The Companies That Support Shizuoka's Manufacturing Industry

For the Creation of a Powerful Industrial Base

Department of Commerce, Industry and Labor
Shizuoka Prefectural Government

Look at some of the small and medium businesses that underpin the success of Shizuoka's manufacturing industry.

Known as the "Industry's Department Store," a good balance of heavy, light, and service industries of many types exists in Shizuoka Prefecture. Shizuoka not only performs a lot of industrial production, but also has highly valued agricultural, forestry, and fishing sectors. When it comes to the range of industries represented in the prefecture, Shizuoka's industrial base contains a huge variety of different businesses, ranging from paper pulp production and other basic products and materials manufacturing to clusters of automobile and motorcycle makers. The prefecture also features expanding cutting-edge electronics, plastic models, and food processing industries.

Within the groups of companies gathered in the prefecture, there is one core business activity that forms the heart of Shizuoka's industry. It is the business of making things. In fact, Shizuoka is known as the prefecture where things are made. The prefecture has layer after layer of small and medium businesses possessing a wealth of technologies that support this core productive. These groups of companies are the pillars on which major corporations' competitive power and excellent brand images are built. While responding to Japan's major manufacturers' orders to cut costs, Shizuoka's companies have been able to realize a revolutionary transformation in product quality and technology. The prefecture's geographical concentration of these types of companies, together with the concentration of innovation and entrepreneurship they produce, means these companies are said to be the seedbeds and the wellsprings of Shizuoka's industrial competitiveness.

Shizuoka Prefecture would like to introduce some of these small- and medium-sized businesses that lay at the core of our industry. Because they are a crucial element supporting our prefecture's manufacturing industries, we would like to expand this base and we would like now to promote our magnificent lineup of small- and medium-sized companies to you, the reader.

Kazumi Tani
Director General
Department of Commerce, Industry and Labor

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The World's Leading Non-woven Mask Maker

San-M Package Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kaoru Miyake

COMPANY ADDRESS: 645 Kanayakawara, Kanaya-cho, Haibara-gun 428-0021

ESTABLISHMENT: April 1967

CAPITAL: 12 million yen

NUMBER OF EMPLOYEES: 140

MAIN PRODUCTS: Surgical and dental masks

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URL: http://www.san-m.co.jp

The Pioneer of Non-woven Materials

San-M Package Co., Ltd. is a leading maker of medical use and general use disposable masks that take advantage of non-woven fabric processing. Non-woven fabric is a special kind of fabric that involves the scientifically controlled, mechanized production of thin sheets, rather than the traditional weaving of fiber and thread.

San-M is a global supplier of a range of products, including disposable surgical and dental masks, and caps for nurses from non-woven fabric supplied from Tonen Chemical Corp. subsidiary Tonen Tapyrus Co., Ltd.

Although San-M's name is not widely known to the public because its business is exclusively conducted on an original equipment manufacturing (OEM) basis, San-M produces 350 million face masks of about 800–900 varieties each year. This represents a 90 percent market share in Japan, a 30 percent share in Europe, and a 10 percent market share in the United States. While San-M shares the global market with Kimberly Clarke of the United States, San-M retains confidence that it is second to none as a world-leading provider of non-woven masks.

A High quality masks completely protect against bacteria, dust, and foul smells.

Epoch-making Automatic Production Process

The company's greatest strength lays in its development of automatic production technologies. The company's founder and former president Takao Miyake maintains that just because people are ordinary does not mean that they cannot have extraordinary ideas. By cooperating with Brother Industries Ltd., San-M developed the world's first ultra-

sonic automatic sewing machine.

This technique uses the properties of ultrasonic waves, which vibrate, emitting energy. This energy creates heat, and by utilizing the vibration energy released by the molecules in the target material that creates a way to bond materials without the need for adhesive. This method is markedly faster than conventional sewing methods, creates no pinholes, and because it is airtight, is more robust in terms of sealing performance.

In 1985, San-M converted all its manufacturing to ultrasonic sewing in order to discriminate its products from those of competitors. Because of this, higher speed and continuous sewing became possible to the point where the company was able to ensure a safe and steady supply of low cost, high quality product. Even though its production is OEM-based, San-M still manages to achieve a near-miraculous profit margin approaching 20 percent.

Total Commitment to Quality

The defect rate of masks is held under 3 percent. Because San-M's products are used for health and hygiene purposes, the company strictly adheres to the most thorough quality controls in order to ensure a sense of trust and confidence in product reliability. The products are fabricated automatically via the ultrasonic sewing process, but more than that, they are also mechanically packed and finished, so that other than when the raw materials arrive, no human hand ever touches them. And because of the high level of automation in the production process, about 80 of San-M's 140 staff members are designated quality control inspectors and are able to hover around the factory to check the production to ensure quality. Even though the ISO 9000 class of quality control certification is considered difficult to achieve, San-M succeeded in gaining ISO 9001 certification in 1994. As a result of these sorts of policies and achievements, San-M has acquired an extremely strong reputation for reliability from its customers.

The Eco series of masks, using the non-woven fabric process to make masks that are both high performance and gentle on users.

Developing Products That Meet Customers' Needs

San-M also strives to develop new products. When the company visited the United States in 1983 as AIDS was becoming a serious problem, doctors expressed their fears of infection through nasal contact or contact through the mucous membrane of the eye. They asked San-M if it was possible to develop a surgical eye mask. Rushing back to Japan, the company developed a mask equipped with a fog-resistant transparent film. The company is constantly listening to the voices of its customers, meeting the needs for masks that can cope with bacteria, or with formaldehyde, and for masks that do not touch the lips. Combined with information about new materials development from manufacturers, San-M has two sources of inspiration, and it is on this basis that the company develops and offers its new products.

Netting a 50 Percent Share by Meeting Customer Needs

Nakada Industrial Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kazumichi Minokawa

COMPANY ADDRESS: 880-3 Shitoro, Kanaya-cho, Haibara-gun 428-0019

ESTABLISHMENT: 1947

CAPITAL: 52 million yen

NUMBER OF EMPLOYEES: 140

MAIN PRODUCTS: Synthetic fiber netting

TELEPHONE: +81-547-45-3141

FAX: +81-547-46-4123

URL: http://www.nakadanet.co.jp

From Production to Construction: The Complete Net Company

Nakada Industrial Co., Ltd. has a 50 percent market share of all Japan's golf practice center safety nets and safety nets used at construction sites. But more than that, when it comes to net products, Nakada Industrial is the complete net maker. Among its flagship products, Nakada Industrial produces safety nets used at construction sites and nets to prevent rockfalls. When it comes to sports nets, Nakada Industrial sells its famous Keiza Sport Net brand for golf practice centers, soccer goal nets, baseball practice nets, and nets for ski centers. Nakada Industrial does much more than simply make and sell nets. Its business also revolves around total management of production, installation, and maintenance. For example, there are the driftwood protection nets for dams and the anti-dust nets that the company supplies. Another example are the nets it makes for golf practice centers, tennis courts and nets to stop stray balls at schools.

In the net making business, generally speaking, it can be said most net production follows similar methods and that manufacturing processes are divided by the classification of the use of the nets. Nakada Industrial, however, has managed to unify the various types of production processes in-house. Nakada Industrial has it all. Nakada Industrial has the comprehensive know-how and a production process that manages everything, from the selection and quality control of raw materials, through the yarn twisting process and knitting to specification, and onto final inspection. Nakada Industrial's consistant manufacturing system enables it to deliver cost-competitive, superior products speedily to meet its customers' needs.

Windbreaker/snow protection net used for the Hakuba Ski Jump Stadium at the Nagano Olympics.

Moving to China and Lowering Costs by One-Thirds

Recently, a large influx of low-cost, Chinese-made paint scattering prevention nets, a standard item for construction use, has resulted in severe price competition. In the face of such competitive pressures, Nakada Industrial has tackled the issue directly. By taking a foothold in China and moving to utilize the lower-cost labor there, the company has remained competitive. As part of a risk-lowering strategy, the company entered into a partnership with a trading company to start production in Wuhan in 1998. By virtue of this move, it was possible to lower production costs of general-purpose, mass-produced polyethylene-based materials by about one-thirds.

Developing Light-Weight Nets in Cooperation with a Materials Manufacturer

Unable to match the huge labor cost advantages of China, Nakada Industrial co-developed a 10 percent lighter net with Unitika Fibers Ltd. It is a collaboration that has seen a big rise in orders. The reason why Nakada Industrial partnered with a materials manufacturer was that Nakada Industrial realized that the best way of being able to answer demands that change year-by-year was to enter into product development with the materials makers' side. Materials makers that can offer a second opinion on the market from their materials know-how. Without such a perspective, it is possible to get full insight into new trends and not to miss crucial product development opportunities.

Presently, among other activities, the company conducts periodic development meetings with a major synthetic fiber maker such as Unitika Fibers Ltd. These sorts of activities demonstrate Nakada Industrial's deep relationship with them even in the development of new technologies and products.

"Gomi Pita-kun" net developed to prevent crows scavenging garbage in urban areas.

New Fields

Nakada Industrial constantly drives toward developing ideas for new, high-value products. For example, the company has developed its "Gomi Pita-kun" garbage net that wraps over piles of garbage bags, preventing scavenging by crows. This is an issue that has become a serious problem in some cities. Locally, Hamamatsu and Yaizu cities have placed many orders for this product. In some mountainous areas, damage to trees by roaming deer can be commonplace. The company has developed a net strong enough to withstand animal chewing. From its ability to recycle PET bottles and polystyrene, and to make nets from polythene, to its production of the environmentally-friendly E UNIT river bank reinforcements, Nakada Industrial has an unceasing commitment to find new and challenging applications for its net products.

Aiming at the World's First Clean Foundry

Kimura Chuzosho Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Hiroyoshi Kimura

COMPANY ADDRESS: 1157 Nagasawa, Shimizu-cho, Sunto-gun 411-0905

ESTABLISHMENT: February 1927

ENCORPORATION: May 1948

CAPITAL: 80 million yen

NUMBER OF EMPLOYEES: 396 (592 when including other Kimura Group companies)

MAIN PRODUCTS: Stamping die castings, general machine castings, industrial machine castings

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Breakthrough Technology Has Helped Kimura To Become the World's Top Maker

Kimura Chuzosho Co., Ltd., Tousei Kogyo Co., Ltd., and Japan Metal Co., Ltd. (referred to below as the Kimura Group) focus on molds for automobile body, small lot machine tools, and industrial machinery.

Until recently, the foundry was a typical industrial workplace, full of hot pig iron, a rather untidy, dusty place with an image really summed up as "dirty, dangerous, and difficult."

But the Kimura Group, with its advanced technology and systematic approach, has long walked along the leading edge of metal industry production, and has completely recast this industry's image, and work environment.

The secret behind this drastic change in the factory environment is Kimura's epoch-making and world-famous full-mold casting process technology, or FMC, a process that made prior methods redundant, and has changed the way metal is cast from the roots up.

DW-Type FDC 600 (6 ton) Die Cast.

Underframe Holder Fc250 Die Cast (11 ton).

When introducing the FMC process, Kimura Group was able to solve the issue of developing this process for mass production, and by using computer aided design (CAD) and computer aided manufacturing (CAM) and by using programmed NC processing, the company was able to save both labor and costs, and com-

pletely actualize high-quality mass production. Kimura Group pioneered a new generation of casting technologies. The company is proud to call itself a pioneer and now is a leader in its field.

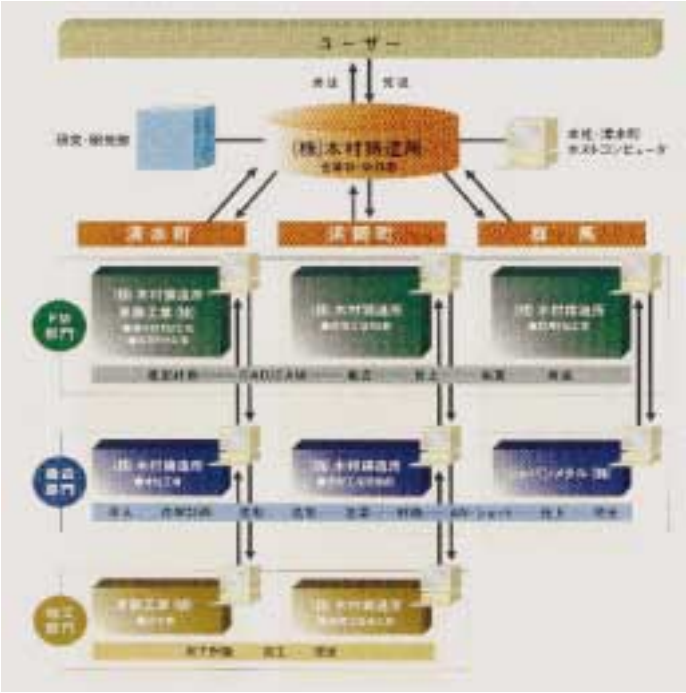
Utilizing CAD/CAM in production.

Cutting-Edge Production Management System

Kimura Group's FMC system involves a rationalization of production methods. Full-mold casting uses polystyrene foam as the pattern. The pattern is first encased in a hardening sand mold. As the metal is poured, the foam simultaneously vaporizes, and the metal takes its place. By using the FMC process, which does not require a process of removing wooden mold, casting time is much shortened, simplified, and becomes much more labor saving.

Transforming the FMC system into a mass production method entailed the construction of a specialized computer system. This system, taking advantage of CAD and CAM, is called NC processing. This is an advanced technological system that enables the automatic finishing of three-dimensional models without the need for hands-on worker involvement.

Turning to the company's Production Management System, Kimura Group, by computerizing all its company sections, and by centralizing management, is able to quickly and flexibly process orders online, fully meeting customer demands right from when an order arrives. Because of the company's promotion



Production management system puts everything online.

of a strict quality control regime and harmonized production processes, Kimura is able to simultaneously shorten its production times and increase volumes.

With its shortened delivery times, low-cost, high-quality mass production capabilities, Kimura Group has taken a 45 percent share of the automobile body molding market. It has become a premier company in this field.

Why Is the Hamaoka Foundry Called the World's Number One Foundry?

Building on the base provided by its revolutionary FMC production system, Kimura Group decided to promulgate its new processes and technologies throughout the company. In April 1988, with the aim of opening the world's cleanest factory, Kimura Group realized this objective with the opening of its Hamaoka Plant.

This foundry makes full use of ultra-advanced technology and the company is proud of its highly efficient and rationalized production that uses the latest, most powerful, yet non-polluting equipment to make a clean production process. The factory has revolutionized the image of the foundry so that it has become a place that is both clean and high-tech. With its world-class facilities, the history-making factory in Hamaoka has opened the door to a new age for the company.

Hamaoka Foundry.

From Japan to a Global Business

The Japanese molding industry, because of its ability to compete in overseas markets, collects orders from both overseas and Japanese companies. About 40 percent of the company's business is domestic. Indirect sales for overseas take about 60 percent of sales.

Industrial molding machinery: centrifugal pump.

Kimura Group products are, however, superior to those of European, American, and other Asian competitors, not only in terms of quality, but also in terms of lead time, value proposition and technology. These qualities and the utilization of advanced technology in Japan mean that Kimura is able to develop a global business without exporting its production to foreign countries.

The success of these factors is shown by Kimura Group's customer base. Kimura Group products are not only widely used by domestic automobile makers such as Honda Motor Co., Ltd., Toyota Motor Corp., and Nissan Motor Co., Ltd., but also in Europe by Swedish and German carmakers, and in the United States. Lastly, Kimura Group's active utilization of technology means that its industrial machinery and machine tools are also evaluated highly.

From Materials Come Components, From Components Come Products: Aiming at the Best

Sugiyama Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Hidekatsu Mochizuki

COMPANY ADDRESS: 2608-50 Nakazato, Fuji 417-0826

ESTABLISHMENT: March 1944

CAPITAL: 113.4 million yen

NUMBER OF EMPLOYEES: 156

MAIN PRODUCTS: Pig iron molding, parts for ductile cast-iron, various dies for home appliances

TELEPHONE: +81-545-32-2182 **FAX:** +81-545-32-2170

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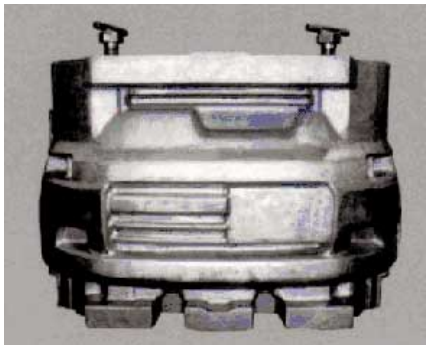
URL: http://www.kabu-sugiyama.co.jp

Never Giving Up: Challenging the 21st Century with Research and Resolve

Sugiyama Co., Ltd.'s eternal slogan is that its business is to challenge the 21st century with a never-say-die attitude to research and unstoppable resolve. Sugiyama has thus built a tremendous reputation for reliability and quality with its customers for its ductile cast iron and high grade cast iron products.

Sugiyama's principal business is pig iron molds and ductile cast iron, and it produces and sells a range of dies and parts for home appliances. The company has factories located at Fuji City, which also serves as headquarters, and at Nakatomi Town in Yamanashi Prefecture. And when it comes to die cast holders, Sugiyama permits no equal.

As well as die holders for die casting, the Fuji Foundry can produce press molds and parts for various types of industrial machinery. It is capable of producing casts of up to 15 tons. The foundry features a low-wavelength electric furnace. Fuji Foundry's operation is distinguished by its full-casting method using polystyrene foam casts, which ensure top quality and quick delivery. In addition, the Yamanashi factory involves in the full-time production of smaller components, including ductile and normal cast iron for compressor refrigerators and parts used for automobile and motorcycle parts.



From die holders to Hi-Duc molding to resin molding. Sugiyama's complete FMC process enables it to produce a wide variety of molded metal products as well as press molds and industry machinery molds.

Leadership over Competitors

Sugiyama's strength is explained by its company motto, "Speedy, low cost, reliable," with which the company produces reliable components of assured quality quickly and at low prices. In order to execute on these demands, full-mode casting (FMC) allows the company to produce ductile products meeting such challenges. Sugiyama has employed the latest, up-to-date full-cast processing using polystyrene molds and a low-frequency induction furnace.

Full-mold casting has recently replaced older casting processes that used wood. It is a technique that uses polystyrene foam as the pattern. The pattern is encased in a one-piece sand mold. As the metal is poured, the foam vaporizes, and the metal takes its place. Full-mold casting represents an epoch-making approach that assures high quality and speedy production at low costs. Its introduction has met with high praise from customers.

A bumper made of resin
by virtue of full-mode casting

From Materials to Products, a Company That Aims to Meet Customer Demands

Sugiyama is always asking how it can improve customer satisfaction, and when it does satisfy its customers,

Excellence in technology and know-how makes Sugiyama a company that is energy-efficient and highly productive, from the manufacture of the smallest parts to the largest casts.

and its aim is to improve even more. Accordingly, the company has assembled a wide range of the latest and most powerful equipment so that it can flexibly meet customer demands.

Materials make parts and parts make products. This attitude to production reflects the company's commitment to total production capability ext
part to the largest casts. The company expects that its production technology will enable it to overcome increasingly severe competition from other Asian countries, particularly China.

Stopping Lead Pollution of the Sea: Switching to Iron Fishing Weights

In order to develop demand for cast iron where demand has reached its limit and is leveling off, Sugiyama is opening new markets. For example, the company has been doing its best to develop fishing banks made of cast iron that resists corrosion almost forever. This technology is working, and fish shoals and seaweed growth have been recognized, and the company hopes to line the coasts of the entire country with such fishing banks.

In addition, as the use of lead in water ducts and pipes and in hunting bullets is being questioned, and as

cast iron steel replaces lead in fishing weights, it is hoped that this will help reduce sea pollution. Sugiyama views such developments positively and is responding to the new challenges such moves pose.

Sugiyama is preventing lead pollution and encouraging the restocking of fish in both rivers and the sea through the promotion of iron fishing weights.

Good Quality Comes from Safety

Because Sugiyama's largest cast products are as heavy as 15 tons, the company takes great efforts to promote the safety of not only its employees but also its visiting customers. The company makes the most stringent efforts to promote a safe environment and, for example, makes the wearing of helmets compulsory for workers and visitors alike.

In addition, because the manufacturing processes involved in the foundry use sand, dust and grit can be a severe problem within the factory grounds. To resolve this, and also to ensure that the environment in the factory for its employees is a healthy and pleasant one, the company has decided to try to obtain ISO 14000 recognition.

Danger awareness and prevention is a matter of education and training. Good training leads to safety consciousness, which is embedded in all the company's production processes.

Toward Becoming the World's De Facto Standard

Alpha Company Ltd.

REPRESENTATIVE OFFICER: Mr. Hiromi Kataoka

COMPANY ADDRESS: 256-1 Ueda, Numazu 410-0316

ESTABLISHMENT: November 1972

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 50

MAIN PRODUCTS: Heat sinks

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URL: http://www.micforg.co.jp

The Creation of a New Field—Heat Sinks

Heat sinks are the radiators that cool computers and other electrical equipment. Alpha Company Ltd., in developing its proprietary MicroForging (very high precision forging) technology, heralded a new age for heat sink technology. The company in fact succeeded in developing high-performance heat sinks that it was previously thought impossible to make.

CPUs are the processing engines of computers; more processing they perorm, the more power and heat are generated. Because of this, the heat sink's ability to dissipate heat is extremely important.

This company uses extremely precise forging technology that molds highly thermally conductive aluminum and copper together to manufacture heat sinks that possess extremely high heat dissipation characteristics. The precision, minute size, and the multitude of shapes the company offers complement the performance improvements that characterize the development of the IT industry. Additionally, the company's single-step forging technology can eliminate the process of fixing copper and other metal sheets to substrates, making it possible to reduce labor and the number of processes, and significantly reducing the production cost.

Alpha Company produces heat sinks of different shapes and characteristics that meet the demand of different types of computers.

* In January 2001 a management reform plan was approved.

Foreign Markets: Always Gathering Information on Cutting-Edge Technologies

The company's main customers include major electronics companies based in the United States and Europe, including IBM Corp., Intel Corp., Motorola Inc., Nokia Corp., Hewlett Packard Co., and Sun Microsystems. Since about 85 percent of sales are overseas, the com-

pany can truly call itself a global enterprise.

"The fact that we are always putting ourselves at the leading edge means that we obtain information of the highest rank. This is the lifeline that keeps this company evolving." These words by President Kataoka sum up Alpha Company policies. Obtaining the most up-to-date, leading information means the company can ride with the biggest trends and keep at the cutting edge. Doing this means Alpha Company can match its technology levels with the changing demands and directions of the market. And of course, through the Internet and participation in international forums and symposiums, engineers exchange information with their colleagues. In addition, Alpha's customers drive Alpha's technology. Orders from cutting-edge customers are of course a source of cutting-edge information.

Making a World Standard

At present, no worldwide standard applies to heat sinks. The company's management goal is to develop a de-facto world class standard for heat sinks. The company believes its experience in making a huge variety of high performance heat sinks that are both easy to make and easy to use and its invention of a mass manufacturing process can make its products a de-facto world standard. Alpha Company also believes that this leads to the industry's growth and opportunities to create new fields of business are opened.

Examples of free-form base heat sinks.

Never-ending Commitment to Pioneer the Unknown

"We have an unceasing commitment to pioneer the unknown. By doing this, we believe that we can contribute to the happiness of many," says President Kataoka. President Kataoka's management philosophy is based on the belief that real creativity means unlimited possibilities, the ability to produce something from nothing. He believes that if the company continues to propose original and innovative technologies and proactively offer them to industry, new markets will open. The high evaluation of these proposals from the industry is a form of wealth for the company. If Alpha keeps on winning in this way, it can fulfil the founder's dream of producing the "rice," the crucial backbone of products, that support industry, that industry depends on for survival.

As a company started out as a cold-forge aluminum subcontractor for fishing reels and automobile parts, Alpha Company has developed and polished its technologies. The president himself even went to the United States to promote with samples in his own hands, and it is from this sort of effort and belief that lends deep meaning to the company. It is with this kind of deeply held management philosophy and belief that the future Alpha can be drawn up clearly.

Liquid Forging Technology: A Process the World Recognizes

Advanced Material Technologies Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Nobuyuki Suzuki

COMPANY ADDRESS: 232-26 Ashitaka-onoue, Numazu 410-0001

ESTABLISHMENT: October 1987

CAPITAL: 267,655,000 yen

NUMBER OF EMPLOYEES: 13

TELEPHONE: +81-55-923-0654 **FAX:** +81-55-923-0662

E-MAIL: amtech@amtech.co.jp

URL: http://www.amtech.co.jp

MAIN PRODUCTS: Production of semiconductor, liquid crystal membrane cast heaters, various types of cast heaters, electrostatic chucks for semiconductor production devices, semiconductor heat spread baseplates (heat sinks), shower plates for liquid crystal manufacturing CVD robot hands, XY tables, various test/prototype compound materials, etc.

Japan's Only Liquid Forging Company

Advanced Material Technologies Co., Ltd., as its name suggests, is a company that makes compound materials from aluminum bases. What makes Advanced Material number one in Japan and a top player in the world market is the company's "liquid forging method."

Liquid metal forging is one of the forging methods for aluminum alloys that involves pouring melted aluminum alloy into a metal mold and then subjecting it to high pressure pressing to solidify it. Until now Advanced Material has produced a variety of materials and compounds including aluminum-ceramics, aluminum-carbon, and magnesium-ceramics.

The aluminum high-pressure press technology, part of the liquid metal forging method, was first developed by the Soviet Union in World War II, and then researched by Japanese aluminum makers after the war.

Advanced Material's President Suzuki also conducted research into this area when he worked at major aluminum production enterprise. Realizing the method could not be used for large-volume production, the company withdrew research from the field, Suzuki resigned and started his own independent business—Advanced Material.

Heater susceptor made by the liquid forging method.

Shower plate: Upper electrode of liquid crystal production equipment.

High Technological and Development Power

Advanced Material's accomplished technical and research capabilities in many fields are highly rated. The company is recognized for its all-round creative abilities by both the high-tech industry and small and medium businesses alike.

In March 2003, Advanced Material

took out four patents on steel alloy combination method and aluminum molding technology and carbon-base compound material and production technology, and has another 18 pending. It also is applying for two patents on utility models. Furthermore, the company even has a patent taken out in the United States.

Future Business Development

So far, Advanced Materials has succeeded in developing aluminum and ceramics compound materials technologies for use in liquid crystal display devices. The company has also succeeded in developing of aluminum tableware with its induction heating technology and continues to expand its business. From now the company intends to utilize its knowledge and technology base of aluminum and other materials to create new products and open new business fields.

In pursuit of this, of the company's 13 staff members, three are involved in the company's research and development section. The company invests a proportionally large budget to this area. As a research and development–intensive technology company, Advanced Material intends to further expand its efforts into more and different areas.

Concretely speaking, when Advanced Material talks about building on its present technology and business base, it means to advance future development into the space and aeronautical fields, and its carbon fiber products into product areas where excellent durability takes priority over price. In July 2002, the National Space Development Agency of Japan adopted Advanced Material's carbon-aluminum fiber thin composite panels for research use in space applications as part of the agency's program to encourage high-tech development programs. Following this success, the company expects its business opportunities to expand.

Advanced Material's 3,000 ton press. The company also has 300, 500, and 1,000 ton presses that can be adapted for various materials and uses.

Developing an Environmental Business for the 21st Century with Original Technology

Yamaichi Metal Co., Ltd.

REPRESENTATIVE OFFICER: Toshikazu Ohga

COMPANY ADDRESS: 715 Honjuku, Nagaizumi-cho, Sunto-gun 411-0945

ESTABLISHMENT: May 1961

CAPITAL: 98.25 million yen

NUMBER OF EMPLOYEES: 20

MAIN PRODUCTS: Aluminum pellet tablet production

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URL: http://www.d3.dion.ne.jp/~ynt1

Yamaichi Metal Co., Ltd. (YMC) is a small business of 20 employees, which is located on the skirt of Mt. Fuji. YMC believes that corporate wisdom moves with the times. Constantly adjusting itself to the fast-changing business environment, YMC conducts research into, develops, and sells a range of products that are useful to the environmental business field. Below, the company explains several examples of its expertise.

Recycling Aluminum Cans, Foil, and Caps

While aluminum recycling is restricted to major companies, YMC, despite being a small business, has a good reputation and is known nationwide. The reason is that the company developed a novel method that, unlike the common methods of recycling aluminum cans, does not produce ingots. To explain further, YMC has developed a method that crushes aluminum cans, a process that removes non-aluminum metals, calcinates in a rotary kiln, granulates, and removes the pigment and the carbide. By repeating this process, the end product becomes identical to the ingot that is obtained when the can is dissolved. The end product, called the Yamaichi Tablet, has been recognized as very high-quality product. The company has acquired several patents, and some more are pending. By virtue of this approach, YMC is able to improve the recycle rate of aluminum dramatically compared to standard processing methods. And use of this type of recycling process has substantially reduced the quantity of waste.

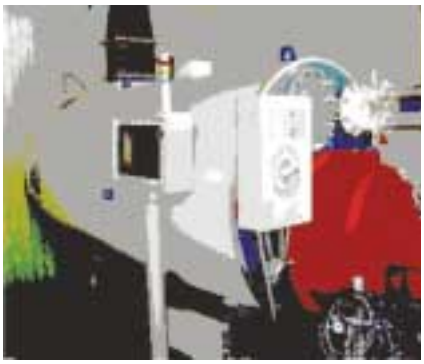
In 1996, the company was consigned by the Ministry of Economy, Trade and Industry to develop technology for aluminum foil and cap recycling and the project was certified under the Japanese Small and

Medium Business Creation Law. Venture capital flowed in from several corporations, and YMC was able to construct a large-scale plant and begin the recycling of aluminum foils and caps used for lactic acid drinks, which had just been buried or incinerated,—a process that had until then been considered impossible.

Creating New Thermal System from Waste Edible Oil

As the world looks towards solutions to deal with global warming and in order to meet commitments stipulated by the Kyoto Protocol, Japan is redoubling its efforts to reduce carbon dioxide emissions. The second half of the 20th century saw the development and gradual spread of "green" energy technologies, such as wind and solar power. At the start of the 21st century, more and more attention is being focused on "biomass," an energy source that has just been wasted before.

In December 2002, with a view to using biomass as a fuel as part of the government's recycling strategy, the Cabinet Office decided to launch the Biomass Nippon strategy, which laid down a concrete strategy to accelerate biomass-generated energy. After seven years of development, YMC has started selling the company's Biomass Burner (BMB). And in April 2003, this device was awarded with Japan's Eco Mark from the Japan Environment Association for environmentally friendly products. After a pilot flame is fired, a chain reaction occurs and continuous combustion begins in BMB. This is YMC's original technology that is based on combustion principals that are not used in other burners.



Biomass incineration equipment.

Recycling Confidential Documents

Office waste paper collection poses a difficult problem when looked from the aspect of ensuring business confidentiality. Also shredding documents into strips cuts the paper's fiber, severely degrading the recycled paper's quality. In a new system that is popular in such advanced recycling countries as Germany and Austria, the paper is given powerful twists, instead of being shredded. Moreover, the system works by adding water and compressing the pulp, squeezing ink into the fibers and ensuring that anything printed is mashed guaranteeing security. This form of processing produces a brick-shaped product. Because the original paper fibers have not been cut, the brick has a high recycling value. It is hoped that banks, insurance, and finance companies—or businesses that need to protect their confidentiality—will be major users of this recycle system.

This system has acquired Level 4 of the DIN (Deutsche Industrie Normen) industry standard. As for throughput, the system can process 120–200 kg per hour. Because the system compresses material to one-twentieth of its original size, a square meter block can weigh 450–550 kg. YMC has mounted this system on a truck, making it possible to conduct processing securely in front of witnesses, adding to the ease-of-mind for those businesses disposing of the paper. So far YMC has sold two processing trucks, but the company believes sales will grow in the future.

The "mobile brick" recycling system.

Developing Academic-Business Relationship

YMC's management practice is very efficient and rational. For example, regarding the company's technology, it collaborates with Tokai University. Traditionally in Japan, cooperation between universities and small companies has not been that easy. However, YMC has developed a relationship that goes beyond the academic-business ties where business makes use of ideas hatched in academia. YMC has its own ideas and asks universities to verify its ideas and inventions.

Challenging New Fields and Developing New Materials by Virtue of a High Technology Power Base

Shinko Flex Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kazuma Torii

COMPANY ADDRESS: 71-5 Nishioka-cho, Hamamatsu 433-8116

ESTABLISHMENT: November 1973

CAPITAL: 14 million yen

NUMBER OF EMPLOYEES: 14

MAIN PRODUCTS: Nonferrous metal materials, silver-based anti-bacterial products, flux for steel making

TELEPHONE: +81-53-438-3451 **FAX:** +81-53-438-3450

E-MAIL: sf@-frex.co.jp

A Great Reputation Built on a History of Materials and Products Development

Shinko Flex Co., Ltd. was founded in 1985 with six employees when the Kawashima Group's research and development department became independent. Currently, the company has a research and development department and a production department for the trial manufacturing of products at the head office site in Hamamatsu, and three factories in Japan. Shinko Flex makes and sells nonferrous metallic materials, flux for steel making, (flux being a substance that promotes metal melting), and silver-based, anti-bacterial agents medicine. Unlike traditional material manufacturers, the company is continually developing and commercializing promising new materials. In particular, Shinko Flex is looking to move beyond basic materials manufacturing to develop various types of promising, value-added materials that have various uses. In spite of the company's size—it has only 14 employees—Shinko Flex is highly rated within its field and has tackled a large number of joint development projects with major manufacturers. President Torii believes that in order for small and medium businesses to survive, they have to maintain their technological originality and the company is positively pushing forward to develop new technologies and materials environ-

Developing Magnesium Alloy with Excellent Safety and Anti-Corrosive Properties

Magnesium (Mg) as a metal has many positive attributes. It is light, hard, safe, and it resists corrosion. But there is a downside. Production of magnesium alloy bullion and recycling of this metal requires melt processing. And melted liquid magnesium easily reacts with atmospheric oxygen, so that there is a danger of ignition. This drawback can raise production costs
mental issues. Taking such issues into consideration, Shinko Flex has overcome these drawbacks. Using its wealth of technological know-how, the company has developed an improved magnesium alloy and, by

The magnesium alloy that the company developed is used in the body of a mobile phone. Mobile phones take full advantage of magnesium alloy's hardness, lightweight, and easy-to-produce characteristics.

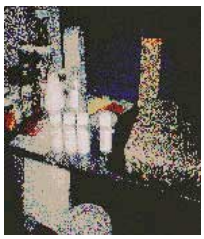
joint research with another company, succeeded in developing products with a continuous forging process and extrusion molding to make magnesium billets.

Shinko Flex's new magnesium alloy is quite light. It is also harder, dissipates more heat, and can be processed more thinly than the standard types of aluminum alloys that have been developed to date. It's suitable for use in a wide range of products, including laptop PCs, mobile phones and video cameras. Looking toward the future, Shinko Flex expects growing demand for the alloy's lightweight characteristics for use in automobile parts and electrical products.

New Recycling Businesses

As with the enforcement of the electrical appliance recycling law and with the automobile recycling law, recycling is becoming a big issue for the manufacturing as a whole. Shinko Flex is tackling this issue with its magnesium scrap recycling process. This has made it possible to process different types of magnesium scrap, from solids to flakes, to weld flash to dross, recycling them into magnesium bullion, solvents, specialized fertilizers, and such. Shinko Flex's complete recycling process offers a consistent and unified process through the whole cycle of magnesium manufacture and recycling. This extends from production to processing, providing makers with the product, recycling, and reuse.

Moreover, Shinko Flex is working to have managed to recycle aluminum dross, paper sludge, and glass into construction materials that have low-echo, anti-skid, and anti-slip qualities for automobiles and pedestrians. A special feature of this is that the materials can drain rainwater and domestic wastewater, obviating the need for ditches. The materials are now largely being utilized on public building projects and barrier-free buildings.



Sample of building materials made of aluminum dross, paper sludge, and glass powder industrial waste. The stone-shaped recycled items on the right are the finished products.

This technology has resulted in several new businesses opportunities with the Government. On the other hand, widespread utilization of such materials, while possible, is somewhat held back by costs. A factor behind this is the lack of a systematic waste recycling collection and processing infrastructure. However, as mentioned, Shinko Flex believes that these materials have extremely high potential as construction materials. The company expects big opportunities to develop once the market is established and recognized for these materials to be used for the reform and construction purposes.

Moreover, outside of its magnesium

scrap business, Shinko Flex is pushing ahead with its technologically sophisticated recycling businesses. The company sees great potential for growth in the future.

This Company Never Thinks of Itself as a Subcontractor

Despite the fact that Shinko Flex has only 14 employees, two thirds of its staff are involved in engineering research and development. The company's workers major in various fields including metal and electrical machinery, on appliances, and in precision engineering. Also, because Shinko Flex has engaged in many mutually fruitful joint development projects with major enterprises and gleaned so much knowledge from such activities, the company has accumulated a wealth of proven knowledge and know-how.

One important point worth mentioning is that Shinko Flex does not allow anyone outside the company into its research areas. It also divides off its research and development booths by project from other areas within the company. Shinko Flex works hard to ensure confidentiality and preserve trade secrets.

Shinko Flex never thinks of itself as a subcontractor. Shinko Flex's attitude to developing new technologies is the same as that of a much larger company. Shinko Flex works hard to improve. In order to keep this attitude, it is inevitable that the company continue to maintain its originality, build up better technologies, and keep its ability to develop the sorts of technologies that other companies cannot copy.

The optical analysis section in the Shinko Flex's research and development department. Shinko Flex continually strives to develop original technologies.

Expanding to a Global Market with Reliable Products

Yamaguchi Manufacturing Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kenzo Yamaguchi

COMPANY ADDRESS: 292-12 Ashitaka, Numazu 410-0001

ESTABLISHMENT: October 1950

CAPITAL: 48.2 million yen

NUMBER OF EMPLOYEES: 138

MAIN PRODUCTS: Various specialized screws, precision metal processed parts (for automobile, home appliances, etc.)

TELEPHONE: +81-55-925-2000

FAX: +81-55-925-2005

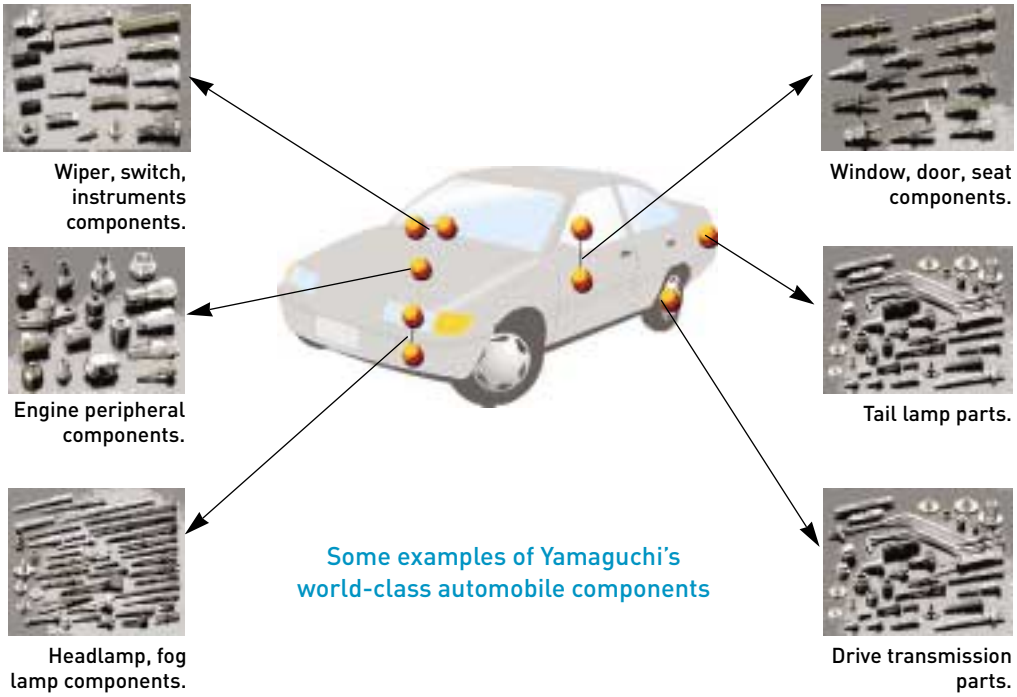
URL: http://www.yamaguchi-mfg.co.jp

Production and Development Technology Built on History and Tradition

Since commencing operations in October 1950, Yamaguchi Manufacturing Co., Ltd. has continued to produce its screws and other precision products, using the most advanced equipment and technologies. Yamaguchi's main advantage over competitors comes with its cold deformation process technology. This process enables the company to produce its high-precision and quality parts economically, without waste in terms of both materials and costs, and in a way that is friendly to the environment. Yamaguchi has achieved a world-class reputation for the quality of its products and for the company's stringent quality control. From the company's beginnings through to the present, Yamaguchi continues to produce specialized screws and precision parts for automobiles and electrical home appliances.

The main factory.

A tradition and achievement lie behind Yamaguchi's screws. (Right) One of the company's outstanding products, tube pins for fluorescent lights.



Some examples of Yamaguchi's world-class automobile components

World Class Quality Supported by the Entire Company

Yamaguchi received ISO 9002 certification in March 1999. The whole company is committed to maintaining the highest quality with its products.

Strict quality control in each stage of production, including design, material procurement, product processing, and pre-shipping inspections, ensures for the highest quality—quality that is relied on by customers around the world.


Precision measurement.


Strength check.


Hardness check.

Moving Overseas, Expanding Business

Yamaguchi is rapidly expanding overseas. In September1989, Yamaguchi set up its first China-based manufacturing subsidiary, Yamaguchi Manufacturing Dalian Co., Ltd. in Dalian, China. Automobile part production commenced in 1992. Following this, the factory was expanded, and production increased. In addition, September 2002, Yamaguchi started preparing for a new stage, setting up another company, Yamaguchi Manufacturing (Zhuhai) Co., Ltd. in Zhuhai. Preparations to start operations have been completed. All the products from these factories that are exported around the world meet the same stringent quality controls as their counterparts in Japan.

Yamaguchi Manufacturing Dalian Co., Ltd.

The Top Maker of Stainless Steel Screws for Building Material Use

Okitsu Rasen Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kohei Kakizawa

COMPANY ADDRESS: 1424 Shimizu Okitsu Naka-cho, Shizuoka 424-0204

ESTABLISHMENT: June 1939

CAPITAL: 35 million yen

NUMBER OF EMPLOYEES: 81

MAIN PRODUCTS: Stainless steel screws

TELEPHONE: +81-543-69-0111 **FAX:** +81-543-69-0116

E-MAIL: kakisawa-ko1@okitsurasen.co.jp

URL: http://www.okitsurasen.co.jp

Sophisticated Stainless Steel Screw Specialists

At home or at the office and even at the factory, there is one thing that is certain to be seen around the place. And it is an essential element somewhere in the construction of every kind of building. It is called the screw. Within the world of screw production, Okitsu Rasen Co., Ltd. takes great pride in being an outstanding maker of stainless steel screws in the Japanese market, with the biggest share in the market, especially when it comes to use in aluminum sash. Okitsu Rasen has never taken its eyes off the market since 1967 when steel screws predominated. Stainless steel screws gradually penetrated the market, so in 1980, Okitsu Rasen became principally a stainless steel screw maker. Okitsu Rasen holds top share of the stainless screw market for industrial use. Reading the market ahead of time, and leading other companies in research and development of new materials and production processes, and staying one step ahead of the competition have been the primary factors behind Okitsu Rasen taking its prominent market share.

The washing process is essential to create clean-looking screws that Okitsu Rasen is proud of.

As far as production technologies are concerned, it is not easy to differentiate one product from others because they all use such standard technologies as compressing and turning processes. But saying that, one of the key secrets of Okitsu Rasen gleaning its huge share can be summed up in the good appearance of the company's screws.

Okitsu Rasen's screws shine like those of no other company, retaining the luster of the stainless steel material. This is because Okitsu Rasen has an internally developed 14-step washing process that completely cleans off waste and dust from the screws. The logic

behind using stainless steel screws is because they should be of high quality and that they should not rust. They are also commonly used in conspicuous places where they can be seen, for example in doors and aluminum sash skirt. Okitsu Rasen's dedication to beautiful products is therefore very much appreciated and highly valued by industry.

Screws come in many sizes and lengths, they can be big or tiny. Okitsu Rasen produces some 7,000 types of screws each year, most of which are standard types. If, however, a customer were to demand 2,000–3,000 different types of screw in a batch, Okitsu Rasen could meet the order immediately.

TPM Management Means Efficiency throughout the Production Process

Okitsu Rasen's next major feature is its thorough production quality control. Okitsu Rasen employs the Total Productive Maintenance (TPM) system, a system that each and every worker adheres to. TPM, as defined by the Japan Institute of Plant Maintenance, requires the following:

1. Aims at building up a corporate culture that thoroughly pursues production system efficiency improvement (Overall Equipment Efficiency: OEE);
2. Constructs a system to prevent every kind of loss, for example, to achieve "zero accidents, zero defects and zero failures," on Gemba (actual site) and Genbutsu (actual thing) over the entire life cycle of a production system;
3. Covers all departments including production, development, marketing and administration;
4. Requires all and full involvement from top management to frontline employees;

Okitsu Rasen puts up on its factory wall a sign to kick off its campaign to win TPM certification.

5. Achieves zero losses by overlapping small-group activities.

Everyone is involved and committed to boost efficiency and to aim for zero down time. Okitsu Rasen is proud to declare that it instituted this system in 1995. In fact, Okitsu Rasen even attached a sign on its factory wall stating the company's goals. It states that Okitsu Rasen commits itself totally to winning the TPM prize no matter what were to take place. In the face of any difficulty and with an indomitable will, the company commits itself to never take its eyes off the target of hitting its zero accidents, zero defects, and zero downtime targets. Following this declaration, and with huge efforts by everyone in the company from the president downwards, Okitsu Rasen is pleased to announce that it won the TPM Prize (Type 2) in 2002.

Making sure that strict inspections remove dud items and prevent mixing of inferior quality products in the production flow to assure quality can drive up costs. But actualizing the goal of ensuring quality without driving up costs needs a philosophy that rids the process of inferior quality right from the start of the production process. Okitsu Rasen utilizes this reasoning, building it into the entire production process to ensure quality.

This also means that not only inferior quality screws never enter the production flow, but also that the

wrong mixes of screws never exist. This is where the real quality proposition comes. For example, if in a million-screw order one or two types of screws fail to meet specifications, the customer can designate the shipment useless. Despite the severe competitive pressures in the market from Taiwan and other countries in recent years, raising their production and lowering their prices, when it comes to ensuring quality throughout the product mix, Okitsu Rasen stands heads and shoulders above the competition. This commitment to high quality with zero mistakes is the key to Okitsu Rasen's success and ensures the company's survival.

Because TPM is embedded in the heart of Okitsu Rasen's production system, inspections are not conducted with the aim of improving yield rate or quality. If problems are crushed at source, inferior quality products just do not get made. Okitsu Rasen is proud to say that the result of this production methodology means that it has driven down inspection costs.

Winning in a World of International Competition with Robust Finances

Another one of Okitsu Rasen's special features is its extremely strong quality of its financial base. The equity ratio is 77.8%, while the current ratio is 600 percent (for the fiscal year ending in December). With those figures remaining high, it is anticipated that the company's current ratio exceeds 80 percent in the current fiscal year.

Against this, Okitsu Rasen faces an increasingly tough market. The business environment surrounding the screw production industry has become extremely harsh.

First, the recent tendency toward fewer residential construction is reducing the market scale of screws for building materials, which are Okitsu's major products. Second, newer building techniques that integrate and simplify building processes and parts are reducing the need for screws. And lastly, as mentioned earlier, international competition is becoming intense. Cheaper products from Taiwan and Southeast Asia are flooding into the Japanese market, making for extremely tough price competition.

There is an upside, however. Although all these factors make for a hard business environment, it is impossible that there will never be a time when screws are not needed. Given Okitsu Rasen's strong financial constitution and the company's commitment to high quality and a quality control regime that ensures top quality at a reasonable price, Okitsu Rasen has all the qualities it needs to remain in business. On top of this, Okitsu Rasen aims to throw resources into technology and development towards new materials and new kinds of screws that have added value. One example is screws with extra tough heads that do not give way despite extremely strong tightening. With these sorts of activities Okitsu Rasen expects to further expand its business opportunities.

Highest Quality and Reliability Based on a Wealth of Know-How

Marucho Plating Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Naotaro Kuji

COMPANY ADDRESS: 12-3 Shimizu Ohmagari, Shizuoka 424-0046

ESTABLISHMENT: April 1950

CAPITAL: 10 million yen

NUMBER OF EMPLOYEES: 91

MAIN PRODUCTS: Standard electrical plating, nickel and copper electroplating, hard chromium plating, non-electrolytic nickel plating, precious metal plating, various alloy plating technologies

TELEPHONE: +81-543-66-3361

FAX: +81-543-65-3261

URL: http://www.marcho.com

Crystallizing Cutting-Edge Technology and Human Potential to Produce Highly Rated Products

Some examples of Marucho's plating work.

Marucho Plating Co., Ltd. handles a wide variety of products, including standard chrome plating used for automobile parts and hard chromium plating with anti-abrasive qualities that are used for engine valves. Marucho is one of only two companies in the world that have technology to do specialized plating such as thick silver electroplating. It is also one of only a few companies in Japan with the technology to do nickel plating for injection tubes. Marucho therefore is, in fact, a high technology plating company that handles a wide variety of high-end products.

Plating technology is developing on from the standard electroplating process used to prevent rust or for decoration. In fact it is moving to more advanced processes, such as copper electroforming in the production of microwave wave guides, precious metal plating in printed circuit boards, and non-electrolytic nickel plating for dust proofing computer parts.

The company has a wide variety of plating businesses. It plates automobile parts, IC terminals, lead frames, flexible printed circuit boards, office automation equipment, as well as microwave wave guides and electrical discharge electrodes, and precision masking and machine tool parts.

In addition, combined with metal processing skills of group company Sanritsu Co., Ltd., the Marucho Group aims to be the only one in the plating industry that is able to totally meet every customer demand.

Enphasis on Research and Development to Solve Customer Issues

Typically, Marucho receives a request from the customer for components that are difficult to plate and require 10–20 development items. Marucho answers its customers with the expression, "When it comes to plating, put your trust in us." Marucho specializes in tackling surface plating technology and quickly sets up a test manufacture line and handle all the development and process through research and development to mass production.

When it comes to cooperative development to meet an order, Marucho participates in a joint study group of companies from different industries. The company is also active in promoting good exchanges between government, business, and academic ties in Shizuoka Prefecture, including the prefecutral industrial technology centers and the Shizuoka University and has extended its technological alliances across the nation.

Looking ahead, Marucho wants to offer a manufacturing structure that deals directly with customers and is focusing on sales engineering, putting staff with tech abilities in charge of sales activities.

Quality Control Trusted by Customers

Marucho is at the cutting edge of plating technology and to support this, it employs such up-to-date measurement equipment as fluorescent X-ray film thickness meters, atomic absorption photometry, and Micro Vickers hardness scale penetrometers are used to maintain high accuracy and quality control throughout the production system. To support these technologies, talents of the employees are fully expressed to stimulate each other. The result is realization of a worthwhile atmosphere for the employees who work for the company and helps fulfill management goals.

Quality control at work.

Marucho boasts its environmentally-friendly cutting-edge equipments.

From Number One in Shizuoka to Number One in Japan in Thermal Spray Technology

Murata Boring Giken Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Mitsuo Murata

COMPANY ADDRESS: 1-30-45 Kitamariko, Shizuoka 421-0106

ESTABLISHMENT: April 1950

CAPITAL: 25 million yen

NUMBER OF EMPLOYEES: 80

MAIN PRODUCTS: Thermal spray processing

TELEPHONE: +81-54-259-1251 **FAX:** +81-54-257-1596

E-MAIL: mitsuo@murata-brg.co.jp

URL: http://www.murata-brg.co.jp

Specializing in Thermal Spray Process

HVOF cermet spraying.

Murata Boring Giken Co., Ltd. started business in 1950, re-boring motorcycle and car engines. Today the company is still in the restoration business, but now with thermal spraying technology the company introduced in 1961 as the company's mainstay. Thermal spraying is a technique that deposits a special membrane on the surface of backing materials in a way that promotes toughness and resistance to friction, corrosion, and heat. Spraying friction-bearing components with melted metal, non-metal, or ceramic sprays extends components' product life cycle and also reconditions worn-out parts. The process attracts a lot of attention from customers because of its ability to lower costs for them.

Murata Boring has a number of thermal spraying services, including plasma spraying, high velocity oxy-fuel (HVOF) thermal spraying, and wire thermal spraying. In 2001, the company held a 3.8 percent market share, making it number four in the country, according to Digital Research. When it comes to the company's specialist fields, however, thermal spraying is not the only area Murata Boring does business in.

Murata Boring also utilizes a lot of high technology, such as a ceramic laser sculpture processing system for flexographic printing and a special spray cladding technique that is used for parts in nuclear power plants.

Up-to-Date Equipment Provides a Broadest Range of Products

Murata Boring's cutting-edge technology is supported by investment in top-class equipment and facilities. Recently, the company has been boosting its competitiveness with new processes and equipment, for example using vacuum plasma spraying (VPS) devices, newer-model laser devices, and ultrasonic cleaning

devices. Murata Boring is increasing its abilities to meet more diversified customer demand. But Murata Boring has strong lines with its large scope of businesses, which range from paper manufacturing and printing rolls to jet engines, to gas turbines for electric power companies, and to components for racing cars taking part in the Le Mans and Indy 500 races. The fact is that Murata Boring has acquired a customer base that spans many industries. This base even extends to medicine. It makes false teeth and several types of other body implants. With this background of accumulated technical knowledge, together with the fact that the company remains strong in its core thermal spraying business that is able to cater to every customer demand, Murata Boring continues to maintain its high reputation across many industry fields.

Cooperative Research and Development with Government, Industry, and Academia

President Murata has emphasized that the company will prosper if it continues to be the only player in niche markets. In markets that necessarily have their limits, unless the company expands into new fields and develops new and original technologies, it is always going to be locked in price competition battles. With these issues in mind, the company is active and progressive in its cooperation with government, industry, and academia. In 1988, Murata Boring teamed up with the Shizuoka Prefectural Industrial Technology Center, Nagoya University, and Bailey Japan Co., Ltd. and others to develop a compound temperature and humidity ceramic sensor using thermal spraying technology. Every year, projects are selected for research and development under public-private enterprise grants. Many patents have been awarded from these fields. Presently, Murata Boring is putting considerable energies into developing glass thermal spraying research and development and is now looking ahead enthusiastically to developing nanotechnology-based spraying technologies.

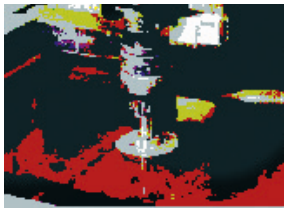
Putting China into Murata's Range of Vision

Murata Boring is pleased to accept many technical trainees from China resulting from Shizuoka Prefecture's Japan-China Friendship Association's exchange programs. Trainees not only learn machining technologies, working with lathes and getting familiar with the mechanics of grinding, but they also learn about Japan and benefit from the interaction with Murata Boring employees.

President Murata's business expansion vision has meant him taking aim at the Chinese market. China is undergoing rapid economic growth. Because the country is investing heavily in plant and excellent steel production, Murata Boring anticipates a growing market for thermal spraying. Murata Boring is constructing its new strategies for the future through information exchange with its Chinese technicians and other sources.

Mastery of Cold Forging Technology Contributing to Future Business Creation

Createch Co., Ltd.



REPRESENTATIVE OFFICER: Mr. Hitoshi Ishida

COMPANY ADDRESS: 1512 Nakajima, Ryuyo-cho, Iwata-gun 438-0201

ESTABLISHMENT: October 1986

CAPITAL: 130 million yen

NUMBER OF EMPLOYEES: 21

MAIN PRODUCTS: Design, manufacturing, and sale of dies for cold forging; production and sales of cold forged products

TELEPHONE: +81-538-66-1800 **FAX:** +81-538-66-1821

E-MAIL: createch@crea-tech.co.jp

URL: http://www.createch-top.com

Technological Innovation Opening the Door to the Future: The Cold Forging Process as a Key Technology

The cold forging technology is the base upon Createch Co., Ltd.'s business is founded. Cold forging as a process is useful because it yields better, is fast, and uses less heat energy than hot forging. With cold forging's energy efficiency, it is thought to be kinder to the environment too.

Products born of Createch technology.

Providing Total Support from Technical Planning to System Construction

High precision cold forged products cannot be achieved by superior dies alone. Making these products requires well-designed process and integrated manufacturing system. The ability and abundance of experience and know-how to provide total support from proposal to finished product is Createch's biggest selling point.

Another essential service that Createch can perform is production tests and the consulting and adjusting necessary to assure successful mass production. Moreover, with its array of heat treatment equipment and production plant, Createch can quickly and flexibly respond to multi-part, small-lot orders while guaranteeing the necessary precision.

EDF: Elastic Deformation Cold Forging Method

The cold forging process has two huge selling points in that it is fast and produces parts of superior strength. But the disadvantage with the process is that cutting and grinding are needed to finish the product, extra work that costs more and delays shipping. Createch finishes the process with just the forge. The result is called the Net Shape. Furthermore,

Createch is able to forge at ordinary temperatures! Createch continues to develop the ultimate cold forging technologies.

"The dies are strong, hard, and undeformable, so they should not be deformed"—this was the convention. However, the dies actually change their shape slightly by the strong pressure during the process. Createch used a twist of this logic of deformation of the die to create delicate shapes using the Net Shape technology. This process, one that omits the elastic deformation stage in standard cold forging, is called the Elastic Deformation Cold Forging process, or EDF process. This is the company's own name for the process it created out of its original technology.

One example where EDF has made a huge success is in producing crowned helical gears, in which the shape of each gear tooth is very slightly arched in the direction of the tooth trace. EDF enabled to make such gears with one shot, which was impossible in the past. Domestic patents and academic prizes back the high evaluation this technology has received.

Nurturing People with Great Ideas

At the end of a long road of hard work comes the flash of a good idea. This is the belief of Createch's President Ishida. He always talks fervently about this, based on his own experience. When he was 35, he and five friends decided to start up their own business. They devoted their lives to engineering development and produced a lot of good results. A vital part underpinning the success of this process is the importance of the inspirational idea.

A person who has inspiration is a person who can move freely, and it is these types of employees that will take responsibility for the future of Createch. To get to this point, it is essential to create an environment where the workers are able to utilize their full potential. Createch has abolished office-type organization and instituted a high level of freedom in the company towards things such as work hours. Management regards the people who develop original technologies as merchandize. The company is working towards the goals of personal happiness through pursuing the policies mentioned.

Helical gear with crowning made by the cold forge process.

Guaranteed Technology from a Single Piece: The Industry's First Mail Order Spring Company

Sawane Spring Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Takayoshi Sawane

COMPANY ADDRESS: 1356 Kozawatari-cho, Hamamatsu 432-8063

ESTABLISHMENT: May 1966

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 50

MAIN PRODUCTS: Wire springs, coil springs, thin-leaf springs

TELEPHONE: +81-53-447-3451 **FAX:** +81-53-448-8298

E-MAIL: sawane@sawane.co.jp

URL: http://www.sawane.co.jp

Supplying Top Quality Springs Backed by Guaranteed Reliability and Quality Control Management

The Japanese spring manufacturing industry's main customers and biggest demand comes from the motorbike and automobile industries. Springs are important components for automobiles and motorbikes. Producers need to have a high level of technical know-how to meet the demands for high-precision parts requested by industry.

Sawane Spring is able to fulfill customer requests for high-precision springs to large coil springs from the smallest orders up to the biggest shipments, reflecting the company's ability to meet all types of customer needs.

Sawane Spring makes springs of the highest quality to a level that surpasses world standards for cars, electrical machinery, and other applications. In fact, Sawane Spring maintains a defective parts rate of less than one part per million. Sawane Spring has received the ISO 9002 international quality assurance standard, and supplies high quality and reliable components to customers.

Opening a New Business Paradigm with Mail Order Sales

Springs are the basic parts of machines. Although some types of springs require the acquisition of special technologies, most types (70–80 percent of Japan's domestic spring production) require no special techniques so that any of Japan's 1,500 spring makers can easily manufacture them. In such a crowded market, it is difficult to discriminate one company from another only with their technologies. In addition, pressures to lower costs and prices are intensifying amid massively increasing international competition as automobile and electric appliance makers are moving their production overseas and buying from local suppliers. The resulting drop in demand and profits is a major concern for domestic spring makers. To counter this, in 1987, Sawane Spring,

STOCK SPRINGS mail order catalog is used by about 12,000 companies.

in order to cultivate the market for small lot springs, became the first company in Japan to standardize its spring lineup and start mail order sale. Sawane distributes a catalog of standardized springs called *STOCK SPRINGS* for various businesses, accepting orders by fax or telephone or online and has built a customer base of about 12,000 organizations. This market's special feature is that same day dispatch is possible for orders as small as one loose spring from an abundance of about 4,000 varieties. Moreover, this is more than just a simple mail order business of standardized products. Sawane is able to customize requests from buyers within a fixed range of specifications and dispatch the orders quickly.

While most spring makers focus on the mass production and sales, Sawane also meets customer needs for test prototype springs and for small orders. Sawane is a manufacturer that is able to meet a wide range of demands quickly.

A Business Structure for All Customers

These days there are many other companies out there who can make small lot springs, but when it comes to selling the smallest orders—when the buyer might only ask for a single screw pack of spring—there is only one company prepared to meet that order. Making the ability to sell even an individual spring requires a second look at product inspection methodology and a business structure capable of making a profit even on a small lot.

Sawane's affiliate Samini Co., Ltd. has taken charge of the mail order business. When Samini receives an order, Samini will immediately contact the company for confirmation. When Samini receives an order by phone, the person receiving the call takes care of the order all the way through the process. Even though the transactions are done through phone and catalog, and neither side can see the other's face, the whole process is conducted as if it were face-to-face.

Samini makes sure that it is able to supply the range of springs that is printed in the catalog. On the sales side, the ideal situation is always to keep inventories down and concentrate on stocking the strongest selling products. On the buyer's side, of course, the opposite is true. The customer wants the biggest selection possible and wants to know how soon the delivery is. It is a balancing act. The company must make absolutely sure that every spring in the catalog is available. But at the same time even Sawane cannot possibly make every type of spring asked for, and it is impossible to juggle production and inventory to every single demand. Accordingly, depending on the product, and when Sawane might have a very few of the required items in stock, it asks for an outside firm to fill the order. Under the slogan "Originality and Cooperation," Sawane has built a system that uses other companies, even competitors, to make up and fill orders. By doing this, Sawane makes sure that it can guarantee to same-day dispatch a huge variety of about 4,000 springs.

Currently catalog ordering makes for about a third of Sawane's sales. From the customers' viewpoint,

the system has been made for their benefit. Sawane's all-out posture to meet all customer demands has ensured the system's success.

About 4,000 varieties of springs are featured in the catalog.

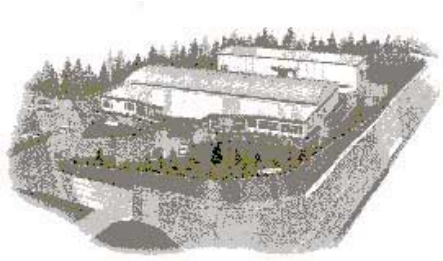
Think, Produce, Sell: All Based on Advanced Technology

Sawane is selling springs by mail order steadily, but the mass production of springs for automobiles and other applications remains the company's predominant business and accounts for most of its sales. Sawane's main business means meeting the customer face-to-face and being able to meet high levels of demand. It is also the ability to offer quality in the face of many kinds of orders. So it is critical that Sawane recognizes that it must keep on raising its production technology to meet those demands.

While polishing up its technological base and promoting its catalog sales system mentioned above, Sawane has built its own space in an industry where discrimination between companies and technologies is difficult. Although it is primarily a manufacturer, Sawane has built a retail business that has not only added to the company's performance but that has also expanded its business range. This can probably be called a form of technological power. This company's motto is "Think, produce, sell." In other words from planning through to production to sale, this kind of technological power lies behind the production of a single spring upwards. When it comes to making springs, Sawane is a company able to meet every customer demand, from tiny to massive orders, to prototypes, to finished articles backed with a history of proven know-how.

Challenging Precision Processing in a Beautiful Environment

Nanto Precision Co., Ltd.



REPRESENTATIVE OFFICER: Mr. Teruo Ishiwata

COMPANY ADDRESS: 173 Miyamoto, Numazu 410-0301

ESTABLISHMENT: March 1979

CAPITAL: 81 million yen

NUMBER OF EMPLOYEES: 91

MAIN PRODUCTS: Mounted machine components, semiconductor production equipment components

TELEPHONE: +81-55-924-4390

FAX: +81-55-924-4391

1/10,000-Level Precision

Nanto Precision Co., Ltd. was set up in Numazu City in March 1979 by the current chairman, Teruo Ishiwata after he worked for a large electronics manufacturer. Mr. Ishiwata originally came to this business with a basis of knowledge in grinding technologies. But wishing to expand his business opportunities with Nanto Precision, the company has accumulated a store of experience and technologies with die parts and mounted machine components.

In 1994, Nanto Precision was recognized as the first in Shizuoka Prefecture for its cutting-edge technology, largely as a result of its general technological and development capabilities and excellent reputation. Nanto Precision is especially strong at high-precision manufacturing technology, quality control, and for its submicron level precision technologies. In 1997, Olympic silver medallist Yoshiyuki Yamaguchi became president, and the company started to look to open up even higher-level production.

Certified under the Small and Medium Business Creation Law

Nanto's main products are mounted machine components and semiconductor manufacturing device components. The company's plan to make a ceramic version of its electronic mounted parts received a certification in 1997 under Japan's Small and Medium Business Creation Law. The company subsequently was able to commercialize the products.

With conventional steel nozzles, wear and tear is usually seen after about 300,000 shots. Compared with this, the company's ceramic nozzle's durability represented a huge leap forward. And because of the low electrostatic propensity, dust tends not to stick and maintenance becomes easier. These are major merits. Another great feature of the company is that Nanto controls the whole manufacturing process, from supply of raw materials, to forming, molding, and sintering, to making the finished product at its own site.

Attaching Importance to the Talented People and Low-Tech

While Nanto retains excellent technical capabilities, it recognizes that the roots of the company are made up of people and technology. The company believes that product quality depends on the quality of its staff. Nanto dedicates itself to training and educating its staff to understand the principles behind making high quality products. The staffs' basic technical ability is based on the lathe, milling cutters, and other tools. These skills form the keystones of employee training. Each day workers are encouraged to polish up their skills. In a manner of speaking, this emphasis on "low tech" might be a unique posture, but its roles as a source of the company's technical power and competitiveness is worthy of attention.

Nanto retaines excellent technologies.

Consideration for the Environment

The company's head office factory is on the hill of Mount Ashitaka that overlooks Mount Fuji and and Suruga Bay. The views from the employee dining room and the lounge are splendid. This shows the company's consideration for the environment and its workers.

In 1999, Nanto was simultaneously awarded the ISO 9000 quality control standard certification and the ISO 14000 environmental standards certification. In addition to its green purchasing, Nanto's consideration for the environment is obvious in its factories that are clean and well ordered.

High Functionality Combined with Simplicity Results in Lower Costs

IAI Corporation

REPRESENTATIVE OFFICER: Mr. Toru Ishida

COMPANY ADDRESS: 645-1 Shimizu Hirose, Shizuoka 424-0102

ESTABLISHMENT: April 1976

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 304

MAIN PRODUCTS: Small industrial robots

TELEPHONE: +81-543-64-5105 **FAX:** +81-543-64-5182

E-MAIL: masato-mochizuki@iai-robot.co.jp

URL: http://www.iai-robot.co.jp

Limitless Potential from a Simple Robot

Without industrial robots, there would be no manufacturing industry. IAI Corporation's leading product is its intelligent actuator (IA), an industrial robot which is capable of uni-axial linear motion. By squeezing functionality into its simple linear motion IAs and concentrating on improving the performance, precision, and cost reduction of its robots, IAI has managed to compete with large manufacturers, taking a 40 percent share of the single axis and orthogonal robot market.

While intelligent actuators are individual systems and simple robots, combining them makes two- and three-dimensional motion possible. In fact, when integrated together, a high level of movement is possible. In this sense, intelligent actuators are the elements of robot systems.

By making use of electric actuator's feature that is lower on energy costs and higher in precision compared with air or hydraulic cylinders, the company added the Robo Cylinder (RC), a general-use version of IA, to the company's lineup.

An example of an assembled IA. Despite being a relatively simple device, IAI boosts product potential while lowering costs so that a combination of these devices can make highly complex production possible.

Original Controllers Made High-Level System Construction Possible

Another feature of IAI's products is that they are sold in a package with controllers. IAI has developed a unique and highly function robot control and programming language called Shimizu Kiden Ecology Language, or SEL. While it is quite unusual for a company to develop its own programming language, SEL's programs can be written on a PC, enabling users to control relatively complicated robots simply, SEL is designed so well that it is just a simple program, and there is no need to

get buried in charts and analysis. On the other hand, its extended and wide range of functionality means that the program can meet the demands of high-level users needing a complicated series of functions. With this programming language, the benefits are that systems can be built quickly without the need for specialized technologies. In addition to offering low-cost robots, the company provides inexpensive SEL software. It is these sorts of advantages that have given IAI a big market share.

Using IAI's SEL programming language, complicated system construction is made easy.

Developing Market and Aiming to Be Global Number One

IAI has developed real moving hardware and the SEL software programming language by devoting about 3 percent of its gross sales revenues to research and development. Also, the company's excellent research staff has made this development possible.

In today's competitive environment when businesses must be able to meet both environmental and energy efficiency parameters, electromotive actuators are beginning to take precedence over older air cylinder technology. This trend is a good tail wind for IAI. Riding this wind, IAI sells its electromotive actuators at a low price competitive enough to air cylinders and promises not only to compete in terms of price but in quality, speed, precision, and delivery schedules, to delight its customers. With this in mind the company plans to boost its sales to 10 billion yen in 2005, making it world number one maker in the small robot market.

Meeting All Customer Needs: From Development and Design, to Casting, Machining, and Assembly

Toyo Machine Industrial Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Zenyu Shinba

COMPANY ADDRESS: 1-9-22 Shimizu Tsuji, Shizuoka 424-0806

ESTABLISHMENT: December 1938

CAPITAL: 45 million yen

NUMBER OF EMPLOYEES: 45

MAIN PRODUCTS: Development and production of specialized machines and machine tools, consignment production of electrical discharge machinery, and various laser-processing machines

TELEPHONE: +81-543-66-3176

FAX: +81-543-65-7200

E-MAIL: toyo-kk1@po.across.or.jp

3D Vibration Table

Toyo Machine Industrial Co., Ltd. has co-developed, with a major steel maker and Osaka Prefecture University, and then commercialized a 3D vibration table for sand-filling use for the evaporative pattern casting and self-hardening sand casting. The primary advantage of the 3D vibration table over standard vertical vibration tables is the circular motion that allows sand flow much more efficiently, allowing for much more complete filling and a substantial reduction in the proportion of defects. Toyo holds the patent for the table's vibration control unit. This unit's special advantage is that operators can control vibration amplitude and speed, allowing the production of various types of molds. Furthermore, because of the device's phase shift ability, uniform vibration is possible.

Toyo Machine Industrial's co-developed 3D Vibration Table.

Total Production Power

Toyo, of course, has machining assembly ability, but more that that, the company has established its own internal materials research and planning division and has developed a total production system that starts literally from the basic materials. With this sort of total production power Toyo has been able to develop a business that produces high quality product at low prices with quick delivery. Toyo has received both ISO 9001 and

ISO 9002 certifications, which proves that the company can offer first-class quality control management that top makers demand.

Meeting Consignments

Toyo's high accuracy wire electrical discharge machine is the company's leading commissioned product. Receiving orders from major electrical machinery and appliances manufacturers, Toyo has been supplying this equipment mainly to China, Taiwan, and Southeast Asia.

Users demand low prices, a high level of precision, fast speed, a good overall design, and easy operability. Toyo takes great care to meet the demands of its customers, and the company endeavors to make good on their trust. Toyo is now arranging to provide a complete shipping quality control system to lower costs even further.

A high precision wire electrical discharge machine.

An R&D Company That Always Challenges

Trying something new is worthwhile because there was no previous example—This is the innovative sprit of challenge constantly drives Toyo. The company endeavors to draw out the individual energies, talents, and spirit of challenge in each and every one of its employees. Toyo aims at research and development where even the smallest change is effective, to always think of ways of meeting the customers' needs. Moreover, Toyo also places great importance on staff education, encouraging them to obtain various technical qualifications. The number of employees who have obtained their first- or second-class technical certifications or electrical engineering qualifications has reached 43, and Toyo continues to work on and strengthen its educational program so that every employee can obtain these qualifications.

A High Technology Base Providing a High Quality Service

Sugimura Seiko Corporation

REPRESENTATIVE OFFICER: Mr. Manabu Sugimura

COMPANY ADDRESS: 1600 Nakashinden, Yaizu 425-0068

ESTABLISHMENT: July 1949

CAPITAL: 12 million yen

NUMBER OF EMPLOYEES: 40

MAIN PRODUCTS: Machine part production (from material supply to high accuracy and technically difficult processing), machine assembly (OEM production, unit assembly)

TELEPHONE: +81-54-624-4700 **FAX:** +81-54-624-5924

E-MAIL: sugimura-seiko@thn.ne.jp

URL: http://www.ric-shizuoka.or.jp

Offering Products and Services to All Fields with a Flexible Manufacturing Process

Sugimura Seiko Corporation has a multifaceted business. Not only producing and selling its own brands of machinery such as a machine that automatically packs Japanese green tea leaves, it undertakes consigned production for non-standard products of medium and large businesses and for prototypes and OEM manufacturing for venture companies.

Normally being an OEM supplier just means taking orders to make and supply products under the client company's brand name. But Sugimura does much more, not only simply undertaking production according to its contractual responsibilities, but also digging out the cause of the customer's problems and pushing the client in a positive direction, offering know-how and technological coordination. With all these activities, and its machine servicing business, Sugimura can meet all of its customers' needs.

Sugimura's strength therefore lies in a value-added service offering problem resolution as well as in executing production. Sugimura's business range is huge, offering services covering materials research, design, manufacture, assembly, control, and painting of machine tools, automobiles, electrical, IT-, environmental- and medical-related devices and equipment. Having cultivated such a wide-range of business areas, it goes without saying that Sugimura's ability to develop things is backed by high technological abilities.

New Technology: The X-θ Table

Sugimura has recently developed a new kind of technology called the X-θ (Theta) Table. This device's distinctive function is that it enables tracing along the curved surface of a principal axis. Normally machines trace along XY lines in vertical and horizontal strokes. However the X-θ is able to trace designs using one moving axis along a moving table, boosting efficiency and saving space. A patent is pending.

A few examples of Sugimura's quality precision products.

Development, Manufacture and Sale of the Automatic Tea Packing Machine

Since developing and commencing sales of its tea packing machine in 1975, the company has continually improved the product. More than 1,000 machines are already in Japan, and they represent the only technology and system of its kind. For customers, the system has several key features that meet essential demands of the tea manufacturing industry. It can pack and bind packages in 10–20 seconds very securely. Because it bowknots the package, unknotting is easy, too.

Sugimura's newly developed X-θ Table, is expected to deal with the various demands of the future.

An Abundance of Experience Makes for Reliable Quality Control and Confidentiality

Sugimura has amassed a customer base exceeding 100 companies, all with their various needs. The company is proud of its wide-ranging industry knowledge and broad technological ability, together with its flexibility in business conception and sense, with which Sugimura can offer effective proposals that meet the precise needs of the industrial fields it serves. Sugimura also plays very careful attention to customer satisfaction and is always trying to top the highest quality standards. On top of its ISO 9000 quality control certification, Sugimura has built a high level of trust and reputation for reliability with its ability to maintain complete customer confidentiality.

Sugimura is also much more than a company that has high technical skills in a few specialized fields. It has cultivated its capabilities in a wide range of areas and built networks of manufacturers. It supplied prototypes and non-standard products for manufacturers, whose efficiency would suffer when making such products, and offers complete support to venture companies from conception to mass production. Sugimura is also able to offer its top-class production facilities and space to customers that do not have production facilities, meaning that when it comes to making things, Sugimura can meet every need.

In a market facing strong price competition from Chinese companies, President Sugimura thinks that Japan has technologies that can produce value-added products that Chinese competitors are unable to make. Without Japanese manufacturers,

there will be needs that cannot be met. Saying that, President Sugimura, as the head of a group of professional product makers, would like to continue to answer all the needs of its customers in the future.

A few examples of Sugimura's quality precision products

Fishing light for saury fish, with new technologies that answer customers' demands for heat dissipation, durability, shading, and portability characteristics.

Single-axis numerical control router for carpentry machinery. Sugimura's long accumulation of experience and technical skills and technologies in the machine tool arena enabled the company to offer a wide variety of high precision tools to a number of expanding business fields.

Industrial use X-ray inner layer measurement/holing device. The device is supplied to X-ray manufacturers around the world as a finished product, proving this machine's comprehensive performance.

A Leading Company with 60 Percent Market Share

Kawasaki Kikou Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Shoichi Kawasaki

COMPANY ADDRESS: 810-1 Dategata, Kakegawa 436-0005

ESTABLISHMENT: 1905

CAPITAL: 100 million yen

NUMBER OF EMPLOYEES: 549

MAIN PRODUCTS: Tea production facility, tea plantation management machinery, food and beverage processing machines

TELEPHONE: +81-537-27-1711 **FAX:** +81-537-27-1716

E-MAIL: k.kawasaki@kawasaki-kiko.co.jp

URL: http://www.ochakaido.com

The Top Tea Production Facility Maker

Since its founding in 1905, Kawasaki Kikou Co., Ltd. has built up nearly a century of knowledge and experience in the business of tea production facility. Today, the company is a leading maker of high quality tea manufacturing machines by utilizing a highly efficient, digitized automatic leaf rolling process machine that enables them to produce high-quality tea extremely efficiently.

Considering the three priorities of tea processing: maintaining high levels of quality, high efficiency, and labor efficiency, the company developed a fully automated system. This cutting-edge computer-controlled, system includes the central control system that most efficiently controls tea production line, microwaves to monitor and measure moisture, and feedback control that monitors colorific values every minute. The company has moved on to take more than a 60 percent market share of the nation's tea production plants of various brands including Shizuoka's.

Particularly interesting is the system's microwave monitoring device that is capable of measuring water content with an accuracy of plus/minus 1 percent 100 times per second without damaging the tea leaves. This original technology developed by Kawasaki Kikou is the object of much attention from other industries and has been adopted even in food and building materials production lines.

Kawasaki Kikou is promoting cutting-edge electronics technology to construct a fully automated tea production line.

From Tea Plantation Management to Tea Manufacturing

Tea plantation management is in an age of rationalization, employing less labor. As part of its total support of the tea industry, Kawasaki Kikou not only provides tea processing

machines but also aims toward complete automation of tea plantation management and is actively pushing ahead developing new production methods.

These moves are aimed at reducing the huge burdens on tea farmers, especially with regard to labor saving when it comes to plucking, and improving efficiency. Kawasaki Kikou has been conducting research and development into plucking management machines that farmers can ride, which are lightweight, downsized, and safe and boosts productivity. These machines have brought safety to tea plantations that are situated on sloping and inclined ground, which had traditionally caused problems. This enables more tea plantation sites to adopt Kawasaki Kikou's system, shortening the work hours of tea farmers, saving labor costs, and improving tea product quality.

Kawasaki Kikou is steadily advancing step by step for fully automated tea plantation management.

The KJ4 tea bag changer, compactly designed for transportation by a small truck. Its low center of gravity ensures safe movement on inclined slopes.

Expanding Its Business into Food and Building Material Industries

Moving on from the technologies developed for its microwave water content measuring system used in tea processing, Kawasaki Kikou is undertaking collaborative research with industry, government, and academia.

Kawasaki Kikou continues to push forward to new areas.

Presently the company is taking its moisture measurement, steam generation, and drying technologies and applying them to new applications in the moisture measurement, sterilization, and drying machines in food, building material, and other industries, aggressively expanding its business.

Kawasaki Kikou's machines developed for the tea industry are full of original technologies, and ideas have been closely watched and highly evaluated by other industries. Because of this, Kawasaki Kikou's systems have been adopted in both food and building material production lines.

In recent years, there has been a lot of media attention on the issue of food safety. In the midst of this, Kawasaki Kikou has introduced its HTST foreign particle sterilization machine. Attention is being focused on this kind of apparatus that can remove, sort, or discriminate foreign particles, and a lot of expectations come from various industries. Kawasaki Kikou intends to continue to challenge new technologies in the new business fields.

Complete and Thorough After-Sale Service

"If there should be a trouble, repair it immediately without stopping the operation." To achieve this goal, Kawasaki Kikou's sales personnel,

never neglect to learn the know-how on site. During the harvesting season, all company employees are on 24-hour standby and ready to offer support. In order for a manufacturing facility to completely command the benefits of using cutting-edge technology, Kawasaki Kikou is both on patrol and ready to offer a complete after-sales service.

Moreover, when the season is over, Kawasaki Kikou helps to prepare for the next plucking season, providing an inspection and maintenance service that will ensure the producer to maintain its extended high-efficiency production, putting producers' minds at rest for the next season.

On top of providing a nationwide service infrastructure and parts service, Kawasaki Kikou makes a binding promise to its customers to remain a safe and reliable company to do business with.

Ambitiously Advancing to New Frontiers with Original Technology

Econos Japan Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Shinichi Hoshida

COMPANY ADDRESS: 491-1 Yoshizawa, Kikugawa-cho, Ogasa-gun 439-0009

ESTABLISHMENT: May 1994

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 18

MAIN PRODUCTS: Pulse beam sterilization equipment, superheated steam generation equipment, superheated steam-type thermal decomposition equipment, ozone-based sterilization equipment

TELEPHONE: +81-537-35-0667 **FAX:** +81-537-35-0668

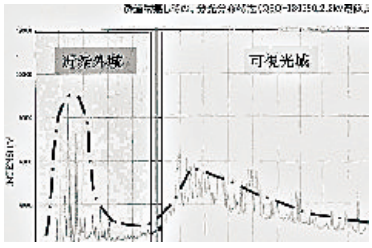
E-MAIL: econos@econos.co.jp

URL: http://www.econos.co.jp

Original Products Developed with Special Technologies

Econos Japan Co., Ltd. is a company that offers a comprehensive range of environmental hygiene systems and equipment. When it comes to hygienic management involving foods, Econos produces sterilization equipment and tray washing systems. In an industry involving food safety, faults or any inadequacy that lower hygiene levels are intolerable. With these facts in mind, Econos focuses on developing hygiene management systems as its most important products. However, Econos has combined special technologies into an all-embracing approach that cannot be found elsewhere.

Firstly, Econos developed a breakthrough approach to sterilization with its pulse beam technology. With this system, pulses of light flashing over several seconds can sterilize the most delicate objects or those with complicated shapes, for example PET bottles or paper containers. The system also rids objects of colon bacillus, fungi and mold, things that ozone or ultraviolet sterilization systems cannot do in such a short time.



Pulse Beam: The chart demonstrates the wide-ranging and effective disinfecting power of the Pulse Beam over a broad range of wavelengths from ultra-violet to near-infrared ray.

Initially, at the time of engineering development, the system suffered from short lamp life, a difficulty Econos was able to completely overcome after joint research with a major electronics manufacturer and a venture company. Now, an extensive range of major manufacturers of egg, milk, and beverage products uses this system.

Secondly, Econos has developed various kinds of heat treatment equipment, including a superheated steam sterilization system. This system works

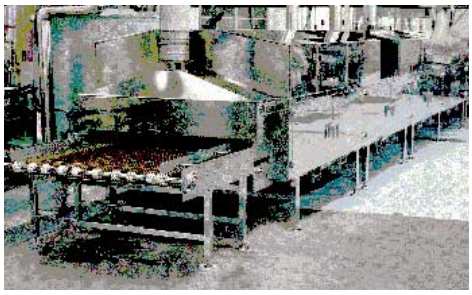
by raising steam temperature over a series of steps from 120 degrees Celsius at one atmosphere to 1,000 degrees, creating high energy in a form that has not been used before. This is a special technique developed only by Econos.

Developing and Providing Products and Systems That Meet Customer Needs

Econos regards exhibitions and other events as the place to understand, what the customers want. After internal reviews, Econos always makes sure that it binds its research and development to those needs. In addition, Econos believes it is just not sufficient to simply sell individual products, but that it has to offer comprehensive environmentally hygienic solutions. From the time of installation of equipment, customer production line stoppages are held to the absolute minimum possible. President Hoshida declares that the ability to grasp and sensitively respond to customer needs is one of the main virtues of small- and medium-sized companies such as Econos.

Econos' philosophy can be understood through its product development history. When Econos first entered the sterilization industry, it began with various types of washing systems and ozone sterilization equipment. But, grasping the demand of the food industry for the development of mold removal technology, Econos went on to develop and utilize the pulse-light Pulse Beamer system.

Meeting customer demands for heat treatment-type germ removal in powdered and particulate foodstuffs, the company also developed the superheated-steam Super Steamer sterilization system. Again, how to cope with domesticated fowl and animal droppings, and, for example, the processing of industrial waste, such as food residue and sewage sludge, has become a huge topic not only for the sterilization and hygiene industries, but also an important environmental issue. Directing itself at these sorts of concerns, Econos also developed its Fire Steamer system.



Super Steamer: Easy steaming and baking at 500 degrees Celsius. The Super Steamer greatly reduces baking times compared to conventional burners. It also makes for a mouthwatering experience, and it almost completely eradicates carcinogenic substances.

Abundant Ideas and a Strong Grasp of Technology

Econos has a product group that develops noodle processing and machinery that produces hot spring–boiled eggs. These sorts of products, at first glance, appear to have nothing to do with the company's environmental hygiene business. These businesses, however, were actually born from further applying the superheated steam technologies developed for the company's Super Steamer system. One of the special characteristics of superheated steam is that it can instantly deoxygenate a targeted space. When this capability is applied to food processing, decorative scorch marks can be added, while moisture and taste are preserved. In other words, without interfering with the original flavor, good yields can be maintained. The system is receiving a lot interest from the food processing industry.

The adoption of this sterilization equipment for use in the food baking industry shows the rich and flexible and creative resources that the company holds. The technology that enables the company to develop products from the design stage, to test models, to operation, demonstrates the excellence of Econos' staff.

An inside view of the company. Econos has design, development, and applications departments.

Employees Finding Their Work Enjoyable and Challenging

This year sees Econos' tenth anniversary. Econos is a young company, with the average age of the employees of about 31—young people making up the majority. Every year Econos hires two new science and engineering staff members. Many have transferred from large enterprises in major cities. Staff find themselves engaged in multiple projects simultaneously and are extremely very busy. It is very demanding work.

However, employees in this company are able to savor a complete range of experiences, from large-scale plant development, to research, to product commercialization. These are the kinds of experiences they would certainly be unable to have in a large company. The company's slogan embraces the work ethic of its staff. The slogan can be summed up as "Fun work, not easy work." And everyone works energetically, from the top executives to each single employee.

Econos' close relationship with its customers, a relationship that includes after-delivery feedback and evaluation to the representatives responsible for research and development, promotes a lively exchange and tremendously increases the enjoyment of creating products.

It is these sorts of policies and practices that are the keys to promoting employee motivation and improving their abilities in small- and medium-sized companies.

Comprehensive Environmental Policies

Econos has a policy summed up in its desire to be an R&D-oriented company that efficiently and economically provides environmental conservation measures that do not impact either nature or people negatively. Such comprehensive environmentally hygienic approach has resulted in a large number of contracts from major food enterprises. On top of this, Econos also developed the Fire Steamer. This was the world's first superheated steam-type, large-sized thermal decomposition device capable of suppressing the occurrence of dioxin. Thus Econos directly tackled a major issue with industrial waste disposal. As a matter of course, the superheated steam is able to process a wide variety of organic compounds and other substances, from domesticated fowl and animal droppings, to coffee lees, vegetable and paper scraps, wood chips, and vinyl chloride. These are all ultimately carbonized and can be recycled. Right now, some legal issues still need to be solved on this topic. But Econos believes that a huge expansion of the range of applications for this sort of waste processing approach into more common usage is possible.

Econos is a growing company whose vision is to expand its comprehensive environment issue–related business. The company never hesitates to invest in its research and development to achieve its goals.

Bird fowl waste disposal at 60 tons/day with the Fire Steamer. Processing is done in a deoxygenated environment. This process is dioxin-free and is without risk of fire and explosion.

Technology Born to Meet Customers' Needs

KGK Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Yoshiyuki Kato

COMPANY ADDRESS: 7947-3 Miyakoda-cho, Hamamatsu 431-2102

ESTABLISHMENT: April 1970

CAPITAL: 24 million yen

NUMBER OF EMPLOYEES: 40

MAIN PRODUCTS: Aluminum die-cast finishing equipment, high-speed plating equipment

TELEPHONE: +81-53-428-3135 **FAX:** +81-53-428-3308

E-MAIL: y-kato@kgk-web.com

URL: http://www.kgk-web.com

Developing the Right Technologies after Thorough Investigation of Clients' Needs

When the present chairman, the father of President Yoshiyuki Kato, established KGK Co., Ltd. in 1970, well-established chains of makers and suppliers characterize the automobile industry, so it was extremely difficult for KGK to break into the market.

President Kato was keenly aware that if he followed the methods of competitors, KGK would be unable to gain customers. To overcome this issue, President Kato compiled customer distribution data and targeted sales promotion areas, and visited bars and restaurants where client employees go after work to find out what the real needs of KGK's clients were. As a result of all these collected information, KGK was able to develop new technologies and give birth to the sort of products that meet its customers' needs.

KGK pays considerable care about how it presents its products to customers. KGK regards the products' looks—a point often ignored—as highly important. In order for clients to better understand KGK, the company strives to present positively, for example, using OHPs to produce easy-to-understand presentation and planning materials.

As a manufacturing company in a competitive business, it is just not enough to possess superior technology to create excellent products; unless KGK also firmly establishes and nurtures its markets and distribution routs, it will not be able to achieve sales. With such conviction KGK has gained market share in the industry by thoroughly investigating the needs of its customers through its own original sales and promotions activities.

Aluminum Die-Cast Finishing Device

KGK's principal sales product is an aluminum die-cast finishing device. Developed by KGK, this device features five numerically controlled axes (X, Y, Z, A, and B axes), four turret-head diamond cutter system capable of high accuracy and coping with complicated shapes.

Further, by avoiding the need for coolant and by employing a high-speed dry cutting process, KGK can realize low costs and clean production.

High-Speed Plating System: The Best Solution for Customers

KGK developed a sealed-type, high-speed plating machine that combines compactness with high efficiency. This nickel composite/plating system was born out of the process of developing a high efficiency engine with Yamaha Motors Co. The device achieves between 50–100 times the processing ability compared to predecessor plating devices. Because the coating liquid and cleaning solvent circulate at high speed in sealed tanks, product waste processing is unnecessary. As well as successfully downsizing the system, KGK succeeded in accurately controlling plating by developing a one-by-one process. Through a combination of these advances, which include high-speed processing, high accuracy and inexpensive processing, KGK's system realizes huge cost reductions.

In-cylinder plating equipment.

Achieving High Quality and High Productivity, Considering Environment and Safety

KGK's philosophy can be summed up in the following statements: By creating high quality products it guarantees the high reliability of its products. KGK strives for broader versatility and longer edge life for its products so that it can ensure higher productivity and lower costs. In order to actualize this philosophy, KGK must boldly challenge and clear many technological and related issues. KGK has an unceasing commitment to challenge these new technologies and will continue to create new technologies incomparable in their originality.

Heat Technologies to Help the Global Environment

Shoei VANS Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Makoto Takanashi

COMPANY ADDRESS: 4-5-6 Shinmiyakoda, Hamamatsu 431-2103

ESTABLISHMENT: August 1985

CAPITAL: 50 million yen

NUMBER OF EMPLOYEES: 25

MAIN PRODUCTS: Heat treatment equipment, including design, production, sale, maintenance, management, and energy saving diagnostics

TELEPHONE: +81-53-484-1122 **FAX:** +81-53-484-1124

E-MAIL: takanashi@shoeivans.co.jp

URL: http://www.shoeivans.co.jp

Total Technological Capabilities Covering Design, Production, and Maintenance

Shoei VANS Co., Ltd. specializes in design, manufacture, maintenance, and systems management for a wide range of high and low temperature heat treatment facilities equipment. It is able to handle nearly any heat treatment system, from small combustion components to entire heat treatment parts irrespective of their design or maker. Its knowledge of heat treatment system has allowed it to give birth to quite a number of products.

Some examples of products that have some sort of a Shoei VANS contribution to them are solar panels for energy-conserving homes, *onigiri* (Japanese-style rice balls) sold at convenience stores, automobile catalytic converters, and industrial deodorization devices.

When it comes to the design and production of heat treatment equipment, Shoei VANS is able to meet the needs of the user, and the company has its maintenance and management business with 350 offices in and around Shizuoka Prefecture. Shoei VANS is able to propose customers a comprehensive array of technologies and solutions that are optimal to the environment.

Energy-conserving home-use solar panel employing a cure device, one of the products born from the company's dry furnace heat technology.

Nationwide Top Share of Solar Cell Module Curing Equipment

As well as standard heat treatment equipment such as dry furnaces and calcinating and melting furnaces, Shoei VANS is able to offer a series of special-purpose, specialized field

products in the environmental products field such as deodorizing equipment and polystyrene melting equipment, and solar cell module curing equipment.

Amongst these products, the solar cell module curing equipment has received a lot of attention across the nation. Used in solar cells for energy-conscious homes and other places, this cure device module is indispensable to the heating and cooling functionality of the solar panel.

Implementing automated process management for efficiency improvement, Shoei VANS adopted its in-house technologies that enable substantial shortening of process times. The company is proud that this product has achieved the top share nationally.

The solar cell module cure device with which the company boasts top market share.

Acquisition of ISO 14001 and Declaration of Environmental Policy

Shoei VANS gives great consideration about the impact of heat treatment equipment on the environment as it advances technological development. Appraising the increasing interest in environmental conservation of recent years, the company acquired the ISO 14001 certification* in October 1999.

Shoei VANS is the first in its industry to embrace the key theme of carbon dioxide reduction as well as design and quality control within the parameters of the certification. The company aims to offer heat treatment equipment that realizes the goals of being energy and resource efficient, and low cost.

* The ISO14001 is an international standard that sets rules for organizational and product standards and aims to lower the burden of industrial activity on the environment. Companies with the certification are required to autonomously aim to hit these standards.

Shoei VANS' deodorizing equipment was displayed at the 3rd Shizuoka Exhibition Environment, Welfare, and Technology in September 2002.

Developing Its Own Strategies to Preserve the Environment with Air as the Theme

Muramatsu Fuso Co., Ltd.

REPRESENTATIVE OFFICER: Mizuo Muramatsu

COMPANY ADDRESS: 1227 Okubo-cho, Hamamatsu 432-8006

ESTABLISHMENT: May 1946

CAPITAL: 35 million yen

NUMBER OF EMPLOYEES: 40

MAIN PRODUCTS: Exhaust gas processing equipment, general environmental protection equipment

TELEPHONE: +81-53-485-4331

FAX: +81-54-485-4889

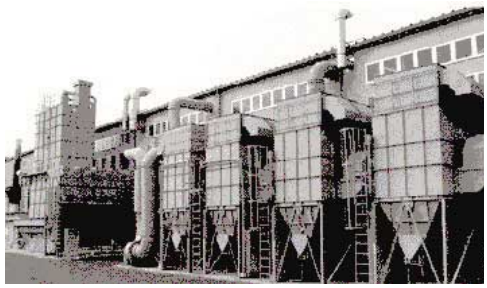
E-MAIL: mf-eng@po3.across.or.jp

URL: http://www.muramatsu-fuso.co.jp

With Air Purification as the Starting Point, Making Totally Environment-Friendly Factories

Air is the number one consideration for Muramatsu Fuso Co., Ltd., a research and development and manufacturing company that produces a range of environmental devices for industry. As well as its main range of fine particulate dust and toxic gas cleaning, deodorizing, and absorption devices for factory emissions, Muramatsu Fuso also produces other industrial equipment for factories such as air-powered raw materials conveyer equipment.

Muramatsu Fuso's specialty is its ability to offer factories a complete range of environmental plant equipment, including dust absorption devices and hot gas cooling systems. While nationally there about 1,000 companies making dust absorption devices, Muramatsu is one of very few that is able to offer a complete range of equipment for the whole plant, for which the company is highly valued.



Muramatsu Fuso designs and produces a wide range of industrial equipments including dust and toxic gas absorbers.

In addition, in a world where environmental restrictions to prevent pollution get stricter year by year, Muramatsu Fuso is a company that concentrates its creative powers and technological abilities to make sure that it is able to match all its customers needs. Not only does Muramatsu Fuso serve the domestic market, but it also exports plants to advanced companies overseas.

The MCCD system was born of the 50 years of experience and technology development the company has pursued since its establishment.

Development of a Dioxin Removal System with Its Original Technology

One system that receives special attention is the company's original Muramatsu Compression Cleaning Dry-Type (MCCD) dioxin removal system. The system works by collecting the hot waste gas produced by waste incineration gases that may contain high temperature poisonous particulate waste as well as dioxin, and transforms these toxic gases to clean air. In 1997, regulations regarding waste disposal methods were strengthened in Japan, and the system easily cleared the higher regulatory hurdles with room to spare.

As for the system's hot flue gas treatment device, the system is able to cool waste gases discharged from incinerators at over 800 degrees down to 200 degrees using a so-called dry-type system. This is a method that does not require a direct water spraying step, a concept that completely differs from former approaches. Because of the system's ability to process such hot flue gases that contain many poisons and chemicals, and with the system being safe, stable, robust, and highly efficient, it has been adopted for waste gas treatment plants by many major enterprises and factories.

Offering Complete Systems from Development through Operation

Sales and engineering, technological development, production, operation, and maintenance capabilities are all united within Muramatsu Fuso, and this technical know-how, information, and technology gained in this line of process are all transfused into the company's new products.

Recently, the company has developed a 24-hour operational distant management monitoring system, enabling the company to keep around-the-clock watch on its customer's plant equipment from Muramatsu Fuso's headquarters in Hamamatsu. Offering this kind of total customer support from production through to operation has become a big selling point.

From now on, responding to increasing environmental problems, Muramatsu Fuso is proposing to offer its dioxin treatment systems not only to factories but also to public incineration facilities.

Absorbing Technologies Toward New Research

At a time when Muramatsu Fuso is developing its environmental protection systems, the company also needs to have knowledge of a range of other related scientific disciplines, including chemical and civil engineering, structural design, and control technologies. Environmental regulations are becoming ever stricter, and the company must meet new demands for the control of pollution sources and other environmental issues from both industry and the populace. To do this, Muramatsu Fuso is constantly endeavoring to absorb new knowledge and technologies. Activities toward this include the periodic opening of information exchange at study forums and symposiums with outside researchers. From now, on top of the current emphasis on dioxin processing, Muramatsu Fuso is planning to expand its research fields into technologies to cope with solvents and obnoxious fumes and smells.

Managing a Continuing Tradition of Profitability over 20 Years

NOA Enterprise Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Yasuyoshi Goto

COMPANY ADDRESS: 209-1 Fushimi, Shimizu-cho, Sunto-gun 411-0907

ESTABLISHMENT: September 1980

CAPITAL: 11.2 million yen

NUMBER OF EMPLOYEES: 50

MAIN PRODUCTS: Power strip, light sources and applied devices, electric heat devices, AC electric devices

TELEPHONE: +81-55-991-5500 **FAX:** +81-55-991-5207

E-MAIL: info@noatek.co.jp

URL: http://www.noatek.co.jp

Challenging Spirit Bringing a Wide Varity of Products

NOA Enterprise Co., Ltd. sells its "NOATEK" brand electrical goods, such as electrical power strip, dressing table lighting accessories, lights, switches, sensors, and remote controllers nationwide. NOA takes great pride in holding Japan's top share of electrical plugs and the home furnishing lighting equipment market.

NOA's crucial strength lays in its ability to accurately read the needs from small retail shops and customers, develop new products faster than any of its competitors, and rush them into the market as quickly as possible.

NOA's principal product development concept is based around making compact and low-priced products, and with these objectives in mind the company is able to offer a wide range of convenient products to the consumer. On top of this NOA utilizes its own mix of creativity and originality to continuously give birth to new products so that the company has built a varied portfolio of consumer items.

Lastly, never fearing failure, NOA

Because of its successful product development strategy, NOA makes a wide variety of popular products.

is a company that constantly pushes out its products one after another, while demonstrating a challenging sprit in both product development and in opening new markets

Opening New Markets with Original Know-How

NOA pays great attention about how it will attack the market with new products and whom it is selling to. And when it does launch a product, it seriously considers how it displays its products at many retail outlets nationally. The reasoning behind this

is that if a lot of people are able to come into contact with the products with their own eyes, they are able to recognize the real value of the product. This is the secret behind the making of a hit in the market. This is the fruit of many years of the company's building of its know-how in cultivating its sales and is the underlying, motive force behind the company's growth.

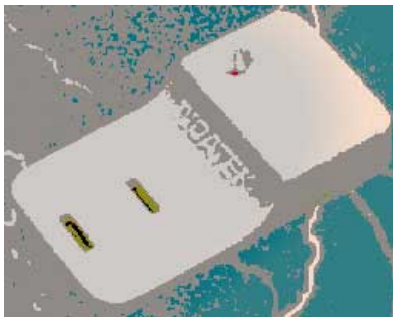
NOA is able to understand the consumer's perception of value, and it is able to offer its products at a price acceptable to the customer. These are the reasons why the company has never made a loss since it was established.

PR Its R&D Strength through Proposals to Customers

One of NOA's biggest hits is its Storm Guard (surge protector). This is a product that protects electrical products from power surges after lightening hits power lines. The product became a big hit in the second half of the 1990s as PC sales accelerated. With perfect timing, NOA launched a large advertising campaign and production soared.

NOA has also simplified its distribution process in an era when wholesalers are being cut out of the distribution chain. Valuing its customers, NOA offers its products directly to customers and the retailers that want them. How quickly a product is able to get to the customer can be the key to success or failure.

As one can see from the company's achivement, NOA regards its originality of product development, its ability to offer the appropriate product to the user, its breaking away from just being a subcontractor, and its independent management style as being primary reasons for the company's strengthening of its competitiveness.



Storm Guard (surge protector), one of NOA's biggest selling products.

The Social Contribution of Product Makers

NOA believes that as a manufacturer, the company should be of benefit to society. In 2000, NOA donated an internally developed set of cameras and image monitoring systems to Numazu City. This system was installed at the bicycle parking lot outside Numazu station's north exit, making a big contribution to crime prevention for the city. It is a great example of how business can make beneficial contributions to the local community.

Specialized LSI Technology to Go beyond Custom Design Company

NALTEC Inc.

REPRESENTATIVE OFFICER: Toyohisa Tajima

COMPANY ADDRESS: Romankan 14F, 2-10-1, Shimizu Minato-cho, Shizuoka 424-0943

ESTABLISHMENT: February 1995

CAPITAL: 199.95 million yen

NUMBER OF EMPLOYEES: 21

MAIN PRODUCTS: Design, development, and custom design of computer peripherals; design of software and LSI circuits; sales of ASSP LSIs

TELEPHONE: +81-543-55-0811 **FAX:** +81-543-55-0810

E-MAIL: minako@naltec.co.jp

URL: http://www.naltec.co.jp

Offering Solutions from Trial Products to Volume Production

NALTEC Inc. started out in 1995 with its engineers holding wealth of experience in printer technology, and since then has achieved unprecedented low prices with its large scale integrated circuits (LSIs) for ink jet printer controllers.

The company's strength lies its design capabilities with printer-related software and hardware, with which the company is extremely experienced. NALTEC is able to offer solutions all the way from trial production to mass production. Simply speaking, the company does not just offer software development and LSI design services; it offers total solutions catering to the planning and designing such as LSI design and precision mechatronics.

Companies that develop similar sorts of services are few and far between, especially so when it comes to printers and scanners and the peripheral device field. NALTEC has an unparalleled accumulation of knowledge and experience in these fields. Its combination of precision design and control technology enables NALTEC to offer a range of cost-competitive product designs.

Within the remarkable growth of the PC-related industries, printer makers have enjoyed an oligopoly. NALTEC has pushed to develop technology that actualizes high-speed, high-quality, and low price components. NALTEC bears the responsibility of playing the role of offering the sorts of core components and technologies to integrators that grow the industry.

IEEEE-1394 Printer Hub (left) and various circuit boards for printer controllers (right).

Host-based Design Concept

Controller LSIs for low-cost ink jet and page printers are developed on the basis of a host-based design concept. This host-based design concept has been offered by a range of companies including Microsoft as well as foreign and domestic venture companies. But NALTEC's specialty is the minimization of the software and peripheral device circuits to the limit by putting all the controlling resources to the PC side, except those functions requiring real-time control.

It is vitally important that printers are fast, inexpensive, and that they print well. NALTEC's growth has come by focusing hard on these basic elements.

From Being a Trusted Developer to Selling Products

From its establishment, NALTEC has always differentiated itself from its competitors by virtue of its technological abilities. NALTEC's technical expertise means that when it is asked to design products by customer, the company is seen as a trusted development partner. The issue with this kind of development role is that while it can be highly profitable, in the end, the only thing that keeps the company in business is the technological expertise held by its employees. Because of this, NALTEC is shifting its strategy from custom designing to selling products that rely on application specific standard product (ASSP) LSIs. On the other hand, NALTEC is still a research and development company. It does not have its own fabrication facilities, and the company is not planning to build one. So NALTEC's products remain outsourced to other companies.

NALTEC currently sells the NALTEC N1 system LSI that has been developed for page printers. The printer makers who adopt this product are able to lower their design risks and development expenses. They are helped meet market needs with low cost product design for the consumer.

Aiming to Become a Community-oriented Company

To continue doing business in the PC-related industry that undergoes extreme technological innovations, NALTEC must have something unique on its own while undertaking cooperative development and technological cooperation with big makers, says President Tajima. To do this, the company needs to recruit excellent research staff, and it has also become essential that the company has excellent sales and marketing staff.

Taking stock of the geographical advantage that the company is located in Shizuoka, which offers excellent access to both the East and West of Japan, and valuing the network of engineers who add value to products, the company is continuously cultivating new technologies and raising its profits taking its chances as they come. And utilizing these measures, NALTEC seeks to be a community-oriented company that gives back to the region. It is also worth mentioning that the company releases its sales figures monthly.

An Engineering Group Opening Up a New Era with Original Technologies

Meiyo Electric Co., Ltd.

The Crystal Harmony cruise ship owned by the Crystal Cruises Company. (Photo courtesy of Nippon Yusen Kaisha (NYK Line))

REPRESENTATIVE OFFICER: Mr. Katsuharu Yoshikawa

COMPANY ADDRESS: 485 Shimizu Nanatsushinya, Shizuoka 424-0066

ESTABLISHMENT: November 1936

CAPITAL: 45 million yen

NUMBER OF EMPLOYEES: 101

MAIN PRODUCTS: Temperature, pressure, and electric field monitoring sensors; data logger/monitoring systems

TELEPHONE: +81-543-45-2212

FAX: +81-543-45-2215

URL: http://www.meiyoelc.co.jp

A Consistent Approach to Product Development from Design to Production

Meiyo Electric Co., Ltd.'s main products are temperature detectors and pressure transmitters for ships. What makes Meiyo Electric special is that the company does not just get orders and produce equipment but maintains a posture of being able to handle the whole process of sensor making and production, from design to manufacture.

When it comes to ship-use products that Meiyo Electric makes, the company boasts that it has an almost 100 percent market share in Japan. On top of being recognized as an authorized components maker by both Japan Defense Agency and the Maritime Safety Agency, Meiyo acquired ISO 9001:1994 in 1995 and then ISO 9001:2000 in 2002 from Lloyd's Register Quality Assurance. Meiyo puts great emphasis on quality control, maintaining this posture through strict equipment inspection and vibration testing. In addition, at the heart of the company is the idea that achieving customer satisfaction is always the base upon which all products are made.

Thermometric resistors and thermocouples—Meiyo Electric's specialties.

Always Making Proposals to Demonstrate Superb Technology

Since it was first established, Meiyo Electric has been developing a series of products that satisfy customers' needs on the basis of its sensor technology. Meiyo Electric makes all sorts of instruments such as data logger/monitoring systems, compact monitors, portable diesel engine efficiency monitors, and angle transmitters. As for integrated systems, Meiyo Electric makes control consoles and remote control systems. Recently, the company also developed an electric field sensor. Meiyo Electric, in fact, produces a

wide range of products ranging from sensors to systems for ships.

With the company's temperature monitoring system for liquefied natural gas transporter ships, the company faced the issue of being able to build a monitor that can cope with very low temperatures. Selecting the material to cope with minus 162 degrees Celsius was bothersome, but in the end, with the company's long experience in monitoring equipment development, Meiyo Electric was able to commercialize the system.

Although Meiyo manufactures products in strictly on order and it does not need to sell products out of their inventory, the company never forgets to make proposals to customers.

Meiyo Electric has received a series of safety and quality certifications from foreign standards bodies, approval from Lloyd's Shipping Register, the acquisition of intrinsic safety approvals for its electric temperature and pressure monitoring systems, and the acquisition of the Conformic Europeene (CE) marking. The technology lying behind Meiyo Electric sensors is found in large luxury passenger liners such as the Crystal Harmony and Diamond Princess.

Offering the Cutting-Edge Technologies

With sensor technology as its core technology and its accumulation of experience in how to improve its development strategies, Meiyo Electric was able to develop a new manufacturing method for its temperature detectors. Meiyo has applied for a patent for this method. From now, following on from its tradition of cultivating its technology and its accumulation of know-how to quickly match the needs of the times, Meiyo Electric is applying itself to offering systemized products that meet the wide-ranging environmental and energy issues that society is facing.

Seabed-installed electrical field sensor. This is a compact, three-axis type sensor.

Meiyo's electric field sensors hold good sensitivity. The company has developed three types of electric field sensors—a seabed-installable, a general-use land model, and a deep-well type. Results have been good with tests conducted in the waters off Mitsu. Besides the fact that such sensors are able to identify ships and changes in sea level, they can also be utilized to inspect the precursor phenomena of earthquakes, and the company expects to sell them widely. And now, the company is considering of land-use models as well.

Outside Japan, Meiyo Electric also conducts technical cooperation with Korean manufacturers, and this has resulted in the knockdown production of various sensors. China is another destination the company is going to enter.

A Workplace Where Excellent Personnel Are Developed

Meiyo Electric recruits university graduates. The company has also recruited one Ph.D. The company recruits people who have engineering-related disciplines, but it feels that technology is really understood from actual practice in the workplace. On top of technical ability, Meiyo pays great attention to the spirit and motivation and ability to really understand the company's emphasis on customer service. Employee training and education are extremely important. The company actively promotes practices such as dispatching employees to external courses, which nurture staff quality. Also, when Meiyo Electric dispatches people on business trips, it puts younger staff with veterans, so that technology is passed to the younger employees, who can see best practice on site, bolstering their experience.

The company also holds "free discussion" lunches at employees' birthday parties, and free discussion is encouraged as part of Meiyo Electric's policy to standardize its customer service and information gathering practices.

Meiyo Electric's motto is "Reformation and Fusion," and the company will never abandon its dream of challenging new technological development.

Products Surrounding Peoples' Lives

Daito Special Wire Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Ken Ikuma

COMPANY ADDRESS: 2-9-37 Nishiasada, Hamamatsu 432-8045

ESTABLISHMENT: October 1953

CAPITAL: 45 million yen

NUMBER OF EMPLOYEES: 61

MAIN PRODUCTS: Mobile telephone cords, audio equipment cords

TELEPHONE: +81-53-441-4558 **FAX:** +81-53-441-3443

E-MAIL: h-suzuki@daito-t.co.jp

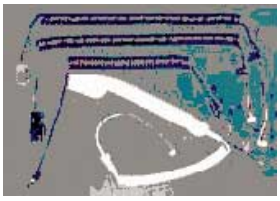
URL: http://www.daito-t.co.jp

Products Not Limited by Group Company Relationships

Daito Special Wire Co., Ltd. manufactures a variety of cords for communications and audio devices, and other equipment. Unlike Japan's six major electric wire makers, including Hitachi Cable and Sumitomo Electric Industries, which receive orders from their affiliated companies, Daito conducts business with a wide variety of companies by virtue of its technological prowess. The company, whose business has grown with telephone cords, has continued supplying Nippon Telegraph and Telephone (NTT) for 35 years since its first order.

The leading products of recent years have been for mobile telephone cords, cords with earphone and microphone attachments allowing for hands-free communication. Daito supplies these parts to Nokia, which holds 30 percent market share in the world. These kinds of products are becoming commonplace in Europe as restrictions on mobile phone use in cars become stricter.

Moreover, Daito's products, such as the portable cassette CD players



Daito's specialty is the production of specialized cords for various products. The company's technology faces a wide variety of challenges, for example making cords with good insulation qualities, cords that do not snap, that resist bacteria, that use environmental friendly materials.

headphones, PC cables, and the electrocardiogram measurement equipment are commonly used in everyday life. Successful products not only need the right color, strength, and thickness but also need to feel right to the touch. Daito's strong technological approach means that it develops highly reliable products that meet both the needs and the wants of its customers.

Manufacturing in China

Being a small local company, Daito quickly moved its production abroad to China's Guangdong in March 1993 much

faster than other local companies. Situated
development zone, the factory is about an hour away from Hong Kong. When Daito first moved there, the factory was virtually a green field site, but more and more Japanese enterprises move into the area as it became difficult to get into the special economic zones.

At this location, Daito operates 24 hours a day. Although there are a certain degree of automation, humans are still the best-suited, most powerful workers when it comes to coping with multiple, small-lot orders. Labor costs in China are approximately one-twentieth of those of Japan, and labor is also abundant. Recently, the number of orders from Chinese customers has been increasing. Only when the company has a short time to fulfill an order or has to fulfill domestic small lot orders, the Japanese factory operates. Daito intends to continue making China as its production base. The most important head office functions such as design, research, and the business development section responsible for new markets will remain in Japan. Nearly all of Daito's employees are from Hamamatsu. When it comes to domestic production, the company will keep on advancing in the areas where it can win in product planning and design.

Daito's Chinese factory currently employs 330 people. This is the place that supports the company's ability to produce a large variety of items quickly.

Originally Developed Inspection Equipment

Because it produces specialized cords that have to endure occasional bending and twisting, Daito has developed its own testing equipment. With this equipment, it has been possible to standardize the method of testing the cords' ability to withstand bending where industrial standards otherwise are not in place.

By virtue of developing three types of testing equipment: bending tester, twisting test equipment, and impact testers, Daito has reached the point where it is able to comprehensively judge the life of electric wire. The efficiency of these various types of test devices, which are also for sale, is highly rated by industry.

Small-sized bending test equipment developed by Daito with a prefectural subsidy.

outside the special economic

A Leader in Insert Molding with Its PIM System Development

Sato Seiki Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Toshiomi Sato

COMPANY ADDRESS: 531 Misonodaira, Fujinomiya 418-0004

ESTABLISHMENT: March 1948

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 116

MAIN PRODUCTS: Harness peripheral system components, inside mold connectors

TELEPHONE: +81-544-26-8173 **FAX:** +81-544-26-8174

E-MAIL: sts@satoseiki.co.jp

URL: http://www.satoseiki.co.jp

A Unified Product Development Process from Design to Production

Sato Seiki Co., Ltd.'s main products are insert mold products for electrical wire connectors for automobiles, which are plastic covered metal parts.

Sato Seiki's special feature is its ability to handle the whole production process from die design to plastic molding and insert molding. The company's strength lays in the technology to be able to combine metals and plastics, two very different materials, in a consistent production process that flows from the design stages to molding.

The equipment Sato Seiki uses has to include specialized machines for the company to be able to offer a complete production process. The company conducts its own equipment design and development and also cooperates with outside machine makers for development and operation of the equipment. While conducting component production, the company simultaneously is always moving toward mass production. For an example of the company's commitment to developing its processes,

Sato Seiki's insert mold products. The company can combine multiple components to a single part and actively makes such proposals to clients.

Sato Seiki is equipped with a 300-ton class insert molding machine, one of only a few units in operation in Japan.

Promoting Its Technical Ability by Making Proposals

Sato Seiki provides product design for its insert molding components. With components that are made up of two or three parts, the company will combine them and design the integrated component and propose this to the customer. Because Sato Seiki can do all the component processing to combine the parts, it is possible to

boost precision and exclude humans, therefore str process. This also lowers costs.

The company's technical ability is promoted through this kind of proposals. In fact after a customer recognized what Sato Seiki can offer, the product the company proposed were incorporated into the customer's automobile lights.

The PIM System: Leading Technology for Insert Molding

In 1993, Sato Seiki developed the Progressive Insert Mold (PIM) System, which utilized the insert molding technology of metal and insulated plastic molding. The PIM system works by melding together the plastic parts and the metal parts in a press into a single component. Presently, Sato Seiki is equipped with five PIM manufacturing systems.

Looking to the future, Sato Seiko is considering selling the PIM system and its technology to embark on a campaign to make higher added value parts.

Excellent Personnel Are Developed at Workplace

Currently, the company only hires university graduates. In a typical year the company might usually hire 10 people, but in 2003, the number was six. The company mainly recruits people who majored engineering, but it is felt that technology is really understood from actual practice in the workplace. On top of technical ability, Sato Seiki pays great attention to spirit and motivation. The company has high hopes that it can combine the abundant energy and motivation of its younger recruits with the know-how of its veterans to develop ever better products.

The PIM System, which combines several technologies to enable insert molding.

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Technology Underpinned by Passion, Production Boosted by Versatility and Speed

HKS Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Hiroyuki Hasegawa

COMPANY ADDRESS: 7178 Kitayama, Fujinomiya 418-0112

ESTABLISHMENT: October 1973

CAPITAL: 878.75 million yen

NUMBER OF EMPLOYEES: 347

MAIN PRODUCTS: After-sale automobile components, race engines, lightweight small-sized engines

TELEPHONE: +81-544-29-1111 (General Affairs Dept.)

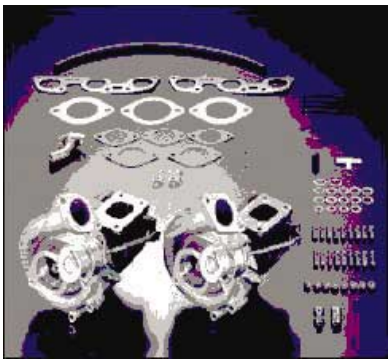
FAX: +81-544-29-1131 **E-MAIL:** overseas@hks-power.co.jp

URL: http://www.hks-power.co.jp

Consistently Making the Best Product Groups for Various Markets

HKS Co., Ltd.'s main businesses are the designing, manufacturing, and selling of a combination of value-added and after-sale automotive products such as turbochargers, shock absorbers, and mufflers.

Because the products themselves are non-essential, these products must have a certain allure or the ability to tempt the fickle tastes of car lovers, hobbyists, and motor sport enthusiasts. This is a very demanding market. If HKS is to satisfy the tastes of the customers ahead of the competition, it must rapidly develop new, high quality products and be flexible enough to supply a lot of products in small quantities. Because of this, HKS has to be able to build brand recognition and a reputation for quality, deliver small quantities of many kinds. Facing a very severe economic environment, HKS has been able to maintain both its management and market stability and its ability to respond to continually changing market demands. In addition, in recent years, following the company's advances in super lightweight, small-sized engine development, HKS is taking aim and enter aircraft market.



An HKS specialty—the turbocharger kit. On top of this, the company also supplies mufflers and shock absorbers. As a "total supplier," HKS develops and produces a selection of parts that answers the whims of the market.

Passion and Consistent Management Supporting Technology

HKS was founded in 1973 with the dream of developing its own race engines. From this, the company has continued to develop the groups of technically sophisticated products that are needed to boost car efficiency, and this has become the primary factor

that has formed the company's brand power. On top of this, however, in a market where there are many types of cars and a large number of car components, HKS' basic policy must be to produce performance-enhancing products. The company's development posture is that it always seeking to maintain a high level of efficiency. HKS continues to keep a tight grip on new product development in various areas and focuses its power on performance-enhancing products such as engines, turbochargers, mufflers, and shock absorbers as its main product groups. Its management has never lost focus on the importance of its basic posture of maintaining high efficiency.

HKS management has maintained a good strategic focus and continually raised the company's goals. Building on the engine development project that was the original aim when HKS was established, the company moved on to performance-enhancing products. HKS has, step-by-step, raised its capabilities to become a complete developer and supplier.

Placing Importance on Customers' Sensitivity

The company's product groups must meet the many and varied demands and finicky tastes of the consumers who are tired of mass-produced conventional cars. Consequently, the demands of this market are extremely sharp and sensitive. Parts' specifications are very important. HKS parts are demanded to have special features that are distinguishable and differentiated from those of competitors' in the same product groups. To meet these requirements, a continuing supply of high-specification, high-capability, and high-quality components is required. To take just one example, with mufflers, the demands of the customers can be influenced just by the timbre of the throat noise or the muffler's shape. These sorts of characteristics are highly equivocal and difficult to evaluate. Getting it right involves the sort of information and knowledge that just cannot be drawn up numerically. It is a question of the sensitivity of design showing up through the technology. Because of this, while their experience might be shallow, it is not unusual for employees to bear a central role in product development in only two to three years after joining the company.

Of course, it seems essential that the company employs people who like cars so that they can make the right kinds of products. Also, the company has remained relatively young, both in terms of management and employees as the company's history goes back only to 30 years, and the company retains the passion and sensitivity to make the right kinds of products. Besides this, from its origins of challenging race engine development, HKS has maintained its future thinking orientation, its ability to strive toward higher goals for example in recent years, this is shown by HKS developing its super lightweight small-sized engine. The company's clear goals motivate its employees and help them fulfill their dreams.

A Huge Variety of Small Volumes

HKS product groups cater for hobbyists and individual tastes. When the products are classified individually, the market size for these kinds of products is not big. Indeed, when it comes to the numbers of parts classified by lists of items at the time of shipping, the number of units in each product category is just several to several tens of units. On the other

hand, the number of components HKS sells is extremely large. If counted in terms of number of items, it reaches six thousand. Additionally, because of the market scale and the small volumes of products, imitations enter relatively easily, so it is absolutely essential that HKS recover its costs as quickly as possible after parts go on sale. So whenever a new car comes out, the key to whether or not HKS can make an early profit lies in how quickly it can get an advanced and highly specialized or customized product into the market.

When targeting users with strong individuals' tastes, the key to success is to set great value in shortening the production time, as well as battling to compress parts' planning, development, design, and commercialization periods. In order to compress the time to market and squeeze more profit, HKS must make sure it keeps up to date with market information quickly. HKS continually polishes its ability to get to the market as quickly as possible. This characteristic is one of the largest primary factors behind HKS' competitiveness. It also can be said that the ability to produce large varieties of small volumes of products quickly protects HKS' profits and its ability to keep its production in Japan.

The Continual Challenge Toward Global Quality

Ogusu Industry Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Michitsugu Ogusu

COMPANY ADDRESS: 10838 Shinohara-cho, Hamamatsu 431-0201

ESTABLISHMENT: March 1946

CAPITAL: 110 million yen (group total)

NUMBER OF EMPLOYEES: 340

MAIN PRODUCTS: Power train components for automobiles, motorbikes, industrial machinery, outboard motors, and electrical machinery

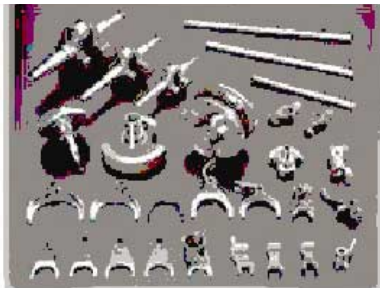
TELEPHONE: +81-53-447-2051

FAX: +81-53-448-0210

URL: http://www.ogusu.co.jp

Offering Vital Components That Depend on Advanced Technology and a Total Production Process

Ogusu Industry Co., Ltd. specializes in the area of power or transmission drive trains on the underside of vehicles that take power from the engine and transmit it to the wheels. Ogusu was established in 1946. Initially, the company started out producing and selling sewing machine parts. However, in 1953, Ogusu set up a factory as a subcontractor for Suzuki Motor Co., Ltd. (Now Suzuki Motor Corporation) and moved onto automobile part production. From these beginnings, Ogusu has gone on to expand its products further into agricultural machinery and other products. Having survived hard times following the Oil Shock, Ogusu is now a mainstay of crucial automobile components so that engine transmission and shaft production represent about 70 percent of the company's products.

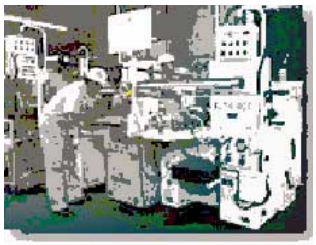


Engine transmission components.

The power train, at the heart of an automobile is Ogusu Industry's specialty.

Automobile components must ensure that traveling can be done safely, and high reliability is an extremely important part of production. Ogusu achieves this high reliability by consistently controlling the whole manufacturing process in-house from materials to subassembly. From the cutting of the materials, through heat treatment and grinding technology Ogusu has developed extremely precise process technologies. When process technologies are

perfectly matched with the assembly process, it is possible to optimize product quality to the highest standards. With such mastery of its technology, Ogusu has gained a high reputation for the seriousness with which it feels responsible for product quality.



Ogusu's specialist production and process improvement machines are 100 percent made in-house, allowing for both high quality and lower costs.

High Reliability Built on Quality, Supported by Human Resources

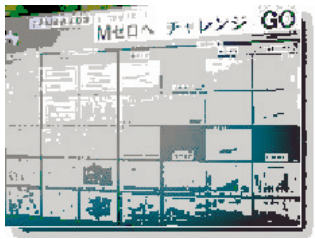
Ogusu's mastery of precision technology engineering means the company has realized extremely high quality, but also a speedy, low-cost, highly efficient manufacturing process.

Behind this, Ogusu's mastery of the production process means that it is able to make all its specialist production and process improvement tools in-house. Ogusu's completely in-house production process, from design to production, is an extremely important feature, and the company conducts its maintenance, repairs and upgrades entirely by itself. Even the company's tools and jigs are made in-house. When it comes to really grasping "know-how," Ogusu has advanced its essential technology and pushed it to an extremely high level. Because of this, it can answer the needs of the customer speedily and precisely, offering products of the highest quality. And this technology is also the soil from which the ability to decrease costs is grown. To actualize this, each individual Ogusu employee has a high level of specialist knowledge and engineering skills, and without this accumulation of talent, it would not be possible for the company to maintain the quality and reliability of its products. Ogusu strives to raise the accomplishment of its human resources to a high level, and it continues with its constant efforts to answer the demands of its customers at the highest level.

Improving Business Structure by Company-wide Participation in TPM

Ogusu implemented its TPM program in earnest in 1998, improving the company's business structure, competitiveness, and its production control anew. Ogusu implemented its TPM policy under the slogan "TPM That Everyone Participates in" and implementing the program across the company's different sections and was able to achieve numerous results, including improvements in the production division and new know-how to production process and machine design.

Following this, the company next set its goals higher, implementing a New Directions TPM system (N-TPM) that built on the improvements already gained but instilled a new sense and appreciation of value. A new goal was set, called QCD, for quality, cost, and delivery date. With these systems in place, Ogusu is striving to reach world-class standards in every business area, and it continues to concretely and boldly meet new challenges.



TMP activity notice board. Everyone is involved as one big team.

Moving Forward and Outward to Challenge Environmental Safety

Ogusu is concentrating a lot of effort also into environmental preservation. In March 2002, the company acquired the ISO 14001, an international environmental management certification. Ogusu is moving forward, focusing on promoting the construction of new systems that prevent and cut waste, conserve natural resources, and have lower energy and resource demands.

The fruits of these forward-looking activities, hand-in-hand with Ogusu's TPM activities, have emerged in several new devices and equipment.

One example is a stable supply, twin-tank flow circulation-type coolant system. Standard systems employ box tanks that use high-pressure coolant pumps and suffer from the problem of sludge accumulation. Ogusu's round tank design, employing a low-pressure coolant pump encourages circulation within the tank so that sludge does not accumulate. By attaching Ogusu's in-house developed separation device (an abrasive grain removal device), the company has realized a system that uses a third less electricity and has superior quality and productivity. Also the frequency with which the corrupted fluid has to be changed has become less, and temperature increases have been greatly reduced.

These kinds of results are the fruits of Ogusu's employees' constant efforts to improve the company's business by coming up with great ideas, and it is these kinds of ideas that make the company stronger day-by-day.

The environment is the number one issue for the automobile industry of the 21st century. Ogusu's attitude is that it will always precisely answer the demands of the time. From now Ogusu, aiming at achieving global quality standards, will continue its challenge to produce high quality and reliable parts.

Stable supply of twin-tank flow circulation-type clean-water, water-soluble grinding fluid coolant system.

Unique Craftsmanship That Creates Universal Quality Products

Unicraft Nagura Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Yoshihide Nagura

COMPANY ADDRESS: 350-1 Iride, Kosai 431-0411

ESTABLISHMENT: April 1957

CAPITAL: 67.5 million yen

NUMBER OF EMPLOYEES: 250

MAIN PRODUCTS: Automobile parts, precision home electric appliances, precision measuring instruments, robot systems, mechatronic parts

TELEPHONE: +81-53-578-0511 **FAX:** +81-53-578-1371

E-MAIL: webmaster@unicraft-nagura.com

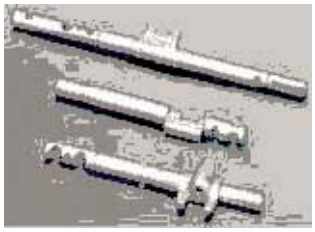
URL: http://www.unicraft-nagura.com

Be UNICRAFT

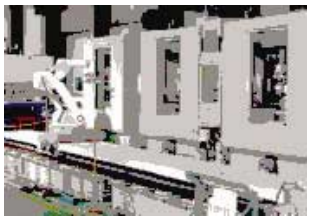
Unicraft Nagura Co., Ltd.'s company name stands for a universal and unique craftsmanship. This means that the company boasts the skill of company's craftsmen who create products that are loved by the world.

Turning into the 21st century, times have changed radically. For a company to expand its business, the company has to pay top priority to quality, and it is essential that the company develop its original ideas and technology to the satisfaction of customers' needs. Unicraft Nagura's corporate philosophy is to "Be UNICRAFT." It is a clear vision of the future promoting the great promise of its initiative and its continued evolution in the pursuit of the ultimate products.

Unicraft Nagura's principal business is the production and sale of precision automobile parts, precision parts for home appliances, precision measurement machines, robot system mechatronic parts. The company's shafts for manual gearboxes, which use a forging method unique to Unicraft Nagura, constitute nearly 100 percent supply of the Toyota group.



Manual transmission fork shafts.



Moving robot system.

Aiming to Be Number One in Five Areas Using the Company's Precision Technology

Unicraft Nagura's technology expertise lies in five fields. These are precision shafts, mechatronics products, robot systems, measurement systems, and

factory automation engineering. The company aims to be the number one company in each of them. The basis for success in all these fields comes from the company's proud tradition of precision technology. With this, Unicraft Nagura has cultivated a combination of technology and a real experience so that it has potential that goes beyond mere theory.

The company's robot system is judged to have integrated capabilities, which means they can be utilized for peripheral functions, which has expanded their market share. The biggest feature of the system is the in inline measurement function that utilizes such cutting-edge technology as laser and image processing. The most important function of this system is that it realizes perfect quality checking, making products confidently reliable.

Focusing on factory automation technology that cuts personnel numbers and automates production processes, the company developed in-house systems that offer both high product quality and low cost production. On top of this, Unicraft Nagura efficiently uses 3D CAD systems, improving design quality and efficiency. Inquiring about customers' needs and looking for solutions, in the future, Unicraft Nagura will examine the strategies needed and offer realistic factory automation solutions, expanding the company's know-how in the area of factory automation engineering.

Unicraft Nagura's production line using the robot engineering system.

Robot moving line system.

The You-You (Leisurely Playing) Factory Concept

"Giving Space for the heart to play, creating a leisurely factory atmosphere"—This work philosophy of Unicraft Nagura extends not only to the technology side but also to the working environment. Taking a second look at its human resources, equipment, and software, the company tries to educate and train its workers and create an environment of lively creativity. Proving this, Unicraft Nagura has instituted and is actively promoting a Total Productive Maintenance (TPM) system that aims toward the improvement of both productivity and the work environment. In fact, the company has been awarded a TPM excellence prize and, along with other quality control and management certification standards, has already acquired ISO 14001 certification.

Certifications of an excellent company; from left to right, TPM excellence prize, QS 9000, and ISO 14001 certificates.

Cultivating Multi-talented Specialist Craftsmen

Ever since it was founded, Unicraft Nagura has maintained a policy of paying great attention to the rearing of its human resources and talent, where, the basis of the company lies in its multi-talented specialist craftsmen.

The craftsman is a person who continually aims for higher levels, never accepting his present level of ability. He is someone who enjoys the pleasure of knowledge.

Ultimate specialists, but full of ability in other fields, these are the human resources the company wants to create. To cultivate such multi-talented people, Unicraft Nagura has a training system for the acquisition of ability in factory automation technology, general technology, and individual technological skills.

With its continuing craftsmanship Unicraft Nagura develops unique products for factory automation.

Not Moving Overseas: the Secret That Keeps the Company in Shizuoka

While many companies move overseas, there is a secret that keeps Unicraft Nagura in Shizuoka. Other companies move overseas to decrease costs. Mass production capability is an essential element to decrease costs, and automation is essential. Unicraft Nagura makes this possible by the in-house developed automation technology, which is the company's strength, and even the system itself can be a product.

Because problems such as breakdowns can be repaired promptly without the need to go outside the company, cost reduction is assured. Also, the production process is fully automated, making production cost per item lower than those made in China. Furthermore, Unicraft Nagura's fully automated line system requires less manpower making cost reductions possible.

Machine production-handling system.

An R&D Company with the Technology to Tackle Everything from Product Design to After-Sales Service

Sodeyama Giken Industries Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kenji Sodeyama

COMPANY ADDRESS: 709-5 Kitanumagami, Shizuoka 420-0901

ESTABLISHMENT: February 1979

CAPITAL: 18 million yen

NUMBER OF EMPLOYEES: 33

MAIN PRODUCTS: Automatic glass edge processing equipment, powder supplied equipment for drainage treatment.

TELEPHONE: +81-54-262-8524 **FAX.** +81-54-263-8155

E-MAIL: sodeyama@mail.web.ne.jp

URL: http://www.wbs.ne.jp/bt/sodeyama

Possessing the Technology to Produce Groups of Diverse, High-Precision Products

Sodeyama Giken Industries Co., Ltd. is an engineering development company that started out making ship-related products, but which now produces a range of precision equipment, environmental anti-pollution equipment, and medical equipment. The core technology, however, underpinning Sodeyama is its edge-grindingtechnology. This type of grinding is useful for mobile phone and PC liquid crystal displays where edges have to be processed. The technology makes the glass stronger and less easy to crack. Because the glass is extremely thin, with the thinnest sheets working out at only 0.2 mm thin, very precise and accurate technology is essential. Sodeyama boasts that it holds the nation's top share of such liquid crystal glass grinding machinery. The company is well known internationally and does a lot of business with big companies.

Sodeyama's edge-grinding equipment automatically repeats grinding of liquid crystal glass edge.

From Rearview Mirror Grinding to New Business Opportunities

Sodeyama was established in February 1979. President Kenji Sodeyama was working as an engineer for a local shipbuilding firm, but after that firm went bankrupt, he set up on his own. At the beginning, work was mainly subcontracted business for shipbuilding. Because the prospects looked dim for this market, Sodeyama searched for new business opportunities.

Eighteen years ago the turning point came when the company, following a request from an automobile parts maker, developed an edge

grinder for rearview and side mirrors. Utilizing this basic grinding technology, and after repeated investigations for potential uses into what sort of applications looked possible, Sodeyama aimed at the mobile phone market and began the production of grinding devices for liquid crystal glass. Following the huge growth of the mobile phone and personal computer markets, Sodeyama has got top share.

Using a special inorganic coagulant, the "ecoX" powder-supplied drainage device is able to drain with high efficiency.

Liquid Crystal Glass Grinding Process Concentrating on Patent Protection

By the time Sodeyama developed its liquid crystal glass automatic edge processing machine in 1989, the company has steadily and repeatedly improved its technology base, improved its equipment's precision, and moved to high-speed processing and the complete automation of its systems. The company developed two grinding systems: an automatic grinding head with a swing-grinding motion and an anchor system, which moves the display unit.

"The company that does not have a patent strategy will be left by the wayside." So said President Sodeyama, and the company went on to acquire patents to protect the technologies and know-how developed and prevent imitations from other companies. This intellectual property protection has become the company's key to ensure expansion of its business.

Doing Business in Korea and Other Countries

Along with the movement of production of mobile phones and computers to Southeast Asia, demand for liquid crystal glass grinding devices are also moving to the same areas so that at the moment, Sodeyama is doing business with Korean and Taiwanese companies. After starting business with Korea in 2001, good appraisals from customers quickly spread by personal communication, raising Sodeyama's reputation and name value higher in both countries, so that business is now thriving and leading to more business. Also, the company allocated the sales director in charge of overseas business to conduct direct sales, but not to involve an intermediary company. Sales are therefore strong because the prices do not contain additional margin.

"There are very few other small- or medium-sized companies of our scale doing such a level of business abroad," says the president. With Sodeyama's level of foreign business increasing, it could be that they might overtake its domestic business.

A Group of Technology Specialists

Sodeyama's research and development rests on three principles. Firstly technology is cultivated and assured by the company's "pioneerism." Secondly, Sodeyama never imitates other companies. This is the "originalism." Lastly, the company has built up a store of knowledge over a long

The main factory.

time. This is called the "expertism." Supporting these ideas, Sodeyama employs 20 technical experts who specialize in machine design, electrical expertise, production technology and assembly, and other fields. There are engineers who were recruited from other companies.

Sometimes customers request Sodeyama to make machines and devices that are world-firsts. Even to respond such requests, President Sodeyama takes a coordinating role, harnessing, and mobilizing all the company's technology and the employees' expert knowledge in the battle to develop new technologies, so that Sodeyama's products will receive high evaluation from anyone in the industry worldwide.

From now onward, harnessing its technical power, the company is putting effort into developing grinding devices that can cope with thin and hard materials in order to meet the expected growth of organic electroluminescent (EL) displays and silicon wafer–based technologies.

Answering Needs While Creating Demand through First-Class Technical Ability

Ishii Group

REPRESENTATIVE OFFICER: Mr. Teruhito Ishii

COMPANY ADDRESS: 5-4-3 Takabayashi, Hamamatsu 430-0907

ESTABLISHMENT: April 1948

CAPITAL: 10 million yen

NUMBER OF EMPLOYEES: 60

MAIN PRODUCTS: Precision dies, automotive parts

TELEPHONE: +81-53-472-9551

FAX: +81-53-474-5130

E-MAIL: all@ishii.co.jp

URL: http://www.ishii.co.jp

GROUP COMPANIES
(Numbers within brackets indicate number of employees.)

Topy Co., Ltd. (20)
Precision die parts production and sale

Nichiei Shikou Co., Ltd. (70)
Cardboard sheet and case sale and manufacture

Sankyo Electric Co., Ltd. (30)
Motorcycle graphics processing

Ishii Planning Co., Ltd. (120)
Restaurant business

E-Marketing Co., Ltd. (3)
Electronic marketing

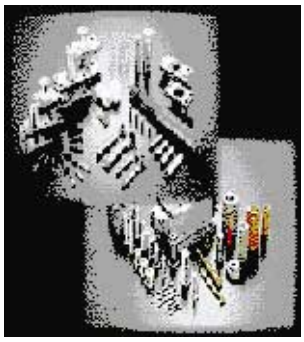
U.S. Tech Co., Ltd. (30)
Subcontracted work

Success Co., Ltd. (45)
Subcontracted work

Company Roots Supporting Its Exquisite Grinding Technology

Ishii Group's roots are in motorcycle production. The father of the present chairman Teruhito Ishii first started motorcycle manufacturing business. Then the company continually kept improving its grinding technology through production of motorcycle components.

Following on from this, Ishii developed elaborate process technologies and has redeveloped these to the point where die parts and precision components have become the company's main business. The establishment of quality with high precision component grinding technology is a subtle process that depends on the years of experience and the skills of the craftsmen. The fact that this company is told "Ishii, the Grinding" by its customers demonstrates the excellence of Ishii's technology.



Right up to the present, Ishii takes an extremely strict attitude towards its technology. It has to meet the demands for reliability from its customers, and it must be assured of its technology so that its parts are precise to within an error of only 5 microns within the factory as well as when its components receive inspections at shipping time.

Technological Expansion Based on Core Technologies

The techniques for precise die making represent Ishii's core technology. But these skills are also the power behind product development and market creation.

Presently, Ishii has four business divisions: die parts business, grinding/cutting and pneumatic equipment business, cold forging engineering business, and LSI design business. Each of these respective business territories interacts with each other, fostering business expansion, and widens the base and scope of the company.

Taking on Cold Forging Technology

Ishii's cold-forged products are part of the company's practice of never forgetting its posture over recent years as a business that unrelentingly challenges new technologies.

Recently, customers have increasingly tended to demand cost decreases and this trend has become severe. Ishii has utilized its own form of precision cold forging technology, and used this to successfully produce high-revolution bevel gears.

Compared with existing process methods, this technique yields far superior cost performance. Furthermore, while there are still some issues that need to be resolves, it appears that there will be a big demand in the future in the field of automobile drive shafts and other components.

Swiftly Meeting Market Needs by Direct Sales by the Top Executive

Ishii's top salesman is Chairman Ishii himself. While leading the company as its top executive, he rushes day and night to promote the company's sales. The real value of having the company's top executive in touch with the customer directly is that it makes for fast interaction and responsiveness to client needs.

Chairman Ishii's business philosophy "three Fs" is a belief that through a combination of sufficient information and intuitive ability, one can predict the future. One must construct a vision that makes a value contribution to society. This he sums up as the "future." A pioneering mind must be directed to all kinds of business activities. This he calls the "frontier." But one must always return to one's original intention and never loses sight of the importance of the fundamentals. These are what Ishii calls the "fundamentals."

A Philosophy of Offering Collaborative Development Based on Finely-Honed Technologies

Onox MFG Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Natsuo Aoshima

COMPANY ADDRESS: 1273-8 Shinbara, Hamakita 434-0003

ESTABLISHMENT: September 1971

CAPITAL: 50 million yen

NUMBER OF EMPLOYEES: 90

MAIN PRODUCTS: Precision engineered metal components, medical instrument development and manufacturing, YAG laser processing, office automation equipment assembly

TELEPHONE: +81-53-582-2137 **FAX:** +81-53-582-2120

E-MAIL: sal-onox@chive.ocn.ne.jp

URL: http://www.onox.co.jp

Consistency from Design through Manufacture

Onox MFG Co., Ltd.'s main businesses are precision metal parts manufacturing, medical instrument development and manufacturing, YAG lasers processing, and office automation equipment assembling. This company's main feature is its new flexible manufacturing system that enables the company to manufacture a variety of types of products in various volumes.

In addition to its ability to manufacture precision sheet metals that was the basis of its business when it was founded, Onox MFG has combined this using up-to-date laser technology. Unlike other companies that are only able to complete one part of the production process, Onox MFG can execute a complete production process from offering design services all the way through to manufacture.

While always aiming at developing products in a cost-conscious way, Onox MFG is constantly making positive suggestions to its customers about, for example, changes in component production method or materials. In this way the company maintains its high reputation for reliability while continuing to expand its business.

Roland DG Corp.'s EGX-600 engraver uses welded-structure frame processed with the YAG Laser.

Unrivalled Technological Power: Offering Solutions to Difficult Problems

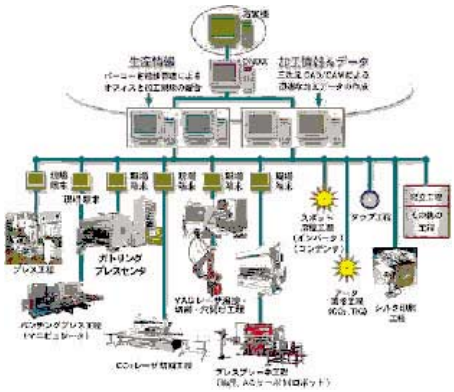
By tying up with customers for joint component development or machine development and manufacture, Onox MFG works hard to propose solutions that rationalize various manufacturing issues. For example, one of the proposals was changing the customer's processing methods by integrating YAG laser processing and precision sheet metal plating processing technology, which was introduced three years ago to compensate for a shortage of skilled metal processing craftsmen.

By overcoming some difficult processes of cutting and hole opening and by promoting three-dimensional processing, as well as cutting down the number of components necessary, Onox MFG realized the technology that takes metal working beyond mere cutting to more complex processing.

Because of these abilities, Onox MFG successfully solved difficult problems that had been difficult to overcome with an accelerated and flexible process that was highly precise, tough, and cost effective.

Meeting Every Demand with Unrestricted Designing Ability and Proven Equipment

Onox MFG is always on hand to deal with customer inquiries and has an in-house material research and development team providing with four technicians who are responsible for the design of various new products. In terms of its manufacturing equipment lineup, Onox MFG has a 550-watt laser for processing and cutting and a 2,000-watt YAG laser system for welding, enough to meet every customer demand.



This chart illustrates Onox MFG's well-organized manufacturing equipment lineup.

In addition, regarding Onox MFG's traditional precision plating, the company owns the only Gatling Press Center in Shizuoka Prefecture. It also has all the multiple types of pressing machines, essential metal working, and production equipment to meet every customer need. This includes a power press, a punch press, a press break, and various types of cutting machines.

Furthermore, to ensure precision and strict quality control management, the company employs three-dimensional coordinate measuring machines as well as other inspection devices.

A Place for Making Products, a Place for Enhancing Human Capability

Concerning recruiting, last year Onox MFG hired two persons, one from vocational college and one high school graduate. The company's personnel development doctrine is that education is based in the workplace and the company strictly oversees this principal in the factory so that employees learn their work from the heart.

Pursuing Simple and Easy Solutions for Diagnosis Medicine

Tauns Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Urao Nonaka

COMPANY ADDRESS: 43-3 Kozuwa, Numazu 410-0872

ESTABLISHMENT: May 1987

CAPITAL: 16.6 million yen

NUMBER OF EMPLOYEES: 20

MAIN PRODUCTS: Medicine, in vitro diagnostic medicine; research and development related to cosmetics and food analysis technologies.

TELEPHONE: +81-55-925-6200 **FAX:** +81-55-925-6161

E-MAIL: tauns@pop13.odn.ne.jp

URL: http://www1.odn.ne.jptauns

Speed of Detection and Ease-of-Use

Tauns Co., Ltd. conducts production of in vitro diagnosis medicine and various analytical reagents, with the company motto of enhancing and enriching the welfare and security of peoples' lives.

The company's outstanding products focus on several fast diagnosis kits. For example, the company makes immunochromatography-based tubercle bacillus group identification reagent kits called Capilia TB and the immunochromatography-based Capilia Flu A, B, which contain influenza virus antigen detection reagents. These kits can both detect the presence of pathogens in as little as 15 minutes.

Tauns has thus dramatically shortened diagnosis times. Traditionally, using the old biochemical method, it took about one to four months from initial examination to diagnose tuberculosis, increasing the unease in the patient and prolonging the treatment time. With influenza detection, doctors are able to examine and diagnose suspected patients quickly without needing to send the results to other laboratories or clinics. So the Capilia Flu A, B kit is extremely useful for identifying and treating influenza. Furthermore, while retaining responsibility for product manufacturing, BL Co., Ltd. has conducted planning, research and development.

The Capilia Flu A, B.

Note: The identification reagent using immune chromatography method uses antibodies that are picked up through the capillary phenomenon. The kit uses an antigen-antibody reaction process and expresses the results through colored markers that can be visually examined and checked.

Embarking on Brand Development

Until recently, Tauns was an OEM supplier of raw materials for the industry and stayed hidden in the shadow of the major suppliers. But given its highly evaluated technology, Tauns has embarked on building its own company brand to raise the company's presence.

Tauns maintains an integrated system of production from raw material to finished product at its factory, situated next to its head office. The Ministry of Health, Labour and Welfare has approved Tauns as a licensed manufacturer, and its products are approved as being included under the nation's health insurance scheme. Sales of Capilia TB, and Capilia Flu A, B, labeled "Made by Tauns" have begun via Nippon Becton Dickinson Company, Ltd., the Japan arm of the major U.S. pharmaceutical firm. This is ensuring the rapid buildup of the company's brand.

In addition, due to the large amount of collaborative domestic research conducted, the company's high level of technology is widely recognized. Further, with the establishment of a joint venture in Zhejiang province in China in fiscal 2003, Tauns looks forward to expanding its business.

Robust Management: Not a Single Loss-making Year

With the company's emphasis on its highly evaluated technology, and having been sounded out by major pharmaceutical firms for investment, the company has refused all such offers because it does not want to accept any changes to its successful business strategy.

Investments are made by the company's own fund and funds from banks. Tauns has never made a loss since it was founded, and its founding members still hold the majority of the company's shares.

Expanding Business to Reagents for Environmental Inspection

Recently, attention has been focused on health protection in an environmental context. The market for reagents to detect Legionaries Disease, formaldehyde contamination, and environmental hormones expected to grow to over 10 billion yen. The company is expanding its products to these fields, as well as diagnosis products for animals.

Finally, as part of the company's moves to boost its research and development capabilities and open new fields, Tauns is progressing towards collaboration with companies that provide monoclonal antibody and the polyclonal antibody creation technologies. Tauns is also looking for partners that can offer the next level of sensitometry from today's nanogram-per-milliliter to picogram-per-milliliter levels of sensitivity.

Products Developed for the Patients' Standpoint

Hollyx Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Kikuji Horiuchi

COMPANY ADDRESS: 294-46 Ashitaka, Numazu 410-0001

ESTABLISHMENT: April 1997

CAPITAL: 15 million yen

NUMBER OF EMPLOYEES: 9

MAIN PRODUCTS: Orthopedic joint plates and screws, orthopedic surgical equipment

TELEPHONE: +81-55-925-4601 **FAX:** +81-55-925-4603

E-MAIL: kikuji@hollyx.co.jp

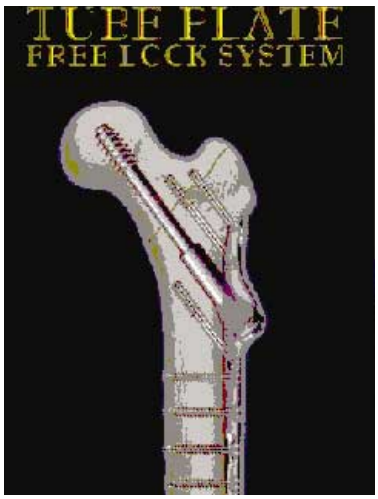
URL: http://www.hollyx.co.jp

Always Challenging the Highest Quality

Hollyx Co., Ltd.'s main business is producing plates and screws for bone connecting and equipment for bone surgery. Hollyx's titanium alloy connective products are lightweight and have good affinity within the body and can be made to fit easily to patients' individual bone structures. They are used to support or fix bones fractured in accidents to help patients suffering from bone diseases, and to support elderly and other patients injured in accidents. Because the surgery time is shortened with such implants, the patients' burden can be substantially reduced.

Each year there are 70,000–80,000 cases of bone fractures or cracking where the splicing and support implants are effective. In terms of market scale, the market is worth about 200–300 billion yen per year.

Until now the market has been dominated by imports. But these important products are problematic for Japanese people because these parts often do not interface with or not make a good match with the Japanese skeleton. Hollyx has developed a size classification system for its screw implants and plates, allowing for the choice of product taking into consideration factors such as bone length, thickness, the nature of the breakage or fracture. Because the stock of parts could become enormous, Hollyx has solved these problems by developing sliding-length implants with an adjustable eccentric washer.



Tube plate free lock system.

Hollyx has gained patents in both Japan and the United States for its washer and instillation tool technology. Moreover, the company was recognized by Shizuoka Prefecture's small and medium business creation law and further continues to advance its research and development.

The Eccentric Washer: Hollyx Parts' Special Features

Hollyx's parts feature a system that uses the eccentric washer fixed between the plate and the screw. The system allows 130–150 degree angles between femur jugular and shaft of bones and 10-degree angles forwards and backwards. The system requires few parts and can provide a perfect fit for all different figures of people. Because the doctor can decide the angle prior to the operation, the insertion process becomes a lot smoother, typically cutting operation time down from what used to average an hour to about 20 minutes. Hollyx's products are highly rated by orthopedists because the shortened operation time is much less of a burden for older people or people injured in accidents.

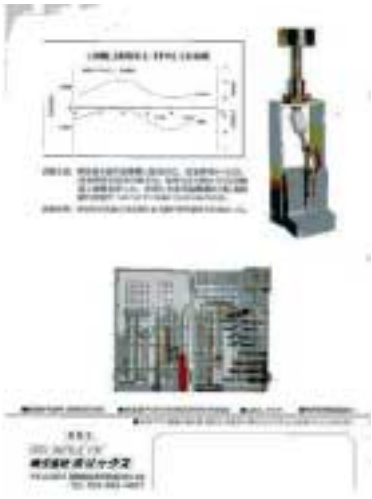
The system has proved very convenient for preventing older people becoming bedridden after accidents. Usually, when someone of advanced age has a tumble and breaks, for example, a femur, the patients age makes healing much more difficult. However, using Hollyx's parts, initial walking rehabilitation is possible about only a week after the operation.

Future Management Strategy

Hollyx used to sell its products via a trading company, but in October 2001 it established a new business unit and commenced direct sales to hospitals. To date, Hollyx's products have been used in about 160 hospitals.

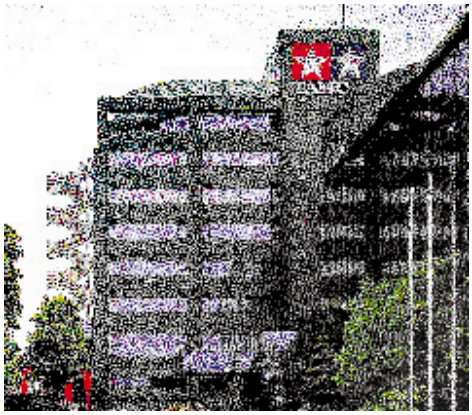
At the same time Hollyx prepared and distributed an information manual providing support for instrument selection. Hollyx has also started research and development into artificial joints, for which the market is growing. The company is providing order-made parts to match individuals' different needs, a point that differentiates Hollyx from bigger manufacturers.

At the moment orthopedic connecting technology and artificial joints are not advanced from the point of view of the psychological problems for patients. Right now Hollyx is in a niche market, but the company expects demand to grow as Japan's society ages. As this happens, competition is expected to become severe. Facing this, the company is strengthening its sales and marketing to let both doctors and patients understand the advantages and efficiency of Hollyx's products.



The Tamiya Brand: Passing on the Joy of Model Making

Tamiya Inc.



REPRESENTATIVE OFFICER: Mr. Shunsaku Tamiya

COMPANY ADDRESS: 3-7 Ondabara, Shizuoka 422-8022

ESTABLISHMENT: May 1946

CAPITAL: 50 million yen

NUMBER OF EMPLOYEES: 425 (as of April 2003)

MAIN PRODUCTS: Plastic models, radio control models

TELEPHONE: +81-54-286-5105 **FAX:** +81-54-285-6979

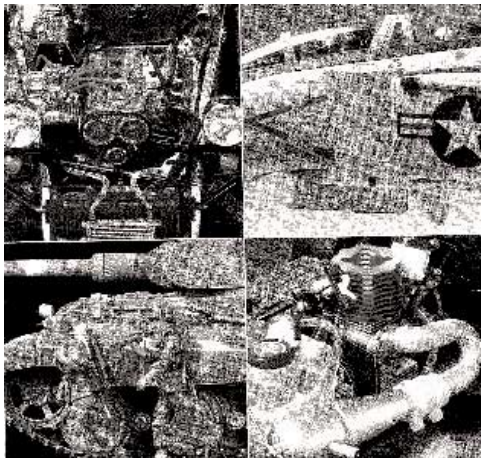
E-MAIL: mailbox1@tamiya.inc.co.jp

URL: http://www.tamiya.com

Bringing the Joy of Model Making to the World

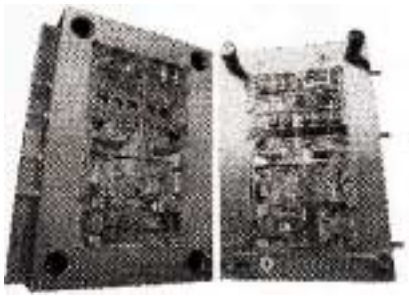
It is not an overstatement to suggest that there is scarcely a model hobbyist in the world who does not know Tamiya Inc.'s "Twin Stars" logo. Tamiya started out in the model business in 1948 making and selling wooden model kit for teaching. Production of plastic model kits started from 1960 and following that the company has produced hit product after hit product, including electric powered, radio controlled cars and mini 4WD cars. These days, Tamiya is Japan's leading hobby model maker and is regarded as representative of the industry across the globe. The company's brand is truly global.

Tamiya has a series of subsidiaries and sales bases in the United States, Germany, and Hong Kong. It is unusual to have a hobby model maker to have such overseas bases. Tamiya's products are exhibited at foreign hobby shows all over the world. With such success in Tamiya's development abroad, about 40 percent of the company's gross sales come from overseas sales. Concerning breakdown of domestic gross sales, about 60 percent come from radio-controlled cars, and scale models make up about 15 percent. Tamiya's sales have reached the 10 billion yen level, the top level of sales in the global hobby model industry. With these sales figures added to its quality and quantity of models Tamiya is called the world's top brand.



The Tamiya brand of plastic models and radio-controlled cars is loved worldwide.

The Technology That Supports High Product Quality



Cutting-edge technology and the mastery of Tamiya's engineers give birth to great products. Here, a plastic model metal mold.

In order to make sure of the accuracy of reproducibly of its scale models, Tamiya travels around the world visiting museums and collecting data, sometimes even purchasing the real thing and disassembling it to gather the correct dimensions.

And, at the time of product design, on top of realizing highly accurate reproductivity, easy assembly is also factored in as well. It takes tens to hundreds of blueprints to make a single scale model design. Recently, Tamiya has been employing a CAD/CAM system for most product design, and this has made a contribution to reducing development periods. Using CAD/CAM when making the models, plastic model dies are processed by advanced tools with excellent capabilities such as the NC milling cutter and machining center based on the data sent from the design division. But in order to actualize smooth surfaces on the plastic surfaces, there are limits to what even sophisticated machines can do, and the company's experienced and skillful technicians finish those parts.

The manufacturing process involves products made from dies with an injection molding and a vacuum molding process. However, to ensure maintaining product quality, Tamiya keeps on repeating test shots, ensuring the conditions for molding remain optimal.

Packing and dispatching of products are automated and put on the line. The accurate packaging of various products is possible. Also, the system can deal with modifications on the product line, allowing the packing system to achieve same-day dispatch upon the receipt of an order.

Tamiya has a complete in-house unified production system where the company controls every element of the product from die casting to packing and shipping. The pursuit of quality control permeates the entire production process, and this means that the customer is always delivered products of the highest quality. Tamiya feels that it is a social responsibility of the company to offer high quality products. This kind of high-minded philosophy results in the wonderful ability to make high quality products.

As in other manufacturing industries, Tamiya has moved some of its manufacturing bases overseas. In 1995, Tamiya set up a complete-process capable factory in the Philippines that can do everything from die casting to packing to export. Featuring the company's most cutting-edge equipment, the Philippines factory accounts for about 30 percent of Tamiya's production. While both technology transfer and training have gone well in the Philippines, an issue for the future is how to pass on the high level of flexibility and know-how of the individuals, something that cannot be conveyed numerically.

In addition, as well as offering high-quality products, Tamiya would like to make products that are beautiful once assembled. Tamiya wants to offer products that are more beautiful than the originals and that appeal to people's sense. It is essential to have the product development ability that is able to give birth to such value-added products. So while Tamiya is actively

moving production and technology transfers abroad, the company would like to keep its intellectual property and strategic planning in Japan.

Detailed drawings on the package show Tamiya's thoughtful consideration to attract hobby enthusiasts.

Thorough Consideration to Create the Joy of Model Making

While Tamiya has a high reputation for its ability to make scale models that are easy to assemble and is closely replicate the originals, the company also gives serious consideration to better the enjoyment of customers' assembly of the models too.

The first step is making the box design, pleasing to the eye. The package design is typically dominated by a large picture of the model inside that is drawn up by Tamiya's in-house artists. The picture is more than just a beautiful rendering of the model, because the picture may also contain images that help guide the model's construction. For example, in the case of an automobile where construction might be a little difficult, there are pictures of the inside of the car. Also the instruction manuals Tamiya makes are easy to understand and highly evaluated by both users and specialists.

In addition, when it comes to the design stage, Tamiya does more than shrink the numeric data obtained from its investigations to produce the scale model. Tamiya delicately adjusts the model design so that the models look somewhat more than just extremely realistic versions of the original. One of the techniques is to provide deliberately separate parts so that users have to assemble them and can really appreciate some of the features or the beauty in the design of the real thing.

Tamiya has a 24 hour on-call and Internet customer service avialable for lost and damaged parts. Tamiya keeps stock of all its parts and manages its inventory in a way that it can answer any request speedily. Orders received in the morning can be shipped in the afternoon. In this way the company closely considers the pleasure of making the kits and the joy of completing the models by its customers.

In addition, in order to assemble Tamiya's products, adhesives and paint and some simple tools are necessary, and Tamiya has added these to its product lines. Tamiya also holds events and activities to actively help convey the fun of it all.

Tamiya's products have both beauty and charm, but what really makes the Tamiya brand in the eyes of its international fans is the joy it brings to making models—a total service from product development to after-sales.

The model market is maturing, facing declining birth rates and with children who have a wide range of other activities to choose from. Tamiya's basic business standpoint is in conveying the fun of making things, and upon this base the company plans to open new markets.

TAMIYA

Meeting Market Needs for 106 Years, Challenging New Fields

Teibow Co., Ltd.

REPRESENTATIVE OFFICER: Tetsuo Shimoishi

COMPANY ADDRESS: 1-2-1 Mukojuku, Hamamatsu 430-0851

ESTABLISHMENT: June 1896

CAPITAL: 499,999,000 yen

NUMBER OF EMPLOYEES: 248

MAIN PRODUCTS: Manufacture and sales of marker pen tips (felt, fiber, and plastic), roller nibs and MIM parts

TELEPHONE: +81-53-461-3191 **FAX:** +81-53-464-6810

E-MAIL: head@teibow.co.jp

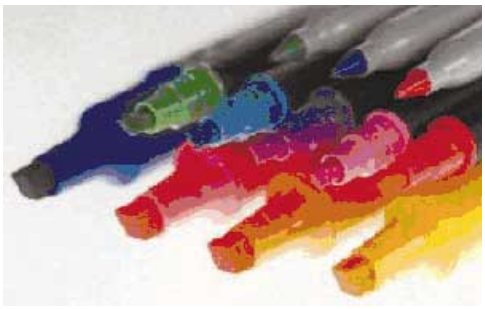
URL: http://www.teibow.co.jp

A Huge Accumulation of Technology Able to Meet Market Needs

Teibow Co., Ltd.'s history began in 1896 as a manufacturer and seller of men's hats. In the 1950s, using the high level of technologies accumulated through fel that making, Teibow converted its business into the development and production of felt pen tips, accomplishing growth so that it has become a top maker of marker pen tips. Presently the company is in its 106th year of operation.

Supporting this history is the idea that the company will do everything in its power to respond to anything the customer requests. It goes without saying that Teibow has kept this spirit, consistently maintaining an attitude of continually meeting its customers' every demand and, in the face of changing markets, striving to develop new areas of business.

This spirit allowed the company to make a turn from hat production to marker pen tips, and then on to oil- and water-based marker tips, and very fine plastic nibs, answering the demands of both pen makers and customers. By constantly raising the level of the company's technology, it is clear that Teibow listens to the voices of its customers and offers new products one after another



Teibow produces some 3,000 different varieties of marker pen tips and holds a 70 percent market share.

This long history of mounting technical ability and mastery of production processes has resulted in the accumulation of superb quality control and technological strength, and the ability to meet market needs. Teibow's product line extends to 3,000 varieties, with global sales in several dozen countries.

Establishing a Unified Process from Research and Development to Production

To ensure a stable supply of products, low costs, and high quality, it is best

not to separate research and development from the production site. Teibow has established a consistent system from research and development all the way to production. Teibow believes that the primary factor and motive force that has pushed the company to prominence as a leading manufacturer of pen tips is its ability to rapidly respond to market needs and bind its production to these demands.

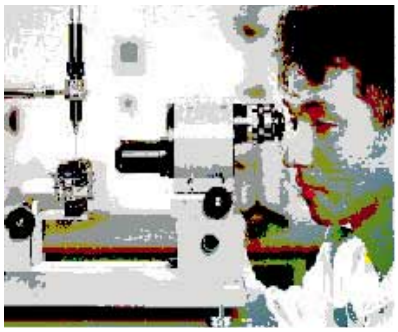
Under Teibow's present production system, its Miyakoda Technical Center in the Hamamatsu Technopolis conducts the research, development, and early production process, with the rest of the production stages being passed on to the head office factory. With this kind of systematic approach, Teibow has taken a 70 percent market share, with all the production done in Hamamatsu.

Amid an international price competition, the cases where domestic production has been switched to China or Southeast Asia are growing. Teibow believes that if it exports any key technology abroad, it will be the end of the company, so it will not let its secrets leave the company in Japan. As long as the company remains in business in Japan, it would like to keep itself in Hamamatsu on the soil where the company was founded. With this attitude, Teibow wants to continue as a leading enterprise taking its challenge from Hamamatsu direct to the world.

New Product Development and Assured Quality Supported by Technology and Personnel

The wellspring that supports Teibow's new product development and quality is the company's accumulation of technology and talented personnel.

Teibow pays very serious attention to research and development, and the



Inspection of welding characteristics. Relying on the commitment of its staff, Teibow conducts the development of new products and maintains rigorous quality control standards.

R&D expenditures including investment in plant and equipment absorb nearly 10 percent of the company's revenues. Research and development themes carried out include investigating how the capillary action works to keep ink rising to the tip, tip materials, ink quality, how the pen tip writes and how easy it is to write with the pen tip, and how smoothly the pen tip slides along surfaces. On occasion, Teibow conducts joint research and has moved to acquire patents in several countries.

Concerning Teibow's employees, the company recruits talented individuals with technical backgrounds from both high schools and universities. Teibow's employees have a strong motive, and there are cases where new research and development happens to take place on site. The workforce is split roughly equally between males and females, but the number of younger workers is extremely high, while the dropout rate is almost zero. With a talented and motivated workforce with full of pride and responsibility supporting Teibow's research and development and production, the company's products have been supported for a hundred years achieving an extremely good reputation.

An Eye to Future Possibilities, Challenging New Business Fields

When people think about marker pens, probably the strongest image

they have is of the pen as a "writing" tool. But in the future, it is possible to think of pens expanding their uses in to "drawing" or "painting" and other fields.

For example, with Teibow's accumulated knowledge of liquid flow using the capillary phenomenon means that it can develop the technologies to extend its pen technologies to brushes and pastes for manicure and cosmetics applications, and for medical uses.

Moreover, with an eye to challenging new fields, Teibow has adopted the latest technology, called Metal Injection Molding (MIM). This is a compound type process involving the fusion of plastic injection mold technology with the addition of a powder metallurgy process, which is ideal for precise, minute, and intricate metal parts incapable of being made by conventional press machining. Moreover, this process is suitable for mass-production. In addition to the development of metallic nibs, Teibow expects to expand this technology into completely new business areas.

With over a hundred years of mastering technologies, Teibow looks forward to enjoying the next hundred years of challenging new business opportunities.

Attention is being focused on metal nibs made with cutting-edge MIM technology.

Leap Into the Global Market by the Data Translation Technology

ELYSIUM Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Toshimasa Kodera

COMPANY ADDRESS: Press Tower, 11-1 Asahi-cho, Hamamatsu 430-0927

ESTABLISHMENT: November 1999

CAPITAL: 30 million yen

NUMBER OF EMPLOYEES: 49

MAIN PRODUCTS: Software products based on 3D geometry handling technology

TELEPHONE: +81-53-413-1000 **FAX:** +81-53-413-1010

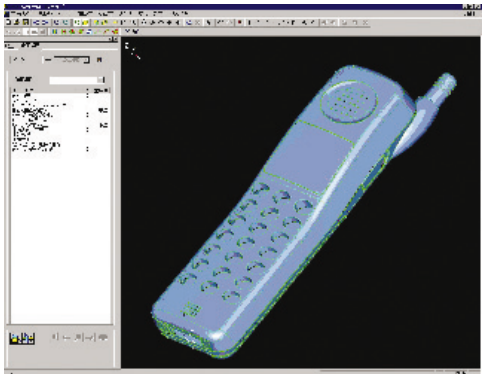
E-MAIL: katoh@elysium.co.jp

URL: http://www.elysium.co.jp

Confident in Its Core Competence

These days almost all industrial products such as cars and airplanes or electric home appliances such as refrigerators and mobile phones are designed with CAD tools. Especially, 3D CAD is becoming a major tool in the manufacturing industry because it can raise the percentage of completion of the product design by its virtual simulation. However, there is no system that can be good at all the manufacturing processes from design, analysis, prototype making, to manufacturing. In fact, different systems for each process are introduced, and this is the very problem of the poor compatibility of data in terms of improving productivity, and so the demand for a 3D data translation software between CAD systems is growing.

ELYSIUM is a leading company in the field of data translation and has provided its Direct Data Translator Software to the global market including such major companies as Boeing Corp. and Renault F-1 team. The company has received universal praise for its technological excellence.



The CAD Doctor: Easily translates and repairs the CAD data. It provides a simple and effective method to graphically understand and correct problems that can appear during the translation process.

ELYSIUM develops and sells the software packages by means of highly specialized technologies for 3D shape handling with good abilities of mathematics and physical science. Its main software products are as follows:

Direct Data Translator: Enables the translation of all geometry from one CAD system to another with the industry's highest success rate.

CAD Doctor: Detects errors in 3D data and heals them automatically and dialogically.

EL-Surf: Corrects incomplete wire-frame data and creates the surface data from it.

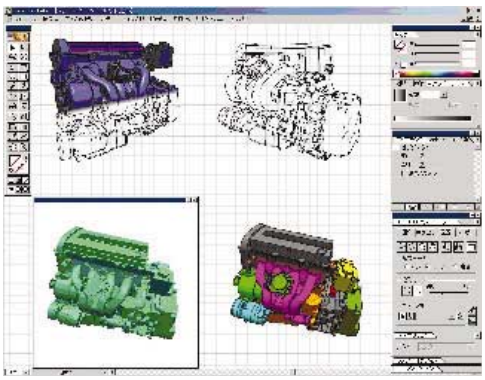
Megapolygon Library: Optimizes, simplifies, collects, and calculates data for large polygon data expression.

3D-TIGER: 3Adobe Illustrator plug-in software that can be used to create 3D technical illustration.

Towards a De Facto Global Standard

Software business costs enormously for the planning and the development, but once developed, unlike manufactured products, the manufacturing costs and the transport costs are not needed, which means the volume efficiency of software products can be remarkable. However, this also means that only a limited number of products that win higher evaluations are able to take the world by storm. In order to keep surviving in this industry, ELYSIUM believes it is important to develop software products that become a big seller in the global market. The company's view comes from the confidence in its proper product development with the world-class high technologies.

There has never been a case that a Japanese standard has been adopted as a global standard, even though Japanese products are superior to those of foreign competitors. Therefore, ELYSIUM aims to gain its global share not by the strategy where the company first set up an official international standard but by the de facto standard strategy in which the product dominates the market through the process where both individuals and the corporate clients all over the world are satisfied with its quality and use it.



3D-TIGER: It takes so much trouble for designers to design the 2D model from the 3D products accurately in the past. However, with 3D-TIGER, it is possible to create high-quality illustrations easily and efficiently.
(Photo courtesy of Unigraphics Solutions Inc.)

Excellent Human Resources Mark Excellent Achievement

There is a fable about the race between the hare and the tortoise. According to the story, the tortoise won the race because the hare fell asleep on the way. "But, if the hare hadn't fallen asleep, what would have happened? The world is full of hares that do not sleep," says Mr. Kodera, President & CEO of ELYSIUM.

ELYSIUM recruits the top-class personnel and aims to do business at full speed at the cutting-edge of the world, in order to compete with the globally competitive companies.

Utopia for Engineers

In Greek, *Elysium* means utopia. This name involves the president's wish that the company must offer an excellent environment where each employee is happy.

Mr. Kodera says, "No matter how the company generates profits, if the employees are not happy there, there must be something wrong with it. I

believe the high average employee pay is one of the standards for judging a company. So ELYSIUM aims to be the No.1 company for the average employee pay in Japan." In fact, the ELYSIUM's engineers, whose average age is 29 years old, enjoy their high salaries. Their average annual salary is about 10 million yen. Also, there are only 49 employees working in the spacious clean office of 1,485 square meters. Such generous treatment is a good incentive for the employees.

By offering the employees exciting work, opportunities for self-actualization, respectable colleagues, and a comfortable work environment, ELYSIUM can extract maximum sensitivity and ability from the excellent human resources, which strengthens the corporate competitiveness eventually.

All employees can use the wide private booth like this.

Aiming at Voice Recognition Technology

CAI MEDIA JOINT DEVELOPMENT Co., Ltd.

REPRESENTATIVE OFFICER: Mr. Mitsunori Fukuchi

COMPANY ADDRESS: 9-22 Kido-cho, Hamamatsu 430-0806

ESTABLISHMENT: August 1995

CAPITAL: 143.55 million yen

NUMBER OF EMPLOYEES: 12

MAIN PRODUCTS: Educational software

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Supplying a Full Lineup of Educational Software for the Household

CAI MEDIA JOINT DEVELOPMENT Co., Ltd. plans, produces, and sells a range of software products for general household education as well as constructing Internet website and setting up systems. The company specializes in developing learning software through games that are both fun and educational—so-called edutainment, a mixture of education and entertainment, which is aimed at a broad cross-section of the population, from infants to adults. One example is Smocca. Presently the company has raised its portfolio to 42 titles and is urgently targeting to develop 50. Again, the company is especially strong in software aimed at elementary school children, offering products in all the subjects, including Japanese language, math, science, social studies, and English. It is said that the company is now a major presence in the Japan market in this area.

Smocca and Friends.

The Struggle to Develop Student-oriented Educational Software That's More Interesting than Games!

Mr. Fukuchi, the company founder and the President, was formerly a teacher at a local cram school for about 10 years. In charge of many pupils, he tried to introduce some educational software, but found that the children soon tired of it. So he went to look for the cause. He found that traditional software was over-focused on study based on Education Ministry guidelines whereas not enough consideration had been paid to the user's point of view because they were created rather by the professional computer programmers' view and were quite hard to use. It was also clear that the software was visually monotonous compared to the software used in games computers. Fukuchi searched for software that cleared up those problems but unable to find anything appropriate; then he founded his own company.

When CAI MEDIA was first established, it outsourced programming and software development. However, after discovering that the programmers' needs and efficiency took precedence,

Smocca Play English 2.

to make satisfactory products, the company took it up itself to plan and develop educational software that was more interesting than mere games and that aimed at the students' point of view.

After considerable effort, the company developed a title that was a hit. In this industry, any title that sells over 1,000 copies is considered a hit. "Smocca's Play English 1" has sold over 40,000 copies. Another eight titles have surpassed the 10,000 sales mark.

Overseas Collaboration

The company has also set up alliances with overseas companies. Cooperating with a South Korean specialty software company, development of new titles has been shortened considerably. While it normally takes about a week to correct a program, the company has developed a structure where it can deal with it within two days of a request.

In addition, at the same time that a Korean educational software maker can sell CAI MEDIA software, the company can, by the same token, convert software made for Korea into Japanese use and sell it in Japan. In other words, CAI MEDIA localizes sales. For just one example, a leading Korean-developed program called "*Eigo wa zettai benkyo suruna!*" (Never study English!) translated into Japanese and localized for the Japanese market has sold over 700,000 copies in Japan.

Future Strategy

Turning to future strategy, CAI MEDIA has two major goals that will broaden its business market. One is developing and enriching its online study contents. The other, building on the base of its experience with the "*Eigo wa zettai benkyo suruna!*" educational software, is improving speech recognition technologies. The company is developing and enriching Internet-based, online contents. Using the above-mentioned "*Eigo wa zettai benkyo suruna!*," one project that the company has been concentrating on is the "Charpy-Chocolate" talking English conversation robot that the company spent three years developing and went on sale in April 2003. The company would like to point out two features of this speech recognition-capable robot.

Firstly, the speech recognition ratio is extremely high. With former speech recognition robots, pronunciation had to be very close to native level, which was very stressful for the learner. However, this product can recognize the voices of the old and young alike, irrespective of gender, and male and female alike, and can recognize a very high ratio of Japanese-pronounced or broken English.

Secondly, the robot is able to recognize many conversation patterns. Until now, most robots on the market could recognize about only 10 phrases and so were unable to go beyond being toys. But Charpy-Chocolate recognizes 80 phrases and about 200 conversation patterns. Further, if connected with a personal computer, it can recognize

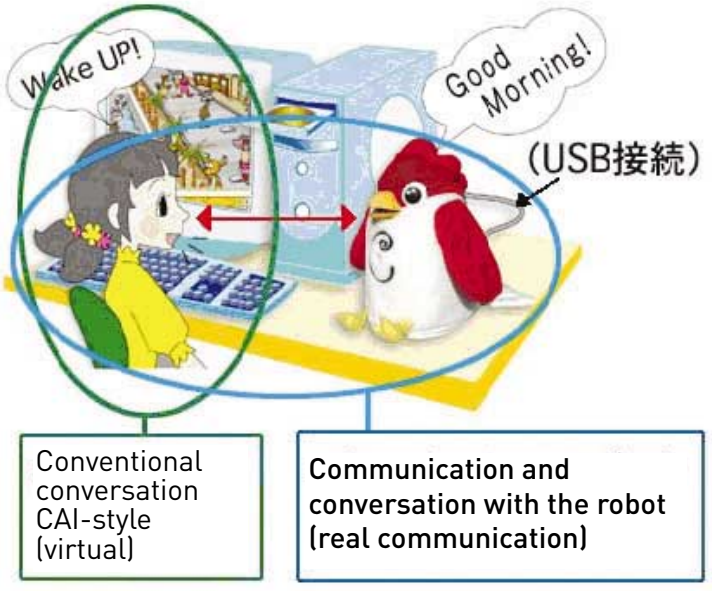
6,000 phrases, and the vocabulary of about 12,000 English conversation patterns is made possible.

Furthermore, uniquely, beyond simple human-robot communication, when connected to the computer, the system is capable of generating a third-party virtual character, making a three-way conversation possible. When conversation between the human and the robot breaks off, the robot and the virtual character can start talking to each other, creating the impression of chatty English conversation, so helping the learner acquire English conversation naturally.

Future Directions for Voice Recognition Technology

At this point the company feels that the speech recognition technology used in the Charpy-Chocolate robot has huge potential for broader applications and development.

Just one example is non-Japanese language ability, or multilingual capability, or the robot becoming a partner to converse with older people living alone, or being used for safety verification. CAI MEDIA is working day and night to develop its speech recognition technology into a highly-rated product that will become one of the company's principal business areas.



Talking English conversation robot.

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