

CYBER WORLD

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VCN-430A + MA-35/400



New Year's Greeting



New Year's Greeting

Yamazaki Mazak Corporation
President Takashi Yamazaki

I wish you a Happy New Year.

Last year, the spread of COVID-19 imposed various constraints on business activities such as restrictions on movements across national borders and the need for maintaining social distancing. It also affected the activities of Yamazaki Mazak, including business meetings with customers and installation of machines, and caused inconvenience to some customers.

The global economy stagnated due to the COVID-19 pandemic and the economic indicators significantly deteriorated in many countries. The market environment for the machine tool industry was also very severe, as exemplified by the downward revision of order quantity forecast by the Japan Machine Tool Builders' Association from the estimate made at the beginning of last year. While the economy has been on a recovery track since summer when the spread of the infection temporarily slowed down, it is still likely to take a while until the end of the pandemic and the situation continues to be harsh with an uncertain outlook for the future. On the other hand, demand for machine tools has been steady in some fields that are expected to grow in the medium to long term, such as 5G, semiconductor and electric vehicle sectors. As represented by consumption from staying at home, the changes in people's lifestyles brought a boom in some industries. Although unexpected changes in the social environment like this pandemic tend to direct people's attention to only their negative aspects, I have renewed awareness that such changes also have positive aspects and it is important to pay attention to them.

This year, it is continuously necessary to take measures adapted to coexistence with the COVID-19 in every situation. Production sites also need to take measures to prevent the infection including the maintenance of social distancing, which is further increasing demand for

automation systems and remote production support. We are promoting the development of machine tools and software based on AI and digital twins. The accurate reproduction of a production field in a virtual space with digital twins will allow the creation of machining programs and other operations to be conducted remotely from offices and homes. I am sure that it will help customers solve challenges during or after the pandemic and we will further enhance our commitment to the development.

The COVID-19 pandemic has made it difficult to organize large-scale exhibitions as before. We have technology centers and technical centers in more than 80 sites around the world. Making effective use of them, we will hold small-scale private trade shows in a distributed manner in the sites located near customers to ensure that solutions that help them improve their productivity are proposed safely with a sense of security.

The idea of "Green Recovery," which aims to achieve economic recovery and a low-carbon society at the same time, is spreading worldwide. Many countries, including European countries, Japan and China have made a carbon neutral declaration one after another and commitment to the implementation is getting into full swing. We will also continue to promote environmentally friendly manufacturing and business management to contribute to the achievement of a sustainable society.

Although the future is unclear under the current social environment, as a machine tool manufacturer that supports a wide range of industries, we would like to overcome this difficult time together with customers and suppliers.

I hope for your continued good health and success and renewed support in this New Year.

AUTOMATION

Automation Solutions

Manufacturers in the world face complex and increasing challenges such as a shortage of labor and a sharp rise in labor costs due to a decline in the working population, as well as the shortening of the product life cycle due to the diversification of consumer needs. In response to these challenges, efforts to automate manufacturing processes and establish an efficient and flexible production system are promoted in the industries. Mazak has developed various types of automation systems to meet the growing demand for automation. A wide range of automation systems are available according to product shape and production volume. We also provide automation solutions including systems equipped with operation support software as well as the automation of workpiece handling and setup operations.

Automatic machining line with Mazak AUTO FLEX CELL (Minokamo Plant 2)

Mazak's Automation Solutions

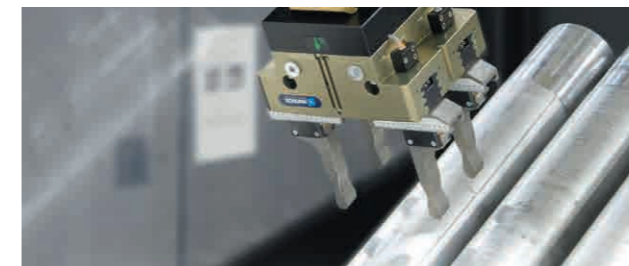
Automation systems with turning-center based machine

Quick Loader Bar Feeder TA (TURN ASSIST) series Gantry Loader GL-50 gantry loader Mazak AUTO FLEX CELL

Automation systems with machining center based machine

2-pallet changer MA (MILL ASSIST) series 6-pallet changer AWC (Auto Work Changer) MPP (Multi Pallet Pool) PMC (PALLETECH Manufacturing Cell)

System size



Automation systems utilizing an articulated robot that can be used without expertise

TA (TURN ASSIST) and MA (MILL ASSIST) series

Workpiece loading/unloading by an articulated robot is the most common example of manufacturing process automation. Meanwhile, teaching of robot hands (programming of robot motions) requires expertise. Accordingly, it is necessary to have external specialists set them to introduce the system and change workpieces to be machined. This increases costs and makes it difficult to operate the system flexibly. Such complicated teaching is not required in the TA (TURN ASSIST) and MA (MILL ASSIST) series, Mazak's automation systems utilizing an articulated robot. The robot setup can be completed just by inputting minimal data such as the shape of materials and quantity on interactive software. Even an operator who is not familiar with robots can easily operate the system. Consisting of a robot and work stocker, the system is compact in size to be carried with a pallet jack and the installation and setup can be completed in a short time. While it conventionally takes many days to install and set up a system, the tasks can be completed in only one day at the earliest for the TA and MA series.

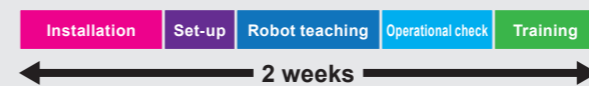


TA (TURN ASSIST) series

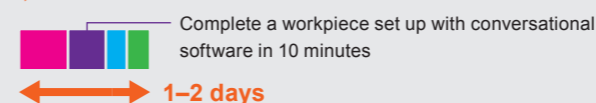


MA (MILL ASSIST) series

▶ Conventional robot system installation



▶ TA/MA installation



Automation systems that support operation setup with dedicated software

MPP (Multi Pallet Pool) and AWC (Auto Work Changer)

To realize long-hour automatic operation with an automation system, it is essential to manage and prepare materials and tools in advance. The MPP (Multi Pallet Pool) and AWC (Auto Work Changer) support the operation of automation systems with dedicated software. The software installed in CNC system can control the automation systems in coordination with the machines. The systems have resource check functions to indicate the programs and tools and displays remaining tool life based on the simulation of extended periods of operation. The suspension of machining during automatic operation is thus prevented to enable smooth production. Both systems are designed to be easily adaptable to future increases in production volume after initial installation at minimal cost.



Multi Pallet Pool

The MPP can be connected to 5-axis vertical machining centers and horizontal machining centers. Workpiece loading/unloading is conducted through pallet changes to allow complex fixtures and heavy workpieces to be loaded.



Auto Work Changer

The VARIAXIS i-300 AWC 5-axis machining center automates the production of small complex components. It is composed of a work stocker utilizing work holders and a dedicated tool magazine that can handle continuous automatic machining over extended periods of time.

Success Story TACHI SEISAKUSHO MFG Co., Ltd.

The MPP dramatically increased the machine utilization rate

Since 2017, the company has introduced two units connected with the MPP to start a completely automatic operation for machining various types of workpieces. The machine utilization rate dramatically rose by machining 50 kinds of workpieces in total continuously around the clock 5 days a week. The operating time per unit reached up to 520 hours in a month and working hours of the operators have decreased by 40%. With the efficiency in parts machining, the unit production volume of industrial machines, etc. has increased by 80%.



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Achievement of mass customization with the introduction of FMS

With the diversification of market demand, manufacturers are required to meet individual needs at low costs with short delivery times, which can be originally offered only by mass production. In response to changing production demand, which is called mass customization, there is a growing demand for automation with a Flexible Manufacturing System (FMS), in which machine tools are coordinated with transport systems and articulated robots, to handle high-mix, low-volume production. The equipment making up an FMS share various data, enabling flexible responses to changes in production schedule and specifications.

Unlike the mass production of one product, high-mix, low-volume production requires many fixtures and tools that involves frequent setups. The FMS enables fixtures and tools to be shared in the system and can allocate production processes flexibly in consideration of the operation status of each machine to efficiently conduct high-mix, low-volume production.

The FMS proposed by Mazak can automate various setup operations including automatic material supply and tool changes. The system can be composed flexibly to, for example, be connected with multiple machine tools or coordinated with machines dedicated to measurement, workpiece cleaning, deburring, etc. We can construct an optimal FMS tailored to customers according to their production processes, machining items and the number of lots to help them realize mass customization.



PALLETECH MANUFACTURING CELL

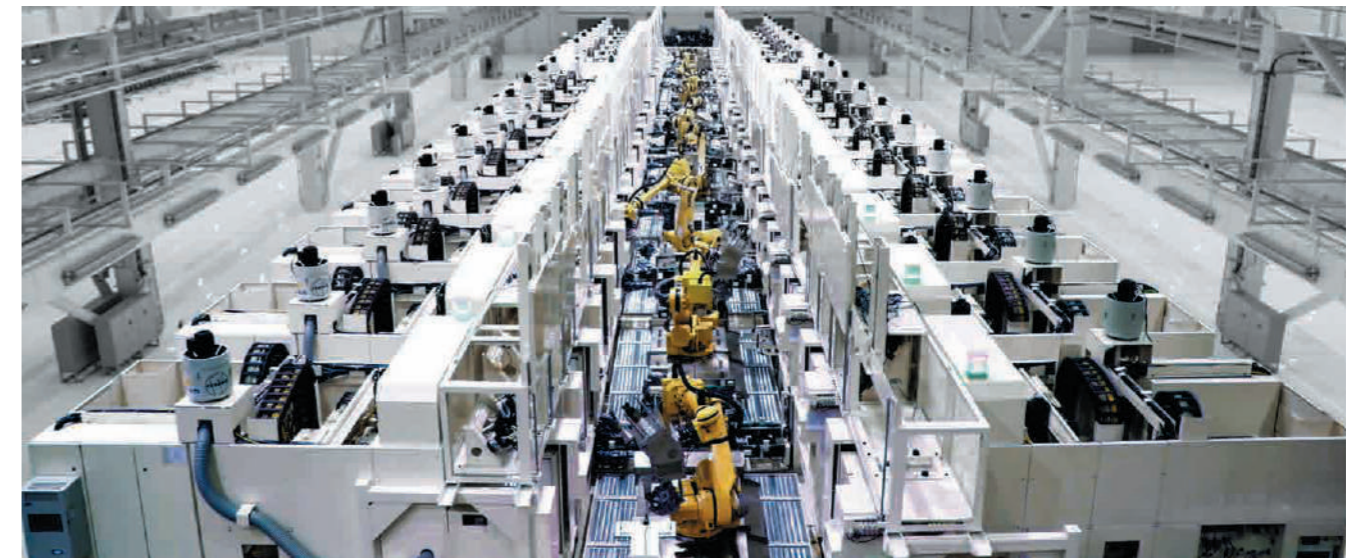
The PALLETECH Manufacturing Cell (PMC) is an FMS composed of such machines as horizontal machining centers, multi-tasking machines and 5-axis machining centers. The system is designed with flexibility to easily add pallet stockers as well as loading stations and machines. It can significantly reduce setup operations even in a production line where different models and dedicated machines are mixed because workpieces can be transferred between processes. Thanks to the high flexibility, machine tools and modules can be retrofitted to a PMC that has already been installed.

MAZAK AUTO FLEX CELL

The AUTO FLEX CELL (AFC) is an FMS exclusively for the INTEGREX i-H series, constructed by freely selecting the components from among articulated robots, various stockers, transport systems, etc. The CNC system displays any missing chuck jaws and tools based on the production schedule. The robot can perform the various setup operations such as loading/unloading workpieces, supply chuck jaws and exchanging special tools. It is also possible to connect AFC with AGV (automated guided vehicle) or AGFL (automated guided forklift) for coordination with a logistics system including external warehouses.

Providing automation solutions tailored to individual needs

Mazak provides turnkey solutions to support from the proposal of an automation system to its setup and operation. We propose a total automation package including the models, process designs, fixtures and tools and undertake every process up to the launch of the production line to ensure that customers can start production smoothly. Deploying staff specializing in turnkey solutions in our sites around the world, we have introduced various automation solutions, ranging from a mass production line for the automotive industry to an FMS for high-mix, low-volume production of parts for aircraft and construction machines, to many customers irrespective of industry. Using this extensive accumulated knowledge of automation, we will provide the optimum production system to meet individual customer needs.



Mass production line for machining parts of automotive engines, which is composed of the FF-5000/40 horizontal machining centers and articulated robots

Success Story Sankyo Shizuoka Seisakusho Co.

Two FMS lines support the state-of-the-art plant

The state-of-the-art plant named Sankyo Dream Factory is supported by two FMS lines. The one is a line composed of multi-tasking machines and horizontal machining centers and the other is multi-tasking machines connected to the Gantry Loader, which both were introduced in 2019. Even before the start of full-scale operation, the operating time has improved by 40% in comparison with conventional automation systems. The company plans to operate the plant for 48,000 hours in total per year to machine as many as 250 kinds of workpieces with five operators in the future.



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 www.metrol.co.jp



Customer Report 01

Using the abilities of sensors to support manufacturing with no in-process defects

Japan Metrol Co., Ltd.

Industrial sensors underpin the automation of plants. Endoscopes are essential for medical practice. Although these two products may seem to have no relation, they commonly need to be highly accurate, waterproofed and resistant to a harsh environment. Located in Tachikawa City, Tokyo, Metrol Co., Ltd. is engaged in the development, manufacturing and sales of high-precision industrial sensors and its founder is a leading expert on the research and development of endoscopes. Sensors and endoscopes are related in this way. How has the company inherited the management policy of making full use of advanced technical capabilities to consistently pursue high precision since the establishment?



02



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- 01. The INTEGREX multi-tasking machine enabled process integration to machine complex workpieces
- 02. The plant of the company has rows of Mazak machines
- 03. Tool setters produced in-house are also mounted on internal equipment to demonstrate product quality
- 04. Mr. Takuji Matsuhashi, President (center), and employees

Metrol is a manufacturer specializing in industrial sensors founded by the father of Mr. Takuji Matsuhashi, President in 1976. In the following year, the company developed precision mechanical sensors as a substitute for conventional dial gauges jointly with Toyota Motor Corporation. "We developed high-precision, waterproof mechanical sensors that can endure harsh working conditions where coolant and cutting chips splatter. We sought evolution that went against the trend of shifting to electrical sensors in those days," Mr. Matsuhashi said.



Mr. Takuji Matsuhashi, President, talking about the company's business model

Aiming for the machine tool industry, Metrol developed tool setters for CNC lathes to detect the wear of blade edges in 1983. They are now used by more than 70 machine tool manufacturers in 17 countries to hold one of the largest market shares. In addition to automobile and machine tool industries, its products are widely used in semiconductor, medical equipment, robot and other industrial machinery sectors. Effectively using digital tools including its original e-commerce website and social media, the company has won customers all over the world. The key to the business of Metrol is its ability to handle high-mix, low-volume production. In fact, the company deals in more than 1,000 items in total, 90% of which are produced on a build-to-order basis. "We devote ourselves to customer-oriented customization. Sixty percent of our products are tailor-made items. I believe that our mission is to help create a mechanism that prevents the generation of defective products in the manufacturing processes of customers by

using the abilities of sensors," he said, explaining the company's worth.

Mazak machines were introduced one after another based on opinions of young staff

In Metrol's plant, a total of seven Mazak machines are fully operated, including the QUICK TURN 100 and 100MY CNC turning centers, the VCN-430A vertical machining center and the INTEGREX j-200S multi-tasking machine. All of the machines were introduced in rapid succession after 2018. "We inevitably shifted our focus to the in-house production of sensor body parts because we had to address the discontinuance of business by some partner plants due to the aging of employees. It was more reasonable to do so in consideration of the delivery time and costs." He explained why the machines were introduced over a short period.



Housing of a touch probe machined with the INTEGREX

The decisive factor for the selection of machines to promote in-house production was the opinions of young production staff. "The staff say that the interactive CNC system of Mazak enables them to create machining programs without using CAD/CAM on PCs in an office and helps them improve their programming skills on site through the work. They also seem to feel rewarded. Indeed, the CNC system helped increase productivity." For example, while the production of complex-shaped 3D touch probe housings used to require two months for the lead time, it was reduced to 15 days after the shift to in-house production. The development of new products has

- ▶ Workpieces machined with Mazak machines and a product of Metrol (right) They underpin high-precision manufacturing in machine tool, automobile, semiconductor and various other industries



also been accelerated as exemplified by the production of prototypes on a weekly basis, which was conventionally conducted on a monthly basis.



The user-friendliness of the MAZATROL was the reason for introducing Mazak machines

Moreover, the promotion of in-house production has helped increase the corporate strength of the company. "Even in the situation where the COVID-19 pandemic is causing revenue decreases, we have increased profits by reducing external expenditure with the shift to in-house production."

Aiming to create a work environment where experienced staff and young staff complement each other

"While mechanical sensors used to be dominant, the ratio of the mechatronics type increased with the addition of electrical elements. Then, with the addition of software elements, they are now connected via IoT. Products are thus evolving with the times. Therefore, we must be committed to human resource development and research and development while keeping it in mind." Towards such a new era, Mr. Matsuhashi is working to create a work environment where experienced staff and young staff complement each other. A specific initiative is the introduction of a mechanism where skilled workers who had a wealth of experience in major companies are invited as mentors to give practical training to young staff who will play important roles in the future. With the integration of the energy of young staff and the knowledge of experienced staff, the evolution towards the new era has already started in the company.



01

Customer Report 02

Fully using two laser processing machines to prevail over the competition

Japan Kouken Co., Ltd.

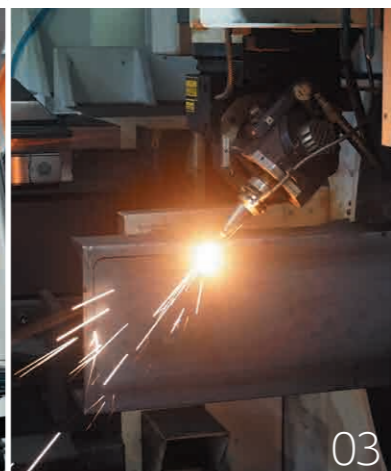
Construction of steel structures, precision cutting of sheet metal and contract manufacturing of assembly parts are part of the businesses handled by Kouken Co., Ltd., located in Shunan City, Yamaguchi. Two laser processing machines of Mazak play an active role in these jobs. One of them is a direct diode laser-based 2D laser processing machine, the OPTIPLEX 3015 DDL. "When I visited a plant of Mazak, this model was recommended enthusiastically," Mr. Takehiro Fukai, President, said. The machine gave momentum to the business development of the company, leading to the introduction of the 3D FABRI GEAR 400 III, a 3D laser processing machine that he had a plan to introduce for a long time.



Yamaguchi, Japan



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- 01. The 3D FABRI GEAR introduced in May 2020 helped improve profitability right after the start of operation
- 02. Young employees actively work in the front lines
- 03. The machine can handle 3D cutting of various shapes such as H-beam steel and round pipes
- 04. Mr. Takehiro Fukai, President (center), and employees

COMPANY PROFILE



Kouken Co., Ltd.

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Post-process was dramatically shortened with precision cutting

The introduction of the OPTIPLEX 3015 DDL produced a larger effect than anticipated. "It can precisely cut rare metal materials that are difficult to cut with an ordinary laser processing machine, so the customers who ask us to do a job that has been rejected by other companies have increased." As a result of overcoming the challenge and working for difficult machining, Kouken improved its business performance significantly. Three years later, the company put a long-held plan into action, which was the introduction of the 3D FABRI GEAR laser processing machine.



The OPTIPLEX DDL provides high speed cutting of various materials and thickness

"I wanted to introduce the machine for a long time because we can ensure high precision cutting and save labor cost with it. The purpose of the introduction was to reduce assembly process in Kiyou-kikai. In other words, we intended to use it for the preliminary cutting of items to be machined in-house." In fact, preliminary cutting of structural members with the machine, along with the preparation of work sheets with the DDL machine, to produce a frame of a 30-ton class industrial equipment enabled the assembly to be completed in just one day, which was one-fourth of the time required conventionally.

"Engineers were surprised at high precision cutting surfaces that did not need grinding

- ▶ Workpieces laser-processed with Mazak machines
- The heat exchanger made of brass (left) has extremely high cutting surface quality



Production set-up time was substantially shortened with CAD/CAM software FX TUBE

process. Welding of the surfaces causes almost no distortion, either. The machine has met our expectation to shorten production lead time."

Aiming to integrate the production sites in two years

"To receive orders amid the fierce competition, it is important first of all to gain an advantage in equipment over competitors. The key is to introduce the high-end machines that can meet a high level of customer demand and make full use of them quickly," Mr. Fukai said with certainty. He is confident that they have effectively used the two laser processing machines.

"For example, the production lead time of manual cutting with a saw or gas cutter can be reduced to one-tenth by using a 3D laser processing machine. This demonstrates what the new equipment is capable of achieving." Kiyou-kikai, in which Mr. Fukai also serves as the president, plans to concentrate the production sites in a place close to the site of Kouken while they are currently dispersed into three locations. "The objective is to develop a manufacturing system that integrates the processes ranging from the cutting of materials to plate work, mechanical machining and adjusted assembly." He is also considering to integrate the management of the two companies in two years. What success will they achieve next?



01



Kubanzheldormash Company

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Number of employees : 700

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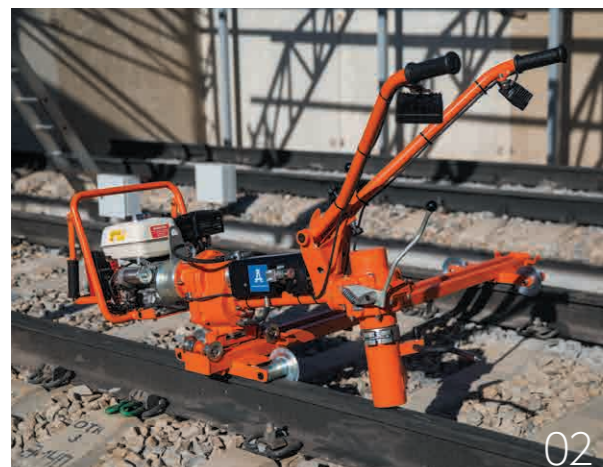
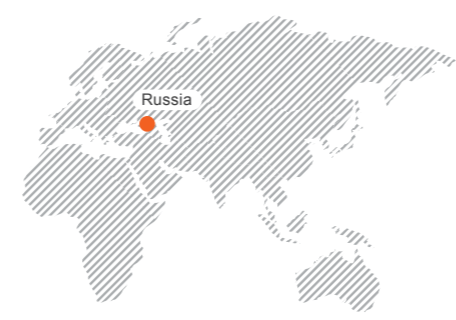


Customer Report **03**

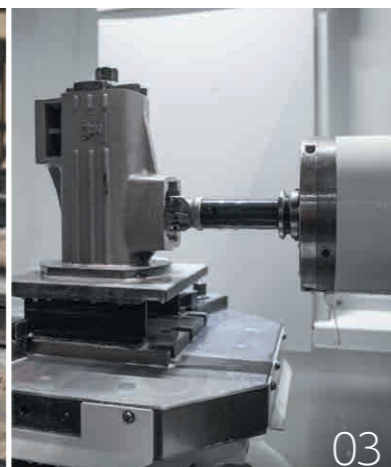
Establishing an integrated production system to win the trust of customers

Russia Kubanzheldormash Company

The safe and comfortable operation of railway vehicles requires the proper installation and maintenance of the rails. Based in Armavir, southern Russia, Kubanzheldormash Company supplies equipment for the installation and maintenance of rails (railway maintenance equipment). The company develops and manufactures all types of railway maintenance equipment including tampers, which tightly press down railway ballast, and rail grinders, which remove rust on rails, to underpin the installation and maintenance of railway tracks around the world. Renowned for durability and user-friendliness, its products also played active roles in the construction work of the Channel Tunnel between England and France opened in 1994. They have been used for laying rails in the submarine tunnel with a total length of 30 km and maintaining them for more than 20 years since the opening.



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- 01. The QUICK TURN 200MA L introduced in 2020 (manufactured at Mazak's Liaoning Plant in China)
- 02. Track wrench (equipment to tighten rail joint bolts) produced by Kubanzheldormash
- 03. High-precision cast parts machined by a Mazak machine tool
- 04. The user-friendliness of the MAZATROL conversational CNC system also enjoys a good reputation among operators

Kubanzheldormash Co. was established as a manufacturer of forged parts in 1933 and started to manufacture railway-related parts in 1939. Since then, the company has consistently offered railway maintenance equipment for more than 80 years to assist the development of Russia as a railway powerhouse. Based on the achievements accumulated in the country, Kubanzheldormash began full-scale exports of products around 1960. Today, its products are used in more than 130 countries and regions, and are exceptionally well known in the railway industry in Europe, Asia, Africa and Latin America. Mr. Anatoly Shchukin, the CEO, explained why the company is selected by customers in the railway maintenance equipment sector, where high reliability is required. "We are one of the oldest manufacturers in southern Russia. The experience and performance backed by our long history allow us to win the trust of customers all over the world."



Mr. Anatoly Shchukin, the CEO, leads the company

A strength of Kubanzheldormash is the integrated production system covering the whole process from the manufacturing of parts to final assembly. With different types of equipment for casting, cutting and heat treatment, it has dealt with orders for both standard and custom-made items in a short delivery period and successfully expanded its business. In response to an increase in orders, the company decided to substantially update its production equipment in early 2000. Then, while considering the introduction of highly efficient machining equipment, the company met Mazak machines.

Mazak machines turned the impossible into the possible

Kubanzheldormash introduced first Mazak machines in 2004. The INTEGREGX 300Y multi-tasking machine and the MULTIPLEX 6100Y CNC turning center were invested to improve the efficiency of machining of railway maintenance equipment parts. The equipment has been renewed in a phased manner since then and a total of 16 Mazak machines are currently operated. "With the Mazak machines, we became able to machine complex-shaped parts in a single setup with high accuracy. What was impossible with the machining equipment before the renewal was turned into the possible." Mr. Shchukin mentioned the effect of the introduction of Mazak machines. In fact, the VARIAXIS 630 5-axis machining center introduced in 2006, shortened the in-process time for various parts including gearboxes to be incorporated in railway wrenches. He appreciates the machine as the production equipment that has had the largest impact on the factory management of the company.



INTEGREGX 400-IV (right) was introduced in 2007 and is still fully operated as a front-line machine

In 2020, Kubanzheldormash introduced the QUICK TURN 200MA L CNC turning center produced in Mazak's plant in China. The combination of it with a robotic arm enabled long periods of fully automatic machining of shaft parts. He said about the effect of the

Parts of railway maintenance equipment precisely machined by Mazak machines



investment: "The introduction of this automation system did not only increase machining efficiency but also helped our employees improve their production engineering skills."



Employees of Kubanzheldormash

Enhancing the integrated production system for further growth

Mr. Shchukin predicts that the future of investments in railway infrastructure is bright. "Railway investments are booming in Russia and other Eastern European countries and demand for railway maintenance equipment is growing. To supply the products that customers want in a timely manner, we have to further improve the productivity of our plants as a whole." Under such circumstances, Kubanzheldormash plans to make additional capital investments and is now preparing for the introduction of Mazak's latest machine tools. "The introduction of cutting-edge machines will further raise our technical level and reinforce the integrated production system we are proud of." While developing its confidence with many achievements in the railway maintenance equipment sector, Kubanzheldormash has recently launched the manufacturing of agricultural machines. The decision was made in expectation of significant growth of demand for agricultural machines in association with the agricultural rationalization promoted in Russia. With its enhanced integrated production system, the company will continuously produce reliable products in the new domain as well and achieve further growth.



PIONEER DRILLING CO., LTD.

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 Number of employees : 250

www.lptpmfg.com



Customer Report **04**

Advancing into the world from Vietnam

Vietnam PIONEER DRILLING CO., LTD.

The discovery of oil and gas thousands of meters below ground requires sophisticated exploration techniques and equipment that can be used under harsh conditions. Based in Ho Chi Minh City, Vietnam, PIONEER DRILLING CO., LTD. manufactures parts of equipment for oil and gas exploration. With high quality, short delivery period and reasonable prices as its strengths, the company machines valves, pumps, pipes and other components. Although its history of parts machining is less than 20 years, the capabilities are already recognized by the largest oilfield exploration company in the world. How was PIONEER DRILLING able to win the trust of globally renowned companies?



02



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- 01. Machining line composed of Mazak's vertical machining centers
- 02. Many Mazak machines installed in the plant
- 03. High-precision and high-efficiency machining is realized with Mazak machines
- 04. Employees who support the growth of the company

In 1999, PIONEER DRILLING CO., LTD. was established as a trading company dealing in equipment for the oil and gas industry. In 2004, the company established a parts machining division to provide machined parts for the industry. The section rapidly grew in just over 15 years and now has three plants in Vietnam. The business began to expand when exports were started on a full scale in 2005. The company aimed to have transactions with the world's leading oilfield exploration companies based in the US and Europe. "We wanted to be the first Vietnamese company that supplies parts to prestigious companies in the oil industry. I thought about what we should do to achieve this simple and clear target," Mr. Thang Van Le, President, said. The strategy adopted by the company to obtain orders from major companies was to enhance its manufacturing facilities, inventory management and human resources. "I thought that the key would be the establishment of a system that enables us to supply large high-precision parts within a very short delivery time. We introduced large equipment and stored all materials in great quantities. Then, we committed to improve human resources. We provided internal and external training to employees to hone their skills."



Mr. Thang Van Le, President

The promotion of these initiatives at a stretch resulted in the receipt of orders from a major US oilfield exploration company in 2006. Just two years later, in 2008, PIONEER DRILLING was certified by that company as a top vendor (a main supplier that is excellent in quality and

delivery period). Thus, the company achieved huge success with the initiatives.

Mazak machines supported the growth of the company

Based on the trust and track record built ahead of competitors, PIONEER DRILLING sought to receive orders from another major oilfield exploration company in 2009. Strict quality conditions offered by this company had to be met to win the orders and Mazak machines were selected as new equipment to accomplish it. "We repeated trial production with existing equipment but could not achieve the values required by the customer. With the recognition of the need to introduce machine tools with higher precision, we selected Mazak as the partner." Under those circumstances, PIONEER DRILLING introduced the VTC-200C vertical machining center in 2010 while creating its second factory at the same time to focus on the study of methods to machine complex-shaped parts. These efforts proved useful and resulted in the receipt of orders from a large oilfield exploration company.



The QUICK TURN 350 was recently introduced

Since then, PIONEER DRILLING has constantly introduced Mazak machines. Dozens of Mazak machines, including SLANT TURN 550 CNC turning center and HORIZONTAL CENTER NEXUS 6800-II horizontal machining center, are now working

► Parts machined by PIONEER DRILLING, which underpin the oil and gas industry and other sectors



actively in its factories. "We have continuously met high levels of requirements from large global companies for more than 10 years. I can say with certainty that Mazak machines have always met our expectations with their performance for the high-precision machining of complex-shaped parts and parts made of hard-to-cut materials." Mr. Thang Van Le thus emphasized that Mazak machines contributed to the growth of the company.

Entering into industries with high potential growth

In recent years, PIONEER DRILLING has increased transactions with customers in the renewable energy, medical equipment and food machinery industries, in addition to oil industry. It focuses on entry into industries that are expected to achieve high growth from a medium to long-term perspective. "The machined parts we handle are becoming more complex and higher precision is required. Our strength is that we have many talented leaders and well-trained staff members. We will continue to meet customer demand with their technical capabilities and our cutting-edge equipment."



A quality assurance system has been established with the introduction of 3D measuring machines and other measures

PIONEER DRILLING has steadily produced results by setting clear targets and constantly investing in equipment and human resources. Based on the vision created by Mr. Thang Van Le, the company will continue to achieve outstanding success.

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

MARQUET, Albert
“Paris, the Louvre Quay”

The Fauvism is one of the major new artistic tendencies of the 20th century. Marquet is a *fauves* (wild beasts) painter. But he in particular had a peaceful and relaxed temperament. He liked to travel and searched for landscapes to paint near rivers or ocean ports all over France. This painting focuses on the Louvre side of the Seine, but on the other side of the river we can see the dome of the royal palace and, beyond that, the two towers of Notre-Dame Cathedral. The dome on the right is the Pantheon. This is probably a view from a window of the Louvre Museum. Marquet liked elevated views of this kind so he always took rooms on the top floor of hotels when he traveled.



MARQUET, Albert [1875-1947]
 “Paris, the Louvre Quay”
 1906
 Oil on canvas



GALLÉ, Émile [1846-1904] “Engraved vase with orchid design” 1897-1900

GALLÉ, Émile
“Engraved vase with orchid design”

Collection Showcase 2

THE YAMAZAKI MAZAK MUSEUM OF ART

This vase is constructed of three-layer cased glass, white and beige over transparent. The forms of orchids are engraved in relief in purple glass applied to the surface. Shallow wheel cutting on the plain areas of the surface white and beige creates a softly modulated, melting effect like the surface of alabaster. Bits of yellow, red, and dark brown are added to accent the central parts of the flowers. Many Gallé vases from around the year 1900 have bases in the form of a bulb with flattened bottom like this one. Other examples with a similar form feature onion, crocus, and meadow-saffron motifs. Near the bottom, “Émile” is carved in indented lines and “Gallé” in raised lines, the meandering form of the lines resembling the stems of the orchids.

