units to support press processing of steel sheets for automobiles



introduced Smooth Monitor AX, which enables the operational status of equipment to be monitored and analyzed. "There was a problem that it was difficult to motivate employees to improve productivity because each operator measured the machine operation status differently. With the introduction of Smooth Monitor AX, we can now share the centralized operation status data on a real-time basis. I expect that this common data shared among employees will stimulate improvement among sectors both in production and office." Mr. Kim expressed his expectations for this software.



Smooth Monitor AX monitor (upper right in picture) facilitates sharing of equipment operation status

Planning to construct a second plant to serve other industries

While producing about 1,000 kinds of cam units of various sizes, CAM TEC KOREA now plans to launch the manufacturing of parts for aircraft and ships based on their past performance. In this vision, the second plant will be established near the main factory by 2021 to start work for other industries.

"Of course, we will introduce leading-edge automation systems in the new plant. We plan to enhance our design and development capabilities in addition to machines and equipment and provide world-class products." The global development of the company, which was targeted when the company name was changed, will be promoted more widely along with the expansion of the automation systems in the future.

MAZAK PEOPLE

Yamazaki Mazak Danmark A/S Service engineer

 **Mr. Soren Bjerk**

Endless ambition and challenge, pleasure to grow through it

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 Group companies.

This issue features Mr. Soren Bjerk, who works as a service engineer at Yamazaki Mazak Danmark A/S (YMDK) and takes care of eastern Denmark, Iceland and Baltic countries. He is an all-round player with broad knowledge and experience.

PROFILE » Mr. Soren Bjerk

Mr. Bjerk joined YMDK as mechanical service engineer in 2000. He expanded his job in service hotline from 2006 and laser machines from 2014.



—In which industries do Mazak machines play an active role in your responsible areas?

YMDK has customers within various industries. For example, in Energy which is Denmark's typical industry, the INTEGREGX and HCN series are playing active roles for machining of wind turbine blades and hydraulic pump housings of offshore oil and gas. In the agriculture industry, the VARIAXIS and 3D FABRI GEAR are used to machine mechanical parts of vegetable harvesters and grass cutting machines.

—What is your current job?

Mainly when customers have troubles at their factories, I hurry there to solve the problems. Soonest settlement is always the first priority to re-start the production, so I keep close contact with customers. As installed machines are varied in ages and types, I try to update my knowledge and technique day by day so that I can handle various machines irrespective of its age. In 2006, I started to work for service hot line. In telephoning, I draw on my long experience in the field. For example, I can guide customers clearly which NC menu and buttons on the control should be pressed on the spot as I already grasp those operation. Also, I can judge whether the problem can be solved over the phone or an engineer must be sent to the customer.



Gaining new knowledge leads to a sound advice

Recently, I'm putting effort into support of other field engineers. I know my colleagues very well, which technical level they are in and what tasks they can handle. It is essential to send the right service engineer out to customers to offer good service. Therefore, scheduling and preparation are very important. Although it's sometimes difficult to be fully prepared as new tasks arise throughout the day, I tell everything I can guide my colleagues and educate them as well.

—What is the pleasure you can obtain through the work?

When I am confronted with a difficult problem, I need to examine every possibility tenaciously until its settlement. The process is very hard, but it gives me a particular pleasure when I can solve the problem. I am really grateful when the customer gives me a call saying "The problem was solved thanks to your guidance. Thank you for your good support."

—What do you keep in mind to improve your skill?

I joined the training offered by the company, to obtain knowledge for both mechanical and electrical such as trouble shooting the machine operation and NC software update, and servicing laser machines as



Calm judgement and prompt action are required in any situation

well. Especially there has been significant development with NC controls that they can handle and they are continuously upgraded, so I try to keep myself updated. Also, when I start taking care of laser machines, it requires new knowledge about building and adjusting the resonator that is completely different from tooling machines. However, it is a pleasure to obtain new knowledge for me. If each service engineer expands the scope of jobs, various problems can be handled and quick support can be offered to customers. It is a big advantage to be flexible as a service engineer. I will keep trying to improve my skill.

Mr. Bjerk always tries to keep learning and grow through overcoming difficulties. His calm and correct work earns high recognition among colleagues and customers. He will expand his activities through his endless challenge.

How he spends his days off

I've been joining the race called OCR (Obstacle Course Racing). It's an extreme sport that pushes your boundaries in both physically and mentally by overcoming obstacles such as crawling up ropes and throwing me into mud ditches. Although it's extremely hard, it gives me a very special feeling of success. I believe that the mental toughness and flexible body fostered through the training will also be beneficial to my work.



News & Topics

The skills of a 'Contemporary Master Craftsman' who supports high-quality manufacturing



Mr. Miyoshi Ouchi, who was named as the newest Contemporary Master Craftsman at Mazak

Recently, production efficiency in manufacturing has been rapidly improved with automation using robots, IoT, and other advanced technologies. On the other hand, some of the precision assembly tasks are difficult to be numerically measured or standardized for the work contents and still require outstanding skills of craftspeople. As an excellent craftsman with exceptional proficient skills, Mr. Miyoshi Ouchi, who is engaged in the precision assembly of spindles in the Cyber Spindle Factory at the Mazak Minokamo Plant 2, was named as one of the Contemporary Master Craftsmen commended by the Japanese government Ministry of Health, Labor and Welfare last year.

Mr. Ouchi has continuously worked for the precision assembly of spindles, which are a core unit of Mazak machine tools, for approximately 30 years since he joined the company. He has especially demonstrated his great skills to improve the precision of the components of high-speed spindles, which are difficult to assemble. In lapping for example, when the face of a spacer is precision finished for the parallelism of bearings in a high-speed spindle, he can manually obtain parallelism to less than 1 μm (0.00004 in.) with his sophisticated skills. His colleagues say that he has the hands of God. "You should adjust the force on your fingertips as if you are gently caressing the head of a baby and then finish the work quickly to avoid temperature rise due to frictional heat," said Mr. Ouchi, revealing his tips. At present, while working to further improve his skills, he is committed to making proposals for improvement measures on spindles at the time of the development of new models to the design department, as well as the skill training of young employees.



Lapping - precision finishing of spacer faces on a lapping machine



Mr. Ouchi - giving technical guidance to a young employee

Six Mazak employees including Mr. Ouchi have been named as Contemporary Master Craftsmen. We will continuously endeavor to cultivate human resources with advanced skills and provide high-quality and high-performance machine tools to customers in order to contribute to the advancement of manufacturing in the world.

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.



Collection Showcase 1
THE YAMAZAKI MAZAK MUSEUM OF ART

SISLEY, Alfred
“The Loing Canal in Saint-Mammés”



SISLEY, Alfred [1839-99] "The Loing Canal in Saint-Mammés" 1885 Oil on canvas

Sisley, a well-known Impressionist painter, was born in Paris, where his father ran a trading company. Although he spent most of his life in France, he was of English nationality. Financially well off, he lived in Paris in the winter and also rented houses amid beautiful natural landscapes in rural areas on the outskirts of Paris and along the banks of the Seine in mild weather. He was joined there by Monet, Renoir, and other artists who were struggling economically and had difficulty obtaining places to stay as they continued their artistic explorations. As they worked together, attempting to capture the landscapes before their eyes in bright sunlight, they developed the techniques that would come to be characterized as Impressionism. Sisley, along with Monet and Renoir, made an important contribution to the Impressionist revolution. He specialized in landscapes in which wide open spaces were filled with light and or views of water in which light was intensified through reflections of the sky on the rippling surface. His paintings were marvelous examples of Impressionist techniques. The Loing Canal of Saint-Mammés was a water route that connected the Loing River to the Seine near the forest of Fontainebleau on the outskirts of Paris. The scenes along its banks were the sort of landscape that Sisley loved to paint. Impressionist pictures had to be painted quickly in order to grasp the effects of ephemeral natural light under changeable weather conditions. This rapidity of execution made it possible for the painter to express his joyous emotions directly.

Collection Showcase 2
THE YAMAZAKI MAZAK MUSEUM OF ART

GALLÉ, Émile
“Applied and engraved vase”

The body is made of a beige overlay on transparent glass with white glass powder mixed in. After strips of pink and purple glass were added, it was pulled to create a radiating flame pattern. The purple violets stand out strongly against the light-colored background produced by the soft fusion of these varied colors with the semi-transparent background. The material used for the upper flower is translucent purple glass with sandwiched silver foil. The lower flower is made of heavy, slightly cloudy opaque purple glass. Both are fused to the surface with the appliqué method, and the surface details are treated with an engraving wheel. The yellowish green leaves are inlaid in the background with marquetry techniques, and the details of the leaves are engraved.



GALLÉ, Émile [1846-1904] "Applied and engraved vase" 1898-1904