

Monozukuri: The philosophy behind Japan's reputed manufacturing industry

In English, the Japanese word '*monozukuri*' can be translated as 'making things'. And it's fair to say Japan has excelled at making things since the postwar boom that turned the country into one of the world's industrial powerhouses.

But *monozukuri* means so much more than its humble English translation. It is indeed the manufacturing philosophy that courses through the veins of Japanese industry, from the largest companies to the smallest. It is a philosophy focused on high-quality craftsmanship, innovation, the pursuit of perfection, and meeting the ever-changing demands of customers and society – on which the 'Made in Japan' brand has built its unmatched global reputation over the past decades.

"The strength of Japanese *monozukuri* comes from the belief of Zen, a sect of Buddhism often considered as a religion or disciplined way of life," says Fujio Matsumura, President of PPE (personal protective equipment) manufacturer Midori Anzen. "Pursuing *monozukuri* is equivalent to pursuing innovation. To continue our success as Japan's leading PPE company, we not only must be able to deliver need-matching products with consistent quality, but also always ready to think outside of the box to achieve innovations."

Shinsuke Yagi, President of Nissan Chemical Corporation, also points out that Japan's modern manufacturing can be traced to Japan's spiritual history and the craftsmanship associated with the samurai sword making tradition. "Japanese technology and machinery are high quality and cutting-edge due to the spiritual roots of Japanese craftsmanship. Originally, Japan was renowned for its high level of quality when it came to the manufacturing of swords and ceramics, and this craftsmanship spirit is at the foundation," he says. "The strengths of Japanese manufacturing are its processing technologies, its high standards, and its ability to maintain very high quality when it comes to quality control, management and services."

When it comes to high standards in the chemical industry nowadays, Japanese companies like Nissan

are focusing on sustainability and green manufacturing. "In the production of chemicals, we are working hard to reduce our burden on the environment," adds Mr. Yagi.

Another Japanese chemicals-based company, Kuraray, has shown its commitment to environmental solutions with its push to promote green-focused products such as PLANTIC™, a biomass-derived plastic film using up to 80% renewable raw materials. "I believe that PLANTIC™ will continue to have a very bright future, replacing fossil fuel-based plastics," says Kuraray president Hitoshi Kawahara.

"Although it is derived from biomass, it has high oxygen barrier performance and is used as packaging for fresh food, such as meat and fish. By maintaining food freshness, it will lead to a reduction in food loss and thereby contribute to both the food industry and environmental conservation."

Japanese companies across the board are supporting the shift towards a sustainable and zero-carbon world. And indeed this environmental drive stems from another key tenet of *monozukuri*, which is a deep commitment to contribute to society through product innovation.

"The purpose and objective of our company's existence is to contribute to society, infrastructure and a prosperous global environment and sustainable future through the pursuit of fluid control technology and materials development," says Makoto Kohno, President and CEO of KITZ Corporation, a leading manufacturer of valves used in a range of industries, including automobiles and semiconductors.

"Our focus is to contribute to the sustainable growth of society through digitalization and the control of new energy sources. Carbon neutrality is a hot topic and in the automotive field there's been a discussion on which direction to go in terms of energy. Hydrogen will be key, so we will be developing products and catering to this new energy source in the near future."

Miyuki Ishihara, president of aluminum manufacturer UACJ Corporation, shares a similar outlook. "Our redefined purpose is to contribute to society by using raw materials to manufacture products

that enhance prosperity and sustainability," he says, referring to the company's Vision 2030 plan, whose three key focus areas are mobility, lifestyle and healthcare, and environment and energy.

"To clarify our position of wanting to contribute globally, we joined the Aluminum Stewardship Initiative. Our 2030 Vision portrays how much we value aluminum as an added value material and our desire to expand our area of expertise."

Another key tenet of *monozukuri* production involves building a close relationship with customers. Japanese firms strive to have an acute understanding of client needs to ensure the development of products best catered to their requirements.

"All of our business activities are based on the philosophy of understanding the user's perspective," says Yorifusa Wakabayashi, President and CEO of Daio Paper. "We are constantly seeking out the needs of our customers. We are prioritizing marketing that helps us to understand and cater to the needs and wants of our customers. Therefore, we will be able to produce best-selling products with added value."

Daio Paper's user-focused product development has led to innovations such as its ELLEX-branded cellulose nanofiber (CNF), a revolutionary material that could see widespread adoption in a range of industries over the coming decades. "It is said that CNF will boast a one-trillion-yen market in the near future. With that in mind, we would like to have a sizable share of the industry."

Keiichi Oyama, President and CEO of Konishi, which is a leading adhesives manufacturer, also highlights a deep understanding of client needs as one of his company's core strengths. "Japanese companies, including our own, are trying to produce products that customers find easier to use and that is why Japanese products are chosen in overseas markets as well. We listen to what our customers want and make it happen," says Mr. Oyama. The company behind Japan's best-selling adhesive, "Bond", Konishi now aims to develop more industrial applications for its products, particularly for the automobiles, construction and electronics industries.



Yorifusa Wakabayashi,
President & CEO,
Daio Paper Corporation

Like Daio Paper, Oji Holdings is a manufacturer of paper products that is also involved in the development of CNF. The company's president and CEO, Hiroyuki Isono, stresses that while Japan faces competition from emerging countries who can offer cheaper products, "replicating high-quality products, which marks the uniqueness of Japanese manufacturing, remains a complex and difficult task".

"The strength of Japanese firms is to consistently develop high-quality products and to achieve an optimal level of standardization across production bases. While local manufacturing companies located in emerging economies are able to produce high-quality products, they might be unable to do so consistently and over longer periods of time. To a large extent, the stable manufacturing of high-quality products makes us stand out. At Oji Holdings, this particularity makes us competitive in a variety of B2B businesses, such as providing high-quality paper products to customers."

High quality is something for which PPE manufacturer Simon Corporation is also renowned. Company president Kazunori Toshioka highlights the importance of *kaizen* (continuous improvement) – a philosophy linked to *monozukuri* – in Simon's product development, which has led to the company having some of the best quality safety shoes on the market.

"We are always looking to continue to improve the technology of our soles and implement the *kaizen* philosophy to do so," says Mr. Toshioka, who reveals the company's desire to find new partners to enhance product development. "This ceaseless pursuit for better and better quality means that we are open to partnerships and co-creation. We are always in contact with other companies and are aware of the R&D and technological advances being made in our industry."

Daio Paper's CNF to support global sustainability drive

With its diverse product range, from cellulose nanofiber (CNF) to home and personal items spearheaded by its renowned **elleair** series, Daio Paper holds ambitions to continue its growth on the global stage.

A simple glance at the ELLEX logo provides an insight into the thinking behind Daio Paper, an ambitious full-range paper manufacturer founded in 1943. As Senior Executive Officer Michihiko Tamaki explains: "It contains 10 ellipses that represent all the different functions of our branded Cellulose Nanofiber (CNF), highlighting elements such as environmental awareness as well as the strength, light-weight, high water-retention and elasticity qualities."

That sustainability vision of the company has three aspects, namely: hygiene, life and regeneration, with which, Mr. Tamaki says, "we hope to achieve our ultimate goal and management philosophy: to realize and shape an abundant and affable future for the world."

"We created CNF to tackle some of the globe's biggest issues," he continues, "and we have identified two in particular that Japan is currently facing. The first is the issue of fossil fuels and the transition away from materials derived from them. The second is the need to create environmentally friendly products that contribute to a better quality of life."



Mishima Mill

"We have tried to minimize the amount of energy used in production and have managed to reduce that energy cost considerably compared to processes of the past. Every year we are striving to reduce those production costs even more."

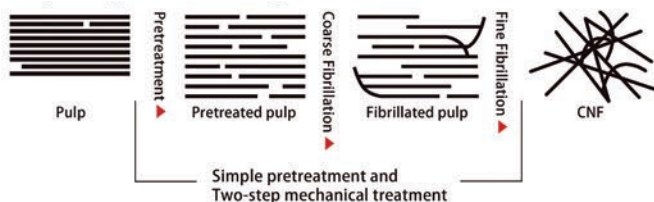
ELLEX, the branded CNF product line, comes in five dif-



Daio Paper's CNF Logo



Examples of ELLEX Applications



Conceptual Diagram of ELLEX-S Manufacturing Process

ferent forms — two slurry types, dry powder, molded sheet and resin composite pellet — and this opens up a huge variety of applications, including electronic devices, protective encapsulants for AV equipment, paints, inks, robotics and, importantly, automotive interior materials and components.

This focus on cars is a key application for Daio Paper's CNF, and is no better demonstrated than with the company's involvement in the Pikes Peak International Hill Climb Race in Colorado, U.S.A., says Mr. Tamaki.

"Partnering with Samurai Speed, we began entering this race in 2018 with a Nissan car,

something we repeated the following year. We switched around a lot of the parts from steel to CNF, including the spoiler. Although there was a race in 2020, we withdrew due to COVID-19. In 2022, we managed to save 60kg (132lbs) in weight, a 51% reduction," he explains.

"The idea behind our involvement in this competition is to showcase our various CNF products by modifying both the interior and exterior of the car, including body panels, doors, and even finer details like the door mirror cases using our CNF molded sheet ELLEX-M and resin ELLEX-R55. Every year we are

looking at exploring new ways to make improvements."

The company's CNF research and development is subsidized by Japan's New Energy and Industrial Technology Development (NEDO). The Ministry of Economy, Trade and Industry has positioned the Daio Paper Corporation as a 'Zero Emi Challenge Company,' one that boldly takes on innovation initiatives towards the realization of a decarbonized society.

One question, of course, is when CNF will form part of everyone's daily lives, and Mr. Tamaki reveals his thoughts on the timescale for this. "We know from experience that carbon fiber took around 50 years for mainstream adoption," he says. "That process began with developments in fishing rod technology and if you follow its path all the way through to today, we see it being used everywhere, even in airplanes. I actually think that 50 years is too long for us, so we are predicting around half of that as the maximum amount of time required. Ideally, we would like to achieve this much sooner and be seeing major changes within a 5 to 25-year timeframe. When you think about it, this project is quite a long-term investment."

"A lot of interested parties are pushing for this timeline to be expedited. Decarbonization is a big thing right now, with the Japanese government setting clear goals for carbon neutrality by 2050. These are real issues, with the amount of carbon in the atmosphere being a real threat; and with temperatures rising, we must do something."

With so many potential applications for CNF across a myriad of industries, Daio Paper's motto of 'passion with sincerity' is expected to help it achieve the ambitious plans in the not-so-distant future.



Automobile weight reduction leads to improved fuel consumption and helps reduce CO₂

UACJ VISION 2030 seeks to achieve sustainable development through aluminum excellence

As part of its three-pronged action plan for the decade ahead, UACJ Corporation aims to create a circular aluminum economy in Japan and overseas markets.

Founded in 2013 in a merger between Furukawa-Sky Aluminum and Sumitomo Light Metal Industries, both over century-old companies, UACJ Corporation is Japan's leading comprehensive aluminum manufacturer. With the slogan "aluminum lightens the world", the firm supplies clients in Japan and beyond with flat-rolled, foil, cast and forged, extruded and precision-machined aluminum products. They include aluminum cans, automobile parts, electric and electronic components, aviation and aerospace materials, foodstuff packaging, and medical and chemical products.

Outside of Japan, UACJ has bases in Thailand and the United States, having moved to strengthen its international presence following the company's formation. "We're the fourth-largest aluminum rolling company in the world, with about 1.3 million tons of annual output in total in Japan, Thailand and the U.S.," UACJ president Miyuki Ishihara says. "One of the strategic values of our three-location operations is that it allows us to organically and flexibly utilize production capacity to meet market demand. For example, we've exported to customers in the U.S. from Japan and Thailand, as a way of supplementing local production in the States."

Looking to the future, UACJ's goal "is to contribute to society by using raw materials to manufacture products that enhance prosperity



Closed loop recycling of aluminum cans compared with smelting

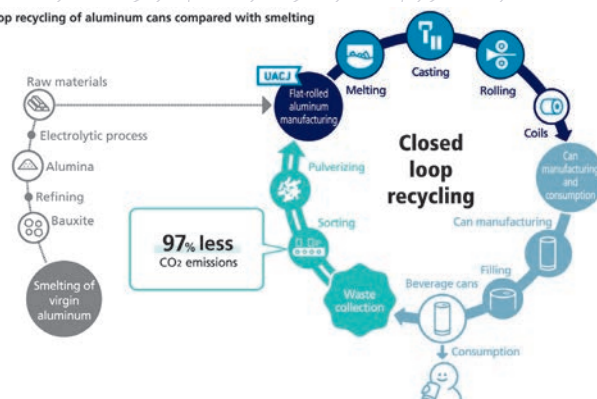
"UACJ Corporation is meeting brisk demand in the market while aspiring to help build a better world and a healthier environment."

Miyuki Ishihara,
President,
UACJ Corporation

Aluminum is an excellent electrical conductor; it also releases heat well and is recycle-friendly. As the world moves away from fossil fuels towards hydrogen and many other alternative energy sources, we believe aluminum inspires our work in building a better world and a healthier environment."

In the drive for a greener future, aluminum's qualities make it a crucial material in the transition to lighter-weight, electric vehicles, which have a central role to play in reducing carbon emissions. Used by UACJ to manufacture automobile parts such as body panels, sunroof guide rails, bumper assemblies and crush boxes, aluminum is both light and strong. These are characteristics which, combined with its ability to aid temperature control by releasing heat, additionally make aluminum the ideal material for electric vehicle battery housings, which UACJ also develops. "With these key traits, aluminum is competitive as it is a unique raw material," Mr. Ishihara says.

Harnessing its research and development divisions in Japan, Thailand and the U.S., UACJ works hand in hand with its automotive clients to craft aluminum products that meet their precise needs. "In addition to supplying bumpers of our clients' design, we can design and develop new products using an optimal type of aluminum alloy," Mr. Ishihara notes. "Having different combinations of extrusion, processing and molding in our business



The production of aluminum from scrap emits 97% less CO₂ than the production of virgin aluminum from bauxite ore.

and sustainability", Mr. Ishihara explains. With this in mind, in 2021 the firm announced a long-term management plan, VISION 2030, which is to focus on three core areas over the next decade.

"The first is Mobility, considering we might have flying cars and drones in the future," he says. "We believe this field will give us

a more comprehensive range of areas where aluminum can be of use. The second area is Lifestyle and Healthcare, including cans, food storage and the medical field. Japan experiences a lot of natural disasters, and we believe we can also contribute to disaster prevention and disaster risk management. The third is Environment and Energy.

division for product development is an advantage, because we can suggest and provide new solutions to our customers."

UACJ's R&D efforts are also focused on the creation of aluminum alloys that promote a circular economy. "We're working on developing recycle-friendly alloys," Mr. Ishihara says. "We've already been able to use recycled aluminum in cans, and in some car models, the body panels are made of 50% recycled aluminum. We believe the development and expansion of recycled alloys is our mission."

Aluminum's major role in creating greener vehicles and a circular economy is integral to UACJ's plans for growth overseas, where North America and Southeast Asia are the company's chief markets. "In North America, we're focusing on beverage cans and automotive parts," Mr. Ishihara says. "Working



UACJ creates quality products using world-class facilities and technologies.

towards environmental conservation, we're using more aluminum cans for beverages that are easy to recycle. We believe we can fill the substantial need in the market.

"In Southeast Asia, we are confident that we can be a key



player in the beverage can market, especially considering the region's economic growth and rising demand for canned beverages. Our industry already has a system in place in Japan which recycles over 90% of aluminum cans, but it's a system that we are yet to establish in Southeast Asia. We can



UACJ is able to meet the diverse needs of a wide range of industries and everyday items.

collaborate with the companies involved in the process of recy-

cling aluminum, and contribute to mitigating regional environmental issues through our products."

As previously mentioned, one of the focuses of VISION 2030 is to address Japan's vulnerability to natural disasters. With the effects of climate change increasing the frequency of such events, particularly those involving water, UACJ has released a lightweight, easy-to-install aluminum flood prevention system, whose name – 'MIZUYOJIN™' – means 'beware of water'. "When metropolitan or urban areas experience water disasters, subway systems and convenience stores are affected," Mr. Ishihara says. "Conventionally, we prevent water from entering an infrastructure by putting up sandbags,



UACJ creates quality products using world-class facilities and technologies.

which are very heavy and make for laborious work. However, anyone can set up our product, and it can be stored in a compact space. We want to create a system that could be put together quickly so that everyone could be prepared to respond to a disaster right away."



Our Purpose

Contribute to society by using raw materials to manufacture products that enhance prosperity and sustainability.

Our Vision

Aluminum is our passion. It inspires our work in building a better world and a healthier environment.

Our Values

- ▶ Respect and understand your associates.
- ▶ Embrace honesty and foresight.
- ▶ Be curious and challenging.

Creating a world where less is more.

A lighter future is a brighter one.
Earth is facing serious challenges:
rapid climate change, and ever-increasing waste.
By making things lighter,
promoting sustainable resources
and minimizing wasted energy,
we can reduce the burden on our planet.
Aluminum – forging a better common future.

UACJ

Aluminum lightens the world
www.uacj.co.jp/english





Sustainability with a human touch

The Teijin Group outlines priorities to support the society of the future.



Tenax™ carbon fibers

Established in 1918, Teijin has evolved into a unique enterprise encompassing three core business domains: high-performance materials, healthcare and IT – offering advanced solutions catering to various demands, including the environment; safety, security and disaster mitigation; and healthcare issues spurred by demographic changes and increased consumer health consciousness.

Now, in a time characterized by great social, economic and political upheaval, the Teijin Group is reaffirming its commitment to its core



"We create and accelerate new value-added solutions that support the society of the future."

Akimoto Uchikawa,
President & CEO, Teijin Limited

promise: to use chemistry to help people realize and maintain a high quality of life. To this end, a pledge to achieve carbon net zero by the end of 2050 sits alongside an innovative internal carbon pricing (ICP) system aimed at creating economic incentives to lower CO₂ emissions.

In the high-performance material business, Teijin carries out an LCA of its carbon fiber Tenax™ and para-aramid fiber Twaron® to calculate their carbon emissions based on the calculation



Twaron® aramid fiber

method in accordance with the ISO14040 and ISO14044 standards. The company also shares with its customers information on its CO₂ emissions related to its fiber-reinforced plastics (FRP) products for automotive components.

Moreover, a recently launched project will realize a blockchain-based commercial platform for enhancing the environmental value of recycled FRP for manufacturers. Such initiatives not only promote the circular economy, but are essential in creating



Sereebo® carbon fiber reinforced thermoplastic, as used in the GMC Sierra Denali 1500

new value-added solutions that support the society of the future.

Company president and CEO Akimoto Uchikawa is clear that the potential of chemistry can only be fully unlocked by focusing on its benefits for society and the global environment, and thus providing solutions that help to ensure our future existence on Earth.



Kuraray: Diversifying its product offering for a greener future

As part of its commitment to provide environmental solutions, Kuraray has expanded its activated carbon business, which contributes to water and air purification. The company also strives to expand reactivated carbon, which will further contribute to the realization of a circular economy.



Kuraray Headquarters in Tokyo

Catering to a variety of industries, Kuraray is a leading supplier of resins, chemicals and fibers, as well as activated carbon and other products.

"Even amid the pandemic, demand remained steady, reaffirming that the products we handle are essential materials that society truly needs," says Hitoshi Kawahara, Kuraray's president. Indeed, the company posted record net sales in 2021.

Looking to the future, Kuraray's 'PASSION 2026' medium-term plan seeks to embrace products that reduce environmental impact. "We're developing solid business growth scenarios to ensure the environmental solutions business becomes a major pillar supporting our profits," President Kawahara explains.

Kuraray has also stepped up its investment in the activated carbon business, which contributes to water and air purification. In 2018, it acquired the world's largest activated carbon firm, U.S.-based Calgon Carbon Corporation, and its European operations, Chemviron S.A. It has since steadily invested in boosting its production capacity. Going forward, Kuraray will pursue the value of reactivated carbon, which reuses activated carbon, as

the company strives to expand its global business, especially in Asia. Reactivated carbon reduces CO₂ emissions in manufacturing pro-



cesses by 80%, which is markedly higher than the reduction achieved by virgin activated carbon. President Kawahara adds: "Our mission is to combine the accumulated technologies and knowledge of Kuraray's carbon material business with those owned by Calgon."

Such collaboration is a key tenet of 'PASSION 2026'. "Throughout our history, we've concentrated on unique technologies, but we can-



"We're out to ensure the environmental solutions business becomes one of the major pillars supporting our profits."

Hitoshi Kawahara,
President & Representative
Director, Kuraray Co., Ltd.

not maintain sustainable growth with such a narrow focus," President Kawahara says. "It became clear that collaboration and the exchange of technologies was necessary."

A company with a significant international presence, Kuraray is targeting continued global growth.

kuraray
Possible starts here
www.kuraray.com

Nissan Chemical: Pioneering a more sustainable chemical sector

The Japanese chemical manufacturer has set out to become a carbon neutral business by 2050, and in doing so, make Japan's carbon-intensive chemical sector more sustainable.

The chemical industry is the world's largest industrial consumer of both oil and gas, producing more than 10% of global fossil fuel emissions. Therefore, as part of the international efforts to combat climate change by drastically reducing emissions – Japan has pledged a target of carbon neutrality by 2050 alongside many of the world's other leading economies – chemical companies are firmly front and center. Japanese company, Nissan Chemical Corporation is one such company working towards making the carbon-intensive sector more sustainable.

Recording a stable operating profit margin (above 10% for 19 consecutive years), a high return-on-equity (19.6% during FY2022), and lucrative shareholder returns (a total payout ratio of 75% compared to a 40% average of TOPICS 500 companies), Nissan Chemical is an R&D-oriented company and future-creating enterprise that responds to social needs with its unique, innovative technologies and a well-balanced business portfolio. Founded more than 135 years ago, today the company is a constituent of the Nikkei 225 stock index and has more than 2,500 employees.

"As a midpoint towards the target of carbon neutrality by 2050, which would be 2027,

we set the goal of reducing our CO₂ emissions by 30% versus our 2018 figures," explains Shinsuke Yagi, Representative Director, President & COO of Nissan Chemical Corporation, discussing the company's green-focused ambitions. "This target is three years ahead of schedule and we have already started to study technologies to reduce greenhouse gas emissions. We've transferred from heavy oil-based to natural gas-based initiatives. When it comes to the production of chemicals, we are working hard to reduce our burden on the environment."

Today, Nissan Chemical's business can be broken down into four main divisions: chemicals, performance chemicals, agricultural chemicals, and healthcare, with the Group putting most emphasis into growing its performance chemicals and agricultural chemicals divisions. Among the company's products are LCD display materials such as SUNEVER® and an external antiparasitic drug for animals called Fluralaner, which is an active ingredient in the veterinary pharmaceutical BRAVECTO®, invented by Nissan Chemical and developed and marketed by MSD Animal Health (MSH).

"With regards to performance chemicals, we have a lot of products that are utilized in

semiconductors and in display applications," says Mr. Yagi. "We want to continue to strengthen the growth of our existing array of products, but also continue to enhance our R&D in order to develop new materials in this field. We are doing so at an accelerated pace at the moment. With regards to our agricultural chemicals, we create our original drug substances using our high core technologies of fine organic synthesis and biological evaluation to create unique APIs."

More hazardous pesticides should be reduced by 50% by the year 2030 in response to various global environmental load reduction, including the European Union's "Farm to Fork" strategy. "As a result of this, we are looking to expand our organic agrichemicals and microbial formulations to help them meet that reduction target of 50%," says Mr. Yagi.

In the semiconductor market, many of the company's major clients are in China, Korea and Taiwan, where there is a huge demand for its products.

"Providing local manufacturing facilities, as well as local R&D facilities, is not only our greatest requirement but also a request of our customers at the moment," says Mr. Yagi. "We feel that we are able to meet the market demands and needs



"When it comes to the production of chemicals, we are working hard to reduce our burden on the environment."

Shinsuke Yagi,
Representative Director,
President & COO,
Nissan Chemical Corporation

locally, and we are also able to quickly respond to our major clients in the field. For us, that is our mission. We want to be able to capitalize on the opportunities that the growth of the semiconductor industry is providing. If we continue to increase our competency in the semiconductor field, it will allow us to contribute to a wide range of other business areas that are going to see major growth in the future, such as sensing technologies and the life science fields."

When it comes to R&D, Nissan Chemical invests around 8% of its overall net sales into its R&D fund, comparing favorably to the 3-4% average of other Japanese companies in the same field.



Create Together



www.nissanchem.co.jp/eng

Konishi provides the adhesives of the future

While its origins were that of a trading firm, Konishi has expanded into many fields and today makes Japan's number one adhesive brand, "Bond", which it is looking to grow overseas.



Keiichi Oyama,
President & CEO, Konishi Co., Ltd.

"Bond" – the number-one best-selling adhesive in Japan – will celebrate its 70th anniversary this year, making Konishi the long-established adhesive manufacturer in Asia.

Konishi started its business back in 1870 as a pharmaceutical trader. Following that, the company expanded its business to the sales of industrial chemicals and transformed itself into a company dealing in



Konishi products

chemistry, while working to meet customer's requests and the demands of the society, as observed in the development of the Bond brand in the 1950s.

Whilst Bond continues to be Konishi's main line of business, the company is today focused on further expanding its chemical products, as well establishing a civil engineering and construction business.

"With the former, we operate as a company specializing in chemicals and, with the latter, our affiliated construction companies play major

roles in the maintenance, repair and refurbishment of social infrastructure and architectural stock," says Keiichi Oyama, President and CEO of Konishi.

As for its famous adhesive products, Konishi is also broadening its target markets by targeting industrial uses. Its functional adhesive products are already extremely versatile. For example, when it comes to its use in smartwatches, Konishi's adhesive is not just used



Use in electronic devices

as a glue; rather it is used to fill out the space between the components in order to dissipate heat.



Konishi's method and material

"There are many applications for adhesives," explains Mr. Oyama. "It can really be used for any kind of application, including in both electronic and mechanical components to reduce vibrations, or reduce the environmental impact. We are currently trying to add more functionality to our products. Even though we have already brought our general-purpose adhesive to overseas markets, our competitors in other countries are strong in terms of their low pricing. We want to bring unique function-added products overseas to stay ahead of the competition."

Konishi Co., Ltd.

www.bond.co.jp



Famous adhesive "Bond"

Saving energy through paint

Nishii is bringing the well-known Japanese heat-insulating paint brand, GAINA, to new international markets in order to help customers combat the effects of climate change.

Long-established Japanese paint trading company Nishii has now started promoting its heat-insulating paints in global markets. The heat-insulating paint, GAINA, was originally developed by Nisshin Sangyo, and has a proven track record in Japan, where in 2018, the product



Painting with GAINA at James Campbell High School, Hawaii

received the Energy Conservation Grand Prize from the Japanese Ministry of Economy, Trade and Industry thanks to its energy-saving and thermal insulation properties.

Nishii has started to develop the Vietnamese market for GAINA in cooperation with Nissin Sangyo and

Musashi Paint Holding.

"We are looking to emphasize collaboration from here onwards, such as working with heat-resistant paint companies in Vietnam to continue our business partnerships domestically and internationally," says Kazufumi Nishii, President of Nishii.

"Our bases in Taiwan and Vietnam are still small, so we want to expand through partnerships in order to fully understand the local conditions. Instead of establishing a local subsidiary that faces high hurdles, we would like to build partnerships with motivated



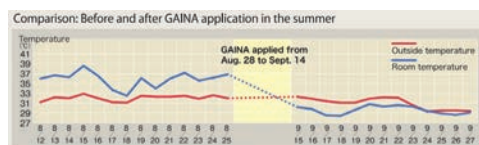
GAINA paint can

companies that have built credibility in the region."

The company has also made inroads with GAINA in Hawaii, where in 2017, about 50 painters from Japan painted the walls of a classroom at James Campbell High School to commemorate the 70th anniversary of the end of WWII. Hawaii

is one of the states in the U.S. that is particularly concerned about environmental issues, and the ever-present summer heat was making it difficult to conduct classes in classrooms without air conditioning.

"We will continue to develop our business in Vietnam, India, Hawaii, Dubai, and other countries and regions that suffer from heat," says the president of



Temperature difference after painting with GAINA



"We will continue to develop our business in Vietnam, India, Hawaii, Dubai, and other countries and regions that suffer from the heat."

Kazufumi Nishii,
President, Nishii Co., Ltd.

Nishii. "The most important factor in developing overseas markets for GAINA is local installers. Nishii is now trying to introduce GAINA to various countries with full knowledge of its price, quality and trustworthiness. Therefore, they are looking for overseas partners who will cooperate with them to protect people's lives from global warming."

NISHII

<https://nishii.co.jp>

Environmentally friendly printing inks for Japan and the world

Founded in 1947, specialist printing ink manufacturer T&K TOKA is targeting greater international reach as it works to develop cutting-edge products that contribute to achieving a greener future.

A 75-year-old firm whose motto is 'technology and kindness', T&K TOKA manufactures market-leading printing inks for a wide variety of applications. "Our philosophy is: use advanced technology and sincere service to provide products that contribute to solving issues for our customers and society," says Representative Director Yoshikatsu Masuda.

With a product portfolio led by its popular UV 161 series, T&K TOKA specializes in UV inks, which are hardened and dried using ultraviolet light. "We have a comprehensive line-up of products that can respond to each area according to the type of printing substrate and the printing method," Mr. Masuda says.

T&K TOKA not only covers a range of printing needs, but is also committed to creating products that help foster a greener future. "For example, we're trying to increase the amount of biomass-derived ingredients within the ink," Mr. Masuda notes. "Currently, research and development of biomass UV inks is underway to increase the biomass component while retaining the performance and ease of use of conventional UV inks. We're also introducing power-saving inks that reduce electricity consumption during UV irradiation."

The development of EB inks, which are dried using an electron beam, is also part of T&K TOKA's drive for more environmentally friendly products. "Flexography and gravure printing are the mainstream



"We've doubled our UV ink sales in North America and Europe since 2018, but we believe there's considerable room for expansion."

Yoshikatsu Masuda,
Representative Director,
T&K TOKA Corporation



T&K TOKA UV Ink

for food packaging," Mr. Masuda explains. "This method requires an organic solvent, so it emits VOCs – volatile organic compounds – and carbon dioxide when it's dry. VOCs will be an issue in terms of environmental protection so we're trying to replace them with EB ink."

"By providing the market with EB inks that incorporate the knowledge of UV ink design that we've accumulated over the years, including the greener technology we've discussed, we believe printing using EB curing systems will be possible on a variety of substrates, thereby contributing to the expansion of the EB market."



Headquarters

While T&K TOKA is a go-to UV ink supplier in Japan, the country's declining population has led the company to increasingly set its sights abroad. "The demographic issue is a threat to our business," Mr. Masuda concedes.

"We've doubled our UV ink sales in North America and Europe since 2018, but our market share in these regions is still low, and we believe there's considerable room for expansion. We've begun to introduce some new products in these markets, with a strong awareness of the needs of each region, and we're strengthening our service system while monitoring the responses of our customers."

Already well established in North America and Europe, UV inks remain a growth product in many Asian countries, with T&K TOKA also targeting sales expansion in Asia. "In the region, the recognition of our UV inks is extremely high; indeed, UV 161 has become synonymous with UV inks," Mr. Masuda says. "We're renewing UV 161 to increase the market share of our UV inks, which are growing faster than the market growth rate, by taking advantage of this high level of recognition."

As part of its efforts to strengthen its global presence, T&K TOKA is eager to establish international partnerships. "We have experience working with foreign partners to develop new overseas markets and have had great success in doing so," Mr. Masuda says. "In 1988, we began a joint venture in Hangzhou, China. It has grown into one of China's leading printing ink manufacturers, with the No. 1 domestic market share of UV inks. We're seeking new partners who share our company philosophy – and we would be very happy if this article led to the beginning of a new encounter."

As T&K TOKA continues its evolution into an ever more international, eco-friendly manufacturer, the company is also preparing for an industry revolution, Mr. Masuda reveals. "I cannot disclose our strategy now, but in five years we will have introduced a new generation of UV inks that will have a completely different design concept from what we have today," he declares.

Master Color
Technology & Kindness



T&K TOKA

www.tk-toka.co.jp/english

Tsukishima Kikai provides equipment for the manufacture of LiB materials

Tsukishima Kikai's engineering capabilities allow us to provide integrated production facilities to produce LiB cathode active materials from precursors through to active materials.

Tsukishima Kikai is a machinery and plant manufacturer that has been providing its clients with chemical, steel and food instruments, as well as water and sewage facilities, throughout its 117-year history. In 2020, we acquired PRIMIX, a manufacturer of high-speed dispersion equipment, and have since been concurrently collaborating with them in the field of lithium-ion batteries (LiBs).

Our company has been deploying manufacturing plants for active anode and cathode materials, as well as electrolytic solutions, in Japan and overseas, vital materials used for LiBs in electric cars. We count on an excellent track record in crystallization, filtration, weighing and mixing technologies thanks to our in-house developed machinery. This allows us to maintain and ensure the quality of active

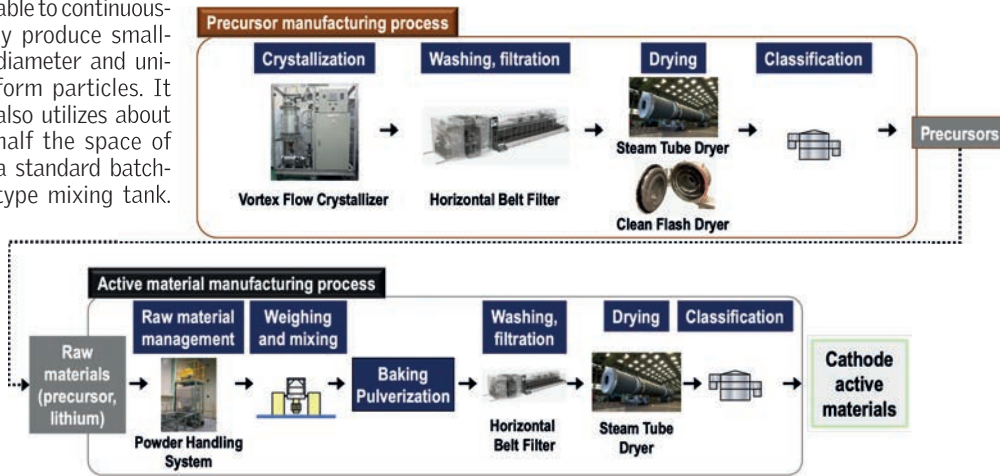
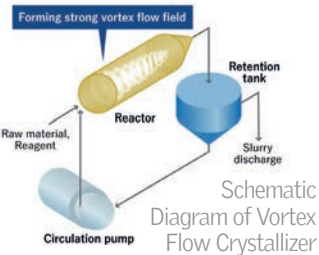
cathode materials, which can greatly impact the performance of LiBs.

Crystallization, in particular, requires precise particle production technology to generate small diameter and variation-free crystals. The Vortex Flow Crystallizer is able to continuously produce small-diameter and uniform particles. It also utilizes about half the space of a standard mixing batch-type mixing tank.

Furthermore, manufacturing and wastewater facilities can also be seamlessly integrated into one single engineering operation.

Tsukishima Kikai will focus on expanding LiB manufacturing machinery sales and contribute to the decarbonization of our society.

TSK
TSUKISHIMA
KIKAI
www.tsk-g.co.jp/en



PRIMIX offering quality mixing solutions for a diverse range of industries

PRIMIX
www.primix.jp/en

From cosmetics to batteries utilized in EVs, PRIMIX Corporation makes sure to offer the best mixing solutions to achieve high-quality products.

Since the early stages of our consumer-grade lithium-ion battery (LiB) production, PRIMIX Corporation has been the pioneer in triple-shaft planetary-type batch mixing technology, combining low-speed double rotating shafts with twisted blades with a high-speed rotating shaft into one single product; like the HIVIS DISPER MIX.

PRIMIX has also built up a track record for its electrode slurry production equipment. We first began development of our electrode slurry production instruments for EV batteries in the 2000s; and came up with the CDM Process (CDM: Continuous Dispersion Mixing), a continuous electrode slurry production process. The CDM Process is the core technol-

ogy behind FILMIX, a thin-film high-speed mixer. With this product we have simplified complicated processes with conventional batch mixers and thus have dramatically improved production efficiency.

With our expertise in manufacturing equipment we are able to cover our customers production processing needs with both the HIVIS DISPER MIX and the CDM process. Furthermore, additional research equipment can also be ordered in conjunction. We have also supplied countless customers with LiB manufacturing equipment, as well as with all-solid state battery research tools. We will continue to solve problems with battery manufacturing processes as manufacturing technologies progress.



FILMIX Model 252



A safety-first firm leveraging cutting-edge technology for a greener future

Handling gases and chemicals can be a dangerous business, but clients know they can trust Toyoko Kagaku – a firm creating safe, environmentally-conscious systems that cover companies' needs.

"Since we handle gas, which is rather dangerous, we prioritize safety," says Takahiro Kato, the president of Toyoko Kagaku – an industrial gas and chemical provider that boasts 70 years of experience. The firm's approach has helped it to become a go-to supplier for companies in a range of sectors.

As part of its Total Gas and Chemical Management service,

"Safety and technical improvements are how we are challenging our staff with every new day that welcomes us."

Takahiro Kato,
President,
Toyoko Kagaku Co., Ltd.



Toyoko Kagaku accompanies its clients every step of the way: from gas and chemical delivery, to the installation, management and monitoring of supply systems, to exhaust recovery and recycling.

The company also works closely with customers in the development of new technology. "We

communicate with them to seek what they want in the future," Mr. Kato says. As Japan targets carbon neutrality by 2050, environmental protection is a key priority. "We're promoting recycling with products like our Helium Recovery System, and we have leak sensors – such as our Liquid Recognition Sensor –



Cylinder Cabinet SiC Thermal Process Equipment - "AileSiC" Series



Liquid Recognition Sensor



Helium Recovery System

that reduce exposure to toxic chemicals and pollutants," Mr. Kato explains.

The firm's green commitment has also seen it branch out into the construction of solar panels and hydrogen stations.

A further focus for Toyoko Kagaku is the semiconductor sector – a growth industry in which the company aims to strengthen its position as a supplier of gases and chemicals to clients in Japan and abroad. "Our chief overseas target is China," Mr. Kato says. "But if there's an opportunity, we're also open to other countries that produce semiconductors."

TOYOKO KAGAKU
www.toyokokagaku.co.jp/en

TMC: Battery Recycling technology for a decarbonized society

Founded in 1986, Town Mining Corporation recycles rare metal scraps and metal resources using its unique know-how.

With the shift to a carbon neutral society rapidly taking place, lithium ion batteries have become a hot commodity, but to truly achieve an environmentally sound circular economy, battery recycling solutions must be developed.



Toyama Lithium Carbonate Line

Japanese firm Town Mining Corporation is one of the companies driving this recycling forward through its holistic approach.

Founded in 1986, the company has a unique and comprehensive recycling process beginning with collecting scrap before inspecting, sorting, and determining which parts are good for batteries or stainless recycling. Once determined,



"Following lithium's extraction from the batteries, we refine it to lithium carbonate, the material that ultimately becomes battery powder. We have minimal waste and our ratio for recycling is more than 90%."

Hiroshi Miyawaki, President,
TOWN MINING Co., Ltd.



Mother Plant
in Shiga
Prefecture

Town Mining has the capability to recycle lithium in its Toyama factory, something company president Hiroshi Miyawaki says is "needed to work towards carbon neutrality".

The process for recycling the lithium into lithium carbonate battery powder involves minimal waste and Town Mining achieves a recycling ratio of over 90% of a

battery's components. This process allows EVs to become even more environmentally friendly, as Mr. Miyawaki explains: "With EVs, the batteries can be recycled and reused. The frames can be recycled and reused. The rubber part can be incinerated, so there are no toxic emissions."



Lithium Carbonate Battery Powder

Town Mining's innovative recycling has allowed it to expand its operation into Korea and China, and the company is always looking to work with new partners with an eye on a more sustainable, cleaner future.



www.townmining.co.jp/english

A sustainable approach to fluid control technologies

KITZ Corporation aims to contribute to a sustainable future through the pursuit of fluid control technology and materials development.



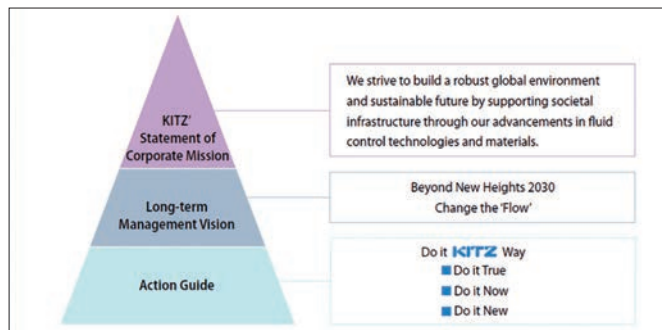
"The KITZ Group handles more than 90,000 types of valves and other fluid flow control devices that are available in diversified designs and made of many kinds of materials."

Makoto Kohno,
President & CEO,
KITZ Corporation

Since its foundation in 1951, KITZ Corporation has become one of the world's leading manufacturers of valves, and Japan's largest company of its kind.

"Today, we continue to upgrade our production systems, including the use of in-house foundries, and our quality assurance system ensures that at all operating stages, our materials, products, and services meet customer requirements," says Makoto Kohno, President and CEO of KITZ. "We also employ a just-in-time production system to dramatically improve production efficiency, enabling us to respond to varied market demands. KITZ strives to lead the flow control industry by becoming the most versatile valve manufacturer."

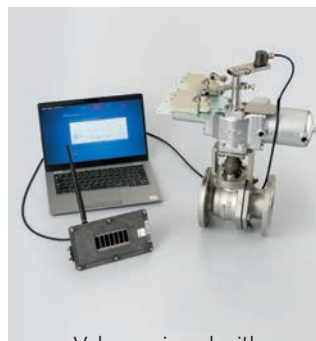
To fulfill this goal, the company has expanded its product range through a strategy of in-house design and acquisition to offer more convenient product sourcing to customers. Just this year KITZ updated its corporate philosophy, "to strive towards building a robust global environment and sustainable future by supporting societal infrastructure through our advancements in fluid control technologies and materials."



Corporate philosophy structure



Grooved-End Butterfly valve



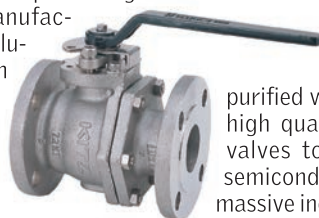
Valve equipped with sensors and other devices



Melting raw materials in a high-frequency electric furnace

This includes providing equipment manufacturers with solutions through its valve and fluid control products. For instance, one of the company's major markets is the semiconductor industry.

"We're not only focusing on semiconductor manufacturing itself, but rather the whole industry of peripherals," explains Mr. Kohno. "For example, a data center has many servers which generate a lot of heat, so it's necessary to use air conditioning (AC) to cool down the equipment. Many of our butterfly valves are used in those AC units."



KITZ Nagasaki factory hydrogen station

"With a large amount of water used by a typical semiconductor fab being ultra-purified water, KITZ supplies high quantities of butterfly valves to the sector. "The semiconductor industry is a massive industry and there are many approaches we can take, so this would certainly make a significant contribution to the KITZ Group's sales from 2022 to 2024," says Mr. Kohno.

Beside semiconductors, the fine chemical field is another area of growing demand, with clients requiring increasingly cleaner valves. "We are doing research and development so we can cater to the growing needs of fine chemical plants."

Digitalization and decarbonization

Digitalization is considered an essential element in improving energy efficiency in various industries, with digital transformation also set to transform fluid control systems. Following KITZ's Long-term Management Vision and Medium-term Management Plan that released in February 2022, "Digitalization" and "Decarbonization" were emphasised as the key areas to accelerate focus on growth segments such as semiconductors, fine chemicals and hydrogen.

"In terms of valves, we are using DX in a system we have developed called the KITZ SMART MONITORING SYSTEM (KISMOS) which uses a sensor in a valve that monitors the flow and accumulates this data on the cloud. We can then provide this information to our customers, and based on this data we can determine the appropriate time to make a replacement, or determine the nature of any abnormality," explains Mr. Kohno. Recently, we have launched a new service-based business using DX to handle that data. KISMOS is applicable not only to our valves but other companies' valves as well. We want to use KISMOS to show our value, and get customers to switch to our valves."

Going forward, KITZ's focus is to contribute to the sustainable growth of society through digitalization and the control of new energy source, says the company president.

"Of course, the company is operated by people, so human resources are vital to maintaining a sustainable company. It is my mission to create a working environment which makes workers feel more comfortable, proud and satisfied to be working at KITZ. We need to continue to be chosen by society as well as be recognized by stakeholders for the sustainable management that we conduct as a company."

KITZ
www.kitz.com/english

Advanced semiconductor manufacturing achieved through world-class technology

With the aim of contributing to society as a development-type company, Micro Engineering has succeeded in fostering solutions not only for wafer polishing and cleaning, but also countermeasures against infectious diseases.

Founded in 1976, Micro Engineering has been making and selling manufacturing machines for the production processes of chemical products since its inception. A key goal has always been to contribute to society as a development-type company, based on the original principles of 'challenging craftsmanship' and 'listening directly to the voices of customers in the market, fulfilling their requirements through technological development.' This philosophy has been continued to this day through the work of current president and CEO, Hajime Tomizawa.

Since its founding, Micro Engineering's business has continued to evolve over the years. The company started out in polishing machines for semiconductor manufacturers, but as customer needs have changed, it has focused on meeting various new demands.

"When we sold the polishing machines to our customers, we received a request from a customer asking if we could make a cleaning machine to wash the polished products. So we manufactured and provided that machine," says Mr. Tomizawa. "When we manufactured and sold the cleaning machine again, we found that customers had requests for an inspecting and measuring machine for the products after the cleaning. By continuing to respond to further requests from our customers, we have been able to develop and manufacture inspection and measuring machines, and factory automation systems."

Underlying Micro Engineering's product development is the constant pursuit of technological innovation as well as consideration for the environment.

"We are focusing on combined energy solutions," says Mr. Tomizawa. "One of the composite energy systems we have is an ultra-fine bubble generator, which is one of the core technologies that can improve polishing and cleaning performance while reducing the amount of slurry and detergents used."



"We take a very positive and constructive view of partnerships with external and international companies."

Hajime Tomizawa, President & CEO, Micro Engineering, Inc.



Inspection Machine



Auto Packaging



Polisher (MGP808XJ)



DryCleaner



CIRCULA

Although this technology has been around for over a decade, further opportunities continue to emerge, he states. "Originally it was developed for the purpose of agriculture and it is also used in the fishing industry, but we have succeeded in eliminating heavy metal contamination, which was a major issue for expanding into the semiconductor field. In the future, we would like to apply this technology to technical fields beyond those related to polishing and cleaning."

Expansion has already seen Micro Engineering tap into the medical field, as the COVID-19

pandemic was taking hold, with the manufacture of the CIRCULA suction hand dryer, for which the company applied its semiconductor equipment manufacturing know-how.

"We had been investigating technologies and products to reduce infectious diseases from various perspectives," explains Mr. Tomizawa. "We examined our own technology and data to assess if there was any COVID-19 pandemic countermeasure that we could help with. This included consideration for the development of a human body cleaning

machine, since we already manufactured wafer and FPD (flat panel display) cleaning machines.

"However, there were major challenges in achieving this, such as finding a cleaning agent that didn't contain chemicals that were harmful to the human body. In addition, it was far from certain if there would be a continued requirement for this type of machine in the future, so we made the decision not to proceed with the development."

Sales of the CIRCULA suction-type hand dryer have only been realized in Japan thus far, but the company president also aims to sell the product in other countries and regions where it is needed, despite the certification hurdles that may come with its launch in overseas markets.

"We are considering Europe as the next overseas base to aim for. We have a lot of customers in Europe, including the United Kingdom, Italy, France, Ireland and Germany, whom we visit from Japan. If we had a business base in Europe, we could listen to them better and meet their demands accordingly."

As the company approaches its 50th anniversary, Mr. Tomizawa has a clear message. "In the coming years, many things in society will evolve further, and it will become increasingly essential to incorporate digital transformation into businesses. This is one of the things we have to do to grow sales and profits with the optimal number of staff in our company."

"In addition, the demand for some products and commodities will decline or become obsolete over time, so it is always necessary to develop cutting-edge technology."

This is a very difficult challenge, but the DNA behind our founding philosophy has permeated into our management team and employees, and we will continue to faithfully implement this as we take our business forward."

MICRO ENGINEERING INC.

www.micro-eng.co.jp/english

Moving *monozukuri* forward one step at a time

Kodama Chemical Industry integrates *hitozukuri* and *genbazukuri* into their processing technologies, resulting in the highest quality products that go beyond mere plastics.



"I would like to be a part of the company's pursuit of potential new materials, especially as we live in a multi-material world."

Junichi Tsubota,
President, Kodama Chemical Industry Co., Ltd.

Established in the aftermath of the Second World War, Kodama Chemical Industry has been producing molded plastic products for over three-quarters of a century.

At the heart of the company's philosophy are the concepts of *monozukuri* and *hitozukuri*.

As president Junichi Tsubota is quick to explain, at Kodama, *monozukuri* is defined as two separate words: *mono*, meaning "thing", or "object", and *zukuri*, meaning "making" or "producing."

The words are separated, Mr. Tsubota goes on, "to highlight the importance of the product itself."

The making of people, meanwhile, or *hitozukuri*, is equally crucial. Mr. Tsubota adds: "Building human capital and establishing a good relationship between every single individual that works for the company is important, and vital for establishing a good working environment."

It is an approach that has stood the firm in good stead as it continues to expand beyond Japanese borders.

Thai Kodama Chemical (TKC) already has an established pres-

ence in Thailand, and with a second subsidiary, Echo Autoparts Thailand (EAT), looking to take advantage of the opportunities afforded by the fast-moving automotive industry, it is clear that Southeast Asia

GMT chair holds the key to the company's current international strategy.

Mr. Tsubota adds: "We are not only thinking of Thailand as a production site. We are considering it as a strategic base, almost like a local hub, that will open the gates to other countries in Southeast Asia."

Among them, of course, India and China, countries Mr. Tsubota views as potential target markets for the sale of carbon fiber-reinforced polymers (CFRP),



Radiator grill



Molded center console

which are of increasing significance in the burgeoning electric vehicle industry.

Not that he will be losing sight of what's really important: "You can spend all the time in the world strategizing and making plans, but at the end of the day people are the ones that make a company great."



SINCE 1946
児玉化学工業株式会社
KODAMA CHEMICAL INDUSTRY CO., LTD.



www.kodama-chemical.co.jp

Distributor Hirano Steel providing metal wires and more to key industries

Utilizing its experience gained over 80 years, Hirano Steel makes sure its products meet the stringent demands of its clients.



Saitama Satte Center

Hirano Steel has been supplying wires for use in reliable and high-quality springs for more than 80 years. Yoshihiko Hirano, who has been company president for the last two decades, knows how trading firms like his that specialize in smaller, niche fields are well placed to meet the demands of domestic and overseas markets, despite the significant logistical challenges the latter brings. The Japanese people and corporate culture are also seen as key advantages.

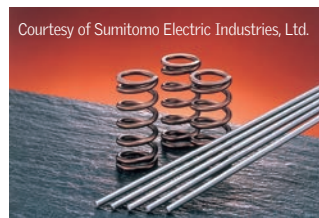
"Many Japanese companies have superior technical capa-

bilities and workers take their jobs very seriously, which helps develop trust with customers," Mr. Hirano says. "From this, longer-term relationships with partners in overseas markets can be built.



Oil Quenched and Tempered Wire

"In the past, we have enjoyed high economic growth and many Japanese companies have lifetime employment. It



Courtesy of Sumitomo Electric Industries, Ltd.

Piano Wire for Precision Spring

means that these companies value people and I think that is our strength."

Although technology — demonstrated by the new DX system for data and promotional efficiencies — and a shift to online sales are important, Hirano Steel continues to provide a personal element to the day-to-day, and for this the employees are fundamental.

"We need to develop our salespeople in order to increase our capabilities," says Mr. Hirano.



"The source of our competitive advantage is our history."

Yoshihiko Hirano,
President,
Hirano Steel Co., Ltd.

"This is vital for face-to-face communication and for the business."

Mr. Hirano knows the value of the company's history, another of its competitive advantages, with the motto of 'honesty and breakthrough' a core strength. He says his legacy will involve leaving a strong financial foundation for the next generation, but still has several years yet to build on the successes to date.



平野鋼線株式会社
HIRANO STEEL CO., LTD.

www.hirano-steel.com/en

The high-performance computing behind chemistry innovation

With global ambitions of expanding to the U.S. and Europe, HPC Systems combines chemical know-how with high performance computing.



"We have a strength in chemistry and can provide scientific knowledge to a project too."

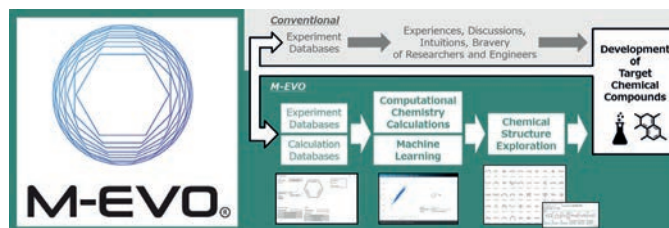
Teppei Ono, President,
HPC Systems Inc.

Established in 2006, HPC Systems develops, manufactures and sells high-performance computers for scientific and engineering calculations. Despite the slow adoption of digital technologies in Japan generally, company president Teppei Ono believes there are "many opportunities in the development of digital transformation" for his business.

HPC Systems operates in the high-performance computing and the configure-to-order businesses, providing the best systems and services for basic research at universities and product development at companies. "We have customers in automotive, chemical, pharmaceutical, biotech, manufacturing and AI, all of whom are very confident in our ability to provide the right technology," says Mr. Ono. "We also provide the correct training so that our customers can properly run their simulations."

There is also a competitive advantage gained by being a SME with specialist chemistry expertise. "Some tier one companies make similar systems, but aren't as strong as us when it comes to chemistry. We are able to provide vertical solutions for clients, from the science to the software, all the way to the system," the president explains.

"We are currently developing advanced software in Materials Informatics with computational chemistry called M-EVO (Molecu-



EdgeTank® 510



EdgeTank® 520



EdgeTank® 542

lar EVOLUTION) to provide a powerful, user-friendly tool helping target chemical structures with desired physical properties easier and faster than before."

Mr. Ono's ambitions are clear, with material science seen as a major growth industry, at home and overseas.

On the other hand, in the CTO business, the company has devel-

oped and sold edge computers for 5G ahead of other companies. "We have a big opportunity to build and become a global PLC. We understand the needs of scientists and researchers, and we can help them create the technology of tomorrow."



Taiyo Chemicals: Seven decades of evolution

Behind the man known affectionately as the "mahjong king" is a committed environmentalist who has been instrumental in improving children's environmental awareness.



Wasabi hydroponic farming system
Established in 1954, Taiyo Chemicals began life as a button manufacturer before expanding into the production of automated mahjong tables. Since establishing a base in Shanghai in 1989, the company has diversified further, manufacturing products for 100-yen stores as well as lighting components for Panasonic and automotive parts for companies such as Toyota and Mazda.

But it is their involvement in the PET business that company president Kazunaga Uenishi is arguably most proud of, with the firm having recently created a PET plastic that is

"We're always evolving to meet the needs of our customers, creating value out of waste."

Kazunaga Uenishi, President,
Taiyo Chemicals Co. Ltd.



World-renowned automatic mahjong table
98% recyclable, heat resistant and toxin free.

And the company's green drive doesn't stop there. Mr. Uenishi

adds: "We've been working with elementary schools and parent-teacher associations to collect plastic bottles for our recycling operations."

Teaching children about the importance of environmental protection means that they form good habits at a young age. It's a model that Mr. Uenishi is keen to apply overseas. "Plastic itself is not evil," he says. "The problem is when it's improperly disposed of."

As well as continuing to focus on PET products and mahjong tables, the company is looking to carve a



ReBirth tableware made from recycled PET bottles
niche in the ever-changing automotive industry. This will involve listening to the needs and requests of customers, but also – occasionally – getting things wrong.

Fortunately, Mr. Uenishi has no fear of the learning process. Indeed, the ability to turn a negative into a positive, and use it to inform future performance, has been key to the company's continued survival and evolution all these years.



www.taiyo-chemicals.co.jp/en

Driving innovation in fabric and fibers

In the competitive landscape of the global market, fabric manufacturer Komatsu Matere continues to excel through R&D and unique technologies to develop its 'ultra components'.

Innovation doesn't just happen; it requires research, expertise, and a true commitment to create fresh ideas and products. Japanese fabric manufacturer Komatsu Matere is a leading example of how placing innovation at the core of a company leads to the development of unique products.

Founded in 1943, Komatsu Matere's strength lies in the one-of-a-

kind technologies and techniques it possesses in the fields of fabrics and chemical fabric manufacturing. The company's former chairman and CEO Kenichi Nakayama, who is now an honorary senior advisor, says "R&D is the core and foundation of this company".

This dedication to forward thinking

has enabled the company to develop its ultra components, which provide non-replicable added value and are used by leading fashion brands and world-class athletes (including those at the Olympic Games) alike.

Mr. Nakayama says the global market is "a battlefield" where the company's years of developing technologies are used to gain a competitive advantage. With its eye on

global expansion, Komatsu Matere has successfully expanded into the fields of construction and architecture and, in line with its sustainability ambitions, has developed its Greenbiz ceramic construction material made entirely from recycled industrial waste.

The product has been used in

construction projects from Italy to the U.S.A., while the company's CABKOMA technology, a thermoplastic carbon fiber composite, has been utilized in several renovation projects, from centuries-old temples to modern train stations.

This technology also forms part of the anti-seismic installation of one of the biggest multinational coffeehouse chains, and Komatsu Matere is always on the lookout for more international clients who can take advantage of its industry-leading solutions.

The company has also expanded into personal protective equipment (PPE), with its dedicated R&D team having responded to the urgency of the COVID-19 pandemic to create "the world's most comfortable" face mask designed to keep the skin at an ideal temperature and humidity level. This kind of innovation follows the company's underlying philosophy set out by Mr. Nakayama: "Every action we take must be fresh."



Kenichi Nakayama,
Honorary Senior Advisor,
KOMATSU MATERE Co., Ltd.

komatsumateRe
www.komatsumate.co.jp/en



Komatsu Matere's factory



CABKOMA



AEROTECHNO Mask & Inner Layers

Midori Anzen: Providing safety and peace of mind

Monozukuri means innovation for Japan's leading manufacturer of personal protective equipment.

Originally established in 1952, Midori Anzen has been manufacturing safety products for 70 years and counting.

And the secret to the company's continued success, according to President Fujio Matsumura, is rooted in its attention to detail and craftsmanship.

"Pursuing *monozukuri*," Mr. Matsumura says, "is equivalent to pursuing innovation."

Extensive research and trials have, for example, led to the production of a compact toecap whose small lateral winglet offers full protection to the small toe, a longstanding challenge for the safety shoe industry.

The company's attitude to innovation goes beyond mere manufacturing. For example, Midori Anzen turns the challenge of Japan's demographic decline into an opportunity to innovatively make use of limited resources.

Furthermore, according to Mr. Matsumura, another key advantage is their 'direct-selling, no-distributor business approach' that enables Midori's sales force to capture the safety needs from customers first

"To continue our success as Japan's leading PPE company, we must not only be able to deliver consistently high-quality products tailored to clients' needs, but also be prepared to think outside of the box."

Fujio Matsumura, President,
MIDORI ANZEN Co., Ltd.



Uniform and Work Apparel

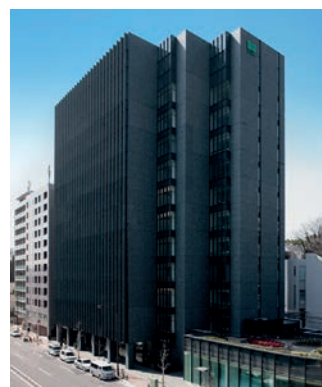
hand, allowing the company's product development team to act without the usual time-consuming market evaluation process.

In terms of recycling and sustainable development, the company



Safety and Work Shoes

has an enviable track record, having been awarded the Japanese Eco Mark Award in 2017: testament to its commitment to recycling and optimizing efficiency without creating collateral waste.



Head Office in Tokyo

Looking ahead, the PPE industry offers opportunities for expansion into South East Asia, while the ever-evolving automotive sector continues to depend on Midori's world-famous seat leather.

Whatever the future brings, Mr. Matsumura is certain of one thing: innovation will be the key to survival in the current market.

M MIDORI ANZEN
www.midori-anzen.co.jp/en

On a firm footing with Simon's anti-slip technology

Workplace safety is the number one goal at Simon Corporation, a company that harnesses over 70 years of experience to create state-of-the-art slip-resistant footwear that prevents accidents on the factory floor.



"Many occupational accidents are caused by slips and falls."

Kazunori Toshioka,
President,
Simon Corporation

A company that celebrates its 75th anniversary in 2023, Simon Corporation specializes in market-leading safety shoes whose cutting-edge anti-slip technology protects against accidents at factories in a range of industries. "We pride ourselves on creating products of the highest quality, so that when our customers take one look at our shoes, they feel safe and secure," says President Kazunori Toshioka.

This dedication to quality means that automation is a feature of several of the company's production lines, while at the same time, Simon Corporation continues to focus on skilled hand craftsmanship in par-



A+A 2019 (Germany)

ticular processes. "Processes such as the cutting of the leather are automated, but the sewing process is still done manually," Mr. Toshioka explains. "The manufacturing of the sole itself and processes such as



Simon Headquarters (Japan)



PT. Indonesia Simon (Indonesia)



Vietnam Simon Safety Industries (Vietnam)

mounting can be done on a separate machine. But fine polishing of the sole and the shoe, as well as specific cutting processes (besides attaching), are done by hand."

The fulfillment of Simon corporation's mission to "deliver safety for all" also comes down to the working culture instilled at the company's production sites in Japan, Thailand, China, Indonesia and Vietnam. "Each individual

takes responsibility for ensuring that there are as few defects as possible in their sphere of control, so at the next stage in the assembly line, defective items are properly identified," Mr. Toshioka



Yanaizu Factory (Japan)



Thai Simon Safety Industries (Thailand)



Yantai Simon Safety Shoes Manufacturing (China)

says. "This philosophy – that the next person in the assembly line is also who we service – ensures that we continually create the best products possible."

A flagship product at Simon is the SX 3-layer shoe, which features independently movable rubber cleats for grip; a polyurethane midsole for shock absorption; and a rubber frame sole for stability. "The SX 3-layer shoe's slip-resistant technology is what we pride ourselves on," Mr. Toshioka says.

"When it comes to the sole, the way it's created is similar to how an analogue calculator works, where when you push one button, the other buttons around it don't move. If one of the sole's rubber cleats touches the ground, the rest of the cleats don't move and so the sole does not change shape, thus ensuring the shoe maintains a firm grip and improves slip resistance."

In addition to preventing accidents, Simon Corporation's shoes are not only extremely comfortable

to wear, but also offer long-term health benefits to their users.

"I used to run marathons, but ended up with plantar fasciitis. As a result, the soles of my feet were inflamed and very painful for about two years," Mr. Toshioka recalls. "It hurt to walk and even stand. I've heard from clients with inflamed soles or similar injuries, who are on their feet most of the day. From my own experience, I can sympathize with those that suffer this type of pain. Once, on a visit to a tire maker, a worker told me that his soles hurt but wearing our shoes eased this pain. When I had my injury, I couldn't wear regular business shoes, but our SX 3-layer shoes brought me some pain relief. The cradling insoles really helped me."

Simon Corporation, which also manufactures protective gloves, aims to strengthen the global market expansion of its products and diversify the range of applications for its footwear.



SX 3-Layer Shoes

"In terms of our international strategy, we'll continue to expand our presence in the ASEAN region and China," Mr. Toshioka notes. "On top of that, we're trying to penetrate the European market. Within Japan, our strategy is to expand the application of our shoes beyond the manufacturer's factory floors. We want our safety shoes to be widely used in the service sector, as well as the warehousing, logistics, food and beverage, and medical sectors. We believe it is important to diversify their application, especially considering Japan's aging population."