

Building a new world: Japan's infrastructure and construction leaders take their expertise global

From a Shinkansen railway system boasting zero passenger fatalities in 50 years of operation to the world's longest suspension bridge connecting Awaji Island to Kobe, Japan is recognized as a global leader in construction and infrastructure. Since the country's first construction boom prior to hosting the 64th Olympics, Nippon enterprises have been admired not only for their ability to build engineering marvels, but for their capacity to do so in one of the world's most inhospitable environments, marked by tectonic activity and mountainous regions. It is therefore no surprise to find that since 1990, the 'land of the rising sun' has consistently ranked amongst the Top 5 in the WEF's 'quality of infrastructure' assessment.

Today, the Japanese construction market has matured. With the oldest population in the world, Japan's demographic line has been sharply declining since 2011, which has lowered the amount of new projects. The Japanese market is currently sustained by the rising need for maintenance and repair of aging infrastructure, which also includes leveraging the latest disaster prevention technologies to enhance resilience to natural disasters. And with Japan looking to reach carbon neutrality by 2050, the environment is also a major priority for those in construction and related industries.

"About 50 years ago, around the time of the Tokyo Olympics, we had the construction of the Shinkansen, the major road networks and many other infrastructure projects to support the Olympics," says Shinya Okuda, president of civil engineering firm Fudo Tetra. "Now, 50 years on, it's time to perform maintenance or refurbish the road and rail networks in particular but also infrastructural systems such as the water and sewage pipe networks, and this is a higher priority than the construction of new projects."

In 2021, the Japanese government launched a national resilience project, allocating a budget of 15 trillion yen over the course of five years. "The project will basically reinforce existing infrastructure to prevent damage from natural disasters," explains Katsutoshi Ogawa, president of Okasan Livic, a trader and manu-

facturer of construction materials. "We have a lot of old structures, like roads, and we need to maintain big rivers and dams also. Our company is trying to supply good techniques and materials for this project, including water and sewer pipes and bridge reinforcement/restoration."

Another company playing its part in the government's national resilience plan is Hiraiwa, which, like many of its peers, is actively engaged in the maintenance and repair of Japan's existing infrastructure and facilities built over the last half century. When it comes to disaster prevention technology, Hiraiwa is a leader in the provision of tailor-made anti-seismic retrofitting solutions, a particularly pertinent area of expertise in earthquake-prone Japan.

"Due to the seismic regulations in Japan becoming stricter each time an earthquake occurs, we get a wave of inquiries. Clients come to us and ask us to inspect their buildings that were built several years ago to see if they still adhere to the most recent seismic regulations," explains Hiraiwa president Toshikazu Hiraiwa. "Needless to say, new buildings have to be constructed according to safety regulations and seismic retrofitting. Public facilities such as hospitals or universities with spacious and wide areas like canteens or gymnasiums request our assistance to ensure the safety of their roofs and facilities. It is not only making sure that buildings can withstand high-magnitude earthquakes but also paying attention to the surrounding infrastructure."

In terms of natural disasters, perhaps the greatest challenge for Japan – and indeed the world – is climate change. Like many other industries, Japanese firms involved in construction have prioritized green technologies, including Chemical Grouting, an expert in soil improvement and stabilization that has developed environmentally friendly solutions such as BioJet and ICERETE.

"ICERETE is an environmentally friendly ground freezing method that means we no longer have to use cement to reinforce soil," explains company president Yuichi Tachiwada, who aims to bring Chemical Grouting's technologies to countries around the globe. "We want the

world to know about our technologies. If we have more people collaborating, then we can protect the Earth together. We want to come up with measures that will tackle the problems that global warming is bringing about. So, we will continue to develop technologies that address this challenge."

Fuji-I-Tec, which specializes in heat insulation, sound insulation, fire-proofing, asbestos removal and the painting of various types of plants including power generation facilities, is also playing a small but important role in the path towards carbon neutrality. "We do not consider our company a key player in changing the industry because we are such a small company," president Fumio Uchikawa states. "Nevertheless, we are extremely proud that our insulation technology highly contributes to the realization of a carbon-neutral society and the efficiency of a facility."

Japan's aging and shrinking population has also presented a challenge to the Japanese construction industry when it comes to finding new recruits. With a shrinking domestic labor pool, companies must turn to new technologies such as automation, while trying to market the industry as an attractive career option for young Japanese.

"Many Japanese companies are struggling in relation to their HR activities because it's very difficult to employ new graduates from university, especially in the construction industry. Less than 10% of our workers are between the ages of 19 and 25, so something must be done to regenerate our workforce," states Seigo Minamioka, president and CEO of construction equipment rental company Nikken. "One of our strengths is the ability to recognise problems and one of those problems right now is the shrinking labor force, with the solution being in our services and IT."

Japan, traditionally an insular country, also aims to welcome more foreign workers as a means to address the labor shortage. "The Japanese government is now pursuing immigration policies for foreign workers to increase the labor force, especially in the medical, technology, and construction fields," says



Yoshinori Takahashi,
President,
NEW COSMOS ELECTRIC CO., LTD.

Masaaki Katsuyama, president of Fuwa Metal. "We have a stance on contributing to the industry in our own way, but in order to make up for the shortage of human resources in Japan, the government will need a long-term strategy."

A large portion of the foreign construction workers destined to land on Japan's shores will come from Southeast Asia, a fast-growing region where many Japanese construction and related companies have turned their attention amid the dwindling demand for new projects on the domestic market. Driven by rapid economic and demographic changes and by reforms that facilitate PPPs, the value of mega projects (those worth more than \$25 million) in the ASEAN (Association of Southeast Asian Nations) region alone stands at an incredible \$2.9 trillion. Since 2000, Japan has financed more than \$230 billion worth of projects in the region, more than any other country thus far.

When it comes to construction projects and related materials and machinery, Japan is renowned in the region for delivering the highest quality, thanks to companies like Hitachi Construction Machinery (HCM), which aims to expand throughout Asia, as well as the U.S., Latin America and Africa. For HCM president Kotaro Hirano, the reputed 'Made in Japan' brand gives Japanese construction machinery manufacturers an edge over competitors. "One characteristic of the Japanese industry is that the whole supply chain has high standards, and those standards are applied across the entire industry. So as a result, the final products show a markedly different level of quality."

Mitsui Miike, another company offering machinery of the highest quality and durability, also has plans to grow internationally, and particularly in the ASEAN region. "The products for which we would like to expand sales overseas are road headers for tunnel excavation, 1-2 MW small hydroelectric power generation equipment, biomass power generation transportation equipment, and planetary gearboxes (for excavators, large cranes, excavators, etc.)," explains president Motohiko Nakamura. "Hopefully, we will also be able to provide power through the electricity generation business we are starting. We would like to take our hydropower generators overseas and sell them in relevant markets, such as Southeast Asia."

Japanese firms engaged in water treatment and sewage are supporting the development of water infrastructure throughout Southeast Asia and beyond with the help of Japan's overseas development assistance (ODA) programs. "In countries and regions where water and sewage facilities are underdeveloped, we believe that pipe jacking methods can play a major role in achieving a safe and hygienic environment," says

Kyoichi Yasuda, president of Yasuda Engineering, a leader in pipe-jacking solutions. "Some developing countries have already begun to develop water pipes and sewerage facilities with loans from other countries including Japan, but Japan plans to continue to provide support through ODA, and we would like to work mainly on pipe jacking work."

Addressing the growing global concern of water scarcity is a major priority for Nihon Suido, which is involved in the ODA business to support developing countries for clean water supply and sewage treatment. "In Indonesia, we started off with ODA projects. We bought companies in Jakarta and made that a hub for our business once those projects were completed," explains company president Kazunori Mayama. "India is also an important market. Through the ODA scheme, we were involved in two big projects there." Nihon Suido uses the latest digital technologies to offer state-of-the-art solutions for water management, which Mr. Mayama says "is critical when we anticipate scarcity in the future".

For its part, Awa Paper is another leader in wastewater treatment, having developed innovative

filtration systems such as M-fine, which is a flat-sheet membrane for membrane bioreactors (MBRs). "Awa Paper can produce anything related to water treatment in different industries that require differently adjusted water filtration systems," comments president Yasuhiro Miki. "Excluding drinking water and the production of beverages, in the context of wastewater treatment, we are emphasizing the recyclability and reusability of water, with new initiatives being applied to what is truthfully an old business. With adjustments in filtration processes, we can reach new, excellent filtration levels applicable to different industries."

Japan's disaster prevention technologies also cover the likes of gas alarms and it is another area in which the Nippon nation excels, thanks to companies like New Cosmos and Figaro Engineering. As a result of the increasing use of natural gas alarms in Japan, where New Cosmos holds a 70% market share of the market, deaths from gas explosions have virtually been eliminated. New Cosmos president Yoshinori Takahashi wants to help other countries reach such milestones. "We feel our experience

in Japan can be replicated elsewhere in countries that need it most. In fact, recent data shows that many people in the U.S., U.K., France, and other countries still experience deaths due to gas explosion accidents and we are making significant efforts to provide gas alarms to overseas markets."

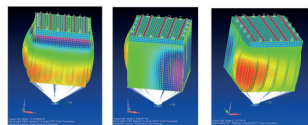
As a specialized manufacturer of gas sensors and modules, Figaro Engineering made heavy investment into its R&D capabilities, allowing the firm to design leading MEMS sensor technology. "Our battery operable sensors can be utilized in wireless and portable devices. To that end, we are expecting to expand our miniaturized products in various fields that represent the frontier of innovation," says president Toshihiro Uda, who adds that the company seeks international partners to further enhance innovation as it looks to strengthen its global presence. "Looking to the future, we are interested in open innovation and working together not only with domestic but also overseas companies, especially startups. We are looking for a partner who can change our business model by integrating our core technology with theirs to create something innovative."

Nihon Suido Consultants: Leading the water sector with sustainable services

Since its inception in 1959, Nihon Suido Consultants (NSC) has been contributing to various business solutions through sustainable growth in the field of water supply and sewerage systems in over 70 countries as a leading engineering consulting firm.

With water scarcity currently on the global collective mind, confronting it requires companies with experience, reliability and high technology – and Nihon Suido Consultants finds itself fitting the bill perfectly for such a task.

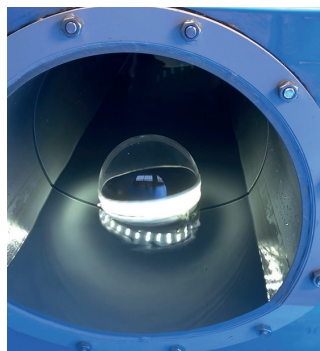
Having already had various successes overseas – Brazil, Sri Lanka and Indonesia to name but a few – NSC's integrated approach provides the backbone of its success. President Kazunori Mayama explains: "So far, we have accumulated knowledge overseas through the work of planning and designing of many water and sewage facilities. From now on, we will use the special technology we have developed to provide sustainable services and contribute to solving water problems around the world."



To combat such problems, Nihon Suido can count on technology which simulates nature's water cycle and models the ground in question. Then, simulated rain on a 100,000-1 million year timeframe is added in order to provide a base model for future infrastructure and city-building models. This forecast can be run on a 10-20 year time period in any area with water management issues.

The technology can also pinpoint radioactive substances within the system. Later, during the management phase, technology such as Blitz GROW and Blitz GIS take center stage – two cloud-based services that regulate facility and

maintenance information, while guaranteeing effective asset man-



agement. One other technology recently developed by the company is a high-performance 360-degree camera. The firm's engineers can observe the interior of sewer pipes, after which AI reads the data and instantly identifies the location of any deterioration.



"NSC is even able to simulate future water environments using sophisticated modelling, including technology that simulates nature's water cycle."

Kazunori Mayama, President, and **Kyogo Nomura**, Vice President, Nihon Suido Consultants Co., Ltd.

When cutting-edge technology meets experience and know-how, success is guaranteed. As such, NSC's undoubted strengths will become increasingly needed in a world where fears increase ever more when it comes to the topic of the provision of water.

Natural Gas Explosions are a Global Concern



Many people die or are injured from hundreds of natural gas explosions each year. These catastrophic explosions can devastate a home, its occupants and destroy nearby buildings in seconds. To prevent this, it's important to understand how gas leaks occur and what you can do to keep you and your family safe.

Causes of Gas Explosions

- Aging utility gas pipes
- Loose or cracked fittings
- Poor maintenance of gas hoses and home appliances
- Gas build-up in enclosed areas
- Improperly installed gas appliances



How You Can Prevent Gas Explosions

Make sure to install DeNova Detect Natural Gas Alarms near all gas appliances. During installation, your alarm should be placed at the optimal location between 4 to 12

inches from the ceiling. Lastly, be sure to schedule routine maintenance checks of appliances.

DeNova Detect Gas Alarm Benefits

- Battery-powered for easy installation and no wiring required
- 6-year battery & service life alarm with no additional batteries needed or electricity costs
- Early detection technology with a 10% Lower Explosion Limit (LEL)
- Innovative MEMS technology sensors virtually eliminate nuisance alarms
- Quicker gas detection provides an average of 11 minutes more escape time which can save more lives



Gas Alarms Save Lives

In Japan, 114 people died from gas explosions in 1982. In response, gas companies took various proactive safety measures including mass installations of residential gas alarms. Now, because most homes in Japan are equipped with NEW COSMOS ELECTRIC gas alarms, the number of fatalities due to residential gas explosions has been reduced to almost zero.

Solutions to Gas Explosion Accidents

In 2014, a gas explosion destroyed two five-story buildings in New York City, resulting in multiple deaths, fifty injuries and the displacement of more than one hundred families and businesses. As a result, Con Edison, a New York utility company, began installing New Cosmos DeNova De-

tect Natural Gas Alarms in 2019. Con Edison has since had over 800 gas leak warnings which prevented possible tragic outcomes. The results consistently reveal that installing Natural Gas Alarms is the right investment to save lives and prevent catastrophic property damage.

Trusted Leader in the Gas Alarm Industry

Since its inception, NEW COSMOS ELECTRIC has been at the forefront of innovation, introducing the first ever residential gas alarm to the world in 1964. Currently, it holds a 70% market share for Natural Gas Alarms in Japan. NEW COSMOS was also the first to develop a long-life battery powered Natural Gas Alarm using MEMS gas sensor technology and the first to deliver a battery-powered AMI smart Natural Gas Alarm to the U.S. The company has sold over 70 million residential gas alarms worldwide and have expanded into seven different countries, most recently expanding into the U.S. in 2019. NEW COSMOS is well-positioned to continue to accelerate their mission to help eliminate deaths due to gas explosions and make a huge impact as a long-standing, trusted global leader in the gas alarm industry.



NEW COSMOS ELECTRIC has one of the largest R&D gas sensor manufacturing facilities in the world

Our Mission is to Protect People and Property With Innovative Natural Gas Safety Technology.



Learn more at
www.denovadetect.com/newsweek

DeNova Detect™

By New Cosmos USA, Inc.



ML-310ES

Nissei Build Kogyo: Bringing ready-made solutions for society's housing needs

Since its establishment in 1961, Nissei Build Kogyo has always prided itself on being the one and only company engaged in prefabricated houses, system architecture, and multi-storey car parks that provides comprehensive support, from development, manufacturing and construction to after-sales services.

In an era with a declining number of workers due to Japan's aging demographic, Nissei Build Kogyo is using its 60-plus-year experience to systematize old, labor-intensive methods within its industry. The firm achieves this by increased production of custom-made products as well as those with predetermined specifications. President Hideki Ueda explains one of the firms' main targets: "My goal is to turn about 80% of the things that we do manually into these prefabricated systems and technologies."

In its quest to standardize its methods, Nissei Build Kogyo can



Hideki Ueda,
President,
Nissei Build Kogyo Co., Ltd.
日成ビル工業
www.nisseibuild.co.jp/en

count on an extremely strong human resource platform. In the firm, every employee is provided with both the skills and subsequent encouragement to prioritize solutions based on what works best for the environment, society and, of course, the customers. Employees operate under a detail-oriented sales system that enables instant response to the needs of customers. One example of this approach was seen during preparations for the Tokyo Olympics. Some areas of the city experienced a dramatic and temporary swelling in population, and consequently there were not

enough schools. Accordingly, Nissei Build Kogyo snapped into action to provide temporary school buildings and kindergartens to help accommodate the people affected.

One comprehensively rounded product that brings the firm much pride is "V-Span-S", an innovative approach which systematizes all the processes involved in the building of housing, from design to construction. By using such a method, customers not only get a better price but overall project time is also cut significantly. Mr. Ueda comments: "I think it is rare to find a system builder like us in the medium-sized market where V-Span-S excels, and I am extremely proud of it." The thorough approach offered by V-Span-S will undoubtedly propel the company to further success both at home and abroad.



[Parking Structure with Ramps]
Visitor's parking lot



[Steel-frame Buildings]
Botanical garden



[Prefabricated House]
Temporary school building



[Steel-frame Buildings] Cowshed

No doubt the finest geo-doctor

Founded in 1963, Chemical Grouting has been supporting the construction industry through its disaster prevention technology that strengthens buildings and infrastructure.



Koishihara River Dam

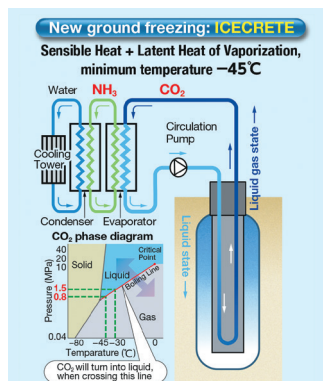
The technology revolution has significantly transformed some industries, but sometimes you have to look a little deeper to find the groundbreaking progress technology has enabled in other sectors. Grouting is an example of the latter, and Japanese construction company Chemical Grouting is one of the companies pushing the industry forward with its world-leading technology.

Founded in 1963, Chemical Grouting has developed technologies used around the world, including the jet grouting method, which uses high-pressure water that cuts through the ground and mixes with cement slurry. "We don't intend to monopolize our technologies, and we hope

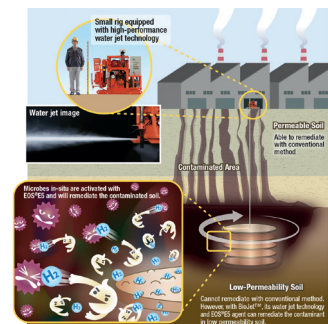
that engineers around the world will actively use them," says company president Yuichi Tachiwada.

Chemical Grouting has developed innovative, environmentally friendly technologies to contribute to the achievement of the UN's Sustainable Development Goals (SDGs). The ICECRETE method, for example, is a new ground-freezing technology that utilizes liquefied CO₂ at -45°C to

stabilize the ground without the use of chemicals or cement. In addition, the ICECRETE method uses 40%



Ground freezing method, ICECRETE



Soil remediation technique, BioJet™

less electricity than the conventional freezing method, contributing to the reduction of CO₂ emissions.

The BioJet™ method, meanwhile, is an environmentally friendly solution for in-situ remediation of contaminated soil. This technology has been commercialized with the cooperation of U.S. company EOS®, and has been commended by the U.S. Department

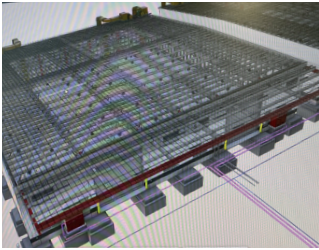


"Not only in construction, Chemical Grouting has high technology and is continuously developing the ability to provide solutions to the problems underground."

Yuichi Tachiwada, President,
Chemical Grouting Co., Ltd.

of Commerce. Chemical Grout is also in the process of licensing the technology to a Taiwanese company.

Moving forward, Chemical Grouting seeks other international partners to help develop innovative technology to tackle global environmental challenges.



Structure study by BIM



A scenery of construction



Long bridge construction



Hiraiwa: the comprehensive construction company

Serving local residents, government offices, major general contractors and many others, Hiraiwa aims to work as a close partner in clients' construction projects.

Remodeling, retrofitting, and reconstruction are pushing the construction industry towards a more sustainable, safer future. Construction companies must be able to guarantee strong life cycles for their new builds whilst offering clients the opportunity to retrofit older buildings with the latest technology.

making certain that buildings can withstand high-magnitude earthquakes but also paying attention to the surrounding infrastructure. For example, we are promoting disaster prevention planning including a storehouse for emergency supplies and an electric supply system in case of a blackout while securing enough space for evacuation."

ment offices, and general contractors to have benefited from this technological approach are several nursing homes, with Hiraiwa determined to serve the needs of Japan's aging society.

Advanced systems such as BIM require technicians of the highest quality, and Hiraiwa employs talented workers from

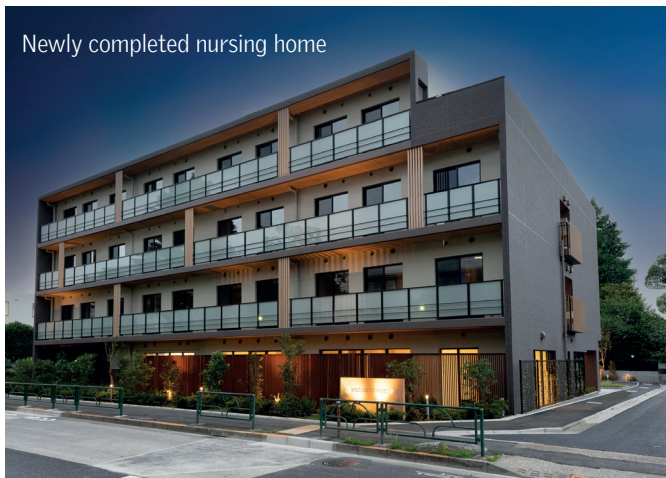
"BIM allows us to present our proposals using perspective and computer graphics."

Toshikazu Hiraiwa,
CEO,
Hiraiwa Construction Co., Ltd.

quality construction solutions, and Hiraiwa has positioned itself to provide these solutions as demand continues to grow in the future. This higher quality construction also reduces the long-term life-cycle costs of a project for clients, and as Mr. Hiraiwa points out, this in turn reduces carbon dioxide emissions proactively.

Hiraiwa is not only at the vanguard of the construction industry in terms of the technology it uses, but also with its working conditions. The company is intent on reducing working hours and improving its employees' working environment, with compensatory days off, a No Overtime Day, and a five-day working week policy. Hiraiwa hopes flexible and diverse working styles can attract the best workers, be they domestic or international; men or women. Mr. Hiraiwa says: "We will be able to support social development by our active employment of women, the elderly, and foreigners, providing various opportunities to motivated people. It is a revolutionary approach, especially for SMEs like Hiraiwa."

This approach is part of Hiraiwa's wider mission to be a good neighbor, providing efficient, safe, and high-quality construction through modern technology which is bringing construction into the digital age.



Newly completed nursing home



Perth image by BIM



Newly completed factory in Vietnam

Japan's Hiraiwa offers customers a one-stop shop from design to construction and maintenance, priding itself on the safety provided by its innovative technology. Founded in 1946, Hiraiwa recognized the need for repair works in the industry before its rivals, establishing its renewal division some 20 years ago with a focus on eco-friendly methods. This renewal work includes the retrofitting of Hiraiwa's tailor-made anti-seismic solutions, helping its customers meet Japan's strict seismic regulations. As president Toshikazu Hiraiwa explains, the company's work goes beyond simple building safety: "It is not only

Hiraiwa applies the same quality from its retrofitting to its new designs, employing industry-leading technology to ensure worker safety and customer satisfaction. Through its Building Information Modeling (BIM) system, which incorporates CG animation and VR, the company ensures there is no discord between the client's idea of a project and the proposal at the design stage.

Mr. Hiraiwa says the system has created a smoother workflow because it avoids "a long process of frequent correspondence and less efficient implementation". Among the residents, govern-

ment offices, and general contractors to have benefited from this technological approach are several nursing homes, with Hiraiwa determined to serve the needs of Japan's aging society.

Not only has the company incorporated talent from abroad, it has also expanded beyond Japan's shores and into Vietnam, where it offers Japanese quality service with local market knowledge. For now, its customer base is primarily other Japanese companies which have relocated to Vietnam and need factories or warehouses. However, there is an increasing demand across Vietnam for higher

The concrete plant specialist with a global outlook



Masatoshi Naokawa,
President and
Representative Director,
KYC Machine Industry Co., Ltd.

Founded in 1950, Osaka-based KYC is a major manufacturer of concrete batching plants and mixers, as well as other construction machinery and equipment, such as scaffolding and conveyor systems.

KYC has established international sites in China, South Korea, Singapore, the Philippines, Taiwan and Vietnam – and amid decreasing domestic

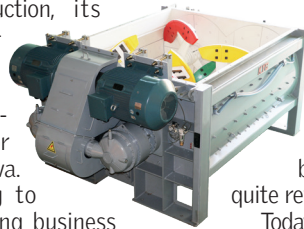
A pacesetter in Japan with over 70 years' experience, KYC Machine Industry Co., Ltd. has set its sights on international expansion and a greener future.

demand for construction, its focus is increasingly beyond Japan's borders, says president and representative director Masatoshi Naokawa.

"We're looking to expand our existing business in emerging economies, for example in Southeast Asia, because their infrastructure sector is flourishing, and their geographical proximity to Japan gives us easier access," he explains.

This strategy is the continuation of a long-held global outlook at

KYC. The firm has delivered more than 900 plants overseas in Asia, the Middle East and Africa since the 1960s, while a technical tie-up with German company BHS-Sontheim GmbH led it



to release Japan's first twin-shaft concrete mixer in 1974. "Nowadays it's a conventional technology, but back then it was quite revolutionary."

Today, KYC remains at the cutting edge of its field, having launched the Nexster twin-shaft mixer in 2020. "It's been upgraded with unique spiral blades for fast flow and homogeneous mixing, making it extremely cost effective."



KYC BP delivered to SAGA-UBE CONCRETE INDUSTRIES, LTD.

change. "Our goal is to develop environmentally-friendly products based on power saving and weight reduction, and realize a carbon-neutral society".

For example, KYC's lightweight, next-generation Iq System scaffolding "reduces the need for larger delivery trucks as it requires only half the volume of conventional framed scaffolding," Mr. Naokawa says. "This will greatly contribute to the reduction of CO₂ emissions."

KYC KYC Machine Industry Co., Ltd.

<https://www.kyc.co.jp>



Power cargo



Seraya Bridge in Singapore

A priority at KYC is to address reducing its carbon footprint from corporate activities to help to solve the problem of climate

Technology for a greener, more sustainable future



"Our strengths are the same as those of Japanese *monozukuri*: high quality, efficiency and durability."

Motohiko Nakamura,
President, Mitsui Miike
Machinery Co., Ltd.

Established in 1882, Mitsui Miike Machinery specializes in material handling systems, manufacturing transport and storage equipment for steelworks and power stations. The Fukuoka-based company's portfolio of custom-made products also includes tunnel excavation machinery, and technology for hydroelectric generation systems.

A specialist in transport and storage equipment for mineral resources, century-old company Mitsui Miike Machinery is applying its expertise in quality, custom-made technology to pursue the goal of carbon neutrality.



According to President Motohiko Nakamura, Mitsui Miike is guided by a commitment to the principles of *monozukuri*, the pursuit of perfection that underpins manufacturing in Japan. "Our strengths are the same as those of Japanese *monozukuri*: high quality, efficiency and durability," he says.

Mitsui Miike's top-selling material handling products are stackers, which stow mineral resources in an open-yard storage space, and reclaimers, which discharge the stowed materials. Currently, the firm chiefly supplies clients in the

steel industry, but the marketplace is shifting. "There have been increasing calls for carbon neutrality and there has been a reduction in steel production, so we need to investigate other propositions that respond to these trends," Mr. Nakamura explains.

As a result, Mitsui Miike has branched out into material handling equipment for biomass power plants, and is also embracing



renewable energy sources in its power transmission and generation business, including the development of hydroelectric power generation systems.



Mitsui Miike's products are sold both in Japan and around the world – and products that promote greener energy are among those that will be central to the company's goal of international sales growth, Mr. Nakamura says. For example, he notes, "we'd like to take our hydropower generators overseas and sell them in relevant markets, such as Southeast Asia".

**MITSUI
MIKE**

www.mitsumiike.co.jp/english

Yasuda Engineering: Japan's pipe jacking specialists



"We strive to ensure quality and to drive down cost, to provide excellent structures that earn the trust of our customers, and to contribute to society with our technology."

Kyoichi Yasuda,
President,
Yasuda Engineering Co., Ltd.

Today, the adoption of pipe jacking – a method where hydraulic jacks are used to thrust pipes through the ground – has become increasingly rare because maintenance of existing sewerage systems is considered a major undertaking. However, Yasuda Engineering continues to lead



Milling Mole TBM

Yasuda Engineering has developed numerous proprietary pipe jacking methods and technologies to contribute to underground infrastructure development in Japan, and is now looking to expand across South East Asia, including Vietnam.

Whilst the domestic Japanese market continues to be the base of Yasuda Engineering's main operations, the shrinking construction sector – due to the maturation of underground infrastructure development – prompted the company to expand its business in 2010 by seeking new opportunities in the fast developing economy of Vietnam, where demand for infrastructure works are high.

"Since entering Vietnam, we have hired and trained local Vietnamese engineers, and some of them have been invited to Japan to learn the pipe jacking method, which is a very unique Japanese construction method," says Noboru Yasuda, Director and General Affairs and Personnel Department GM. "And now they are among the top-class specialist technicians in pipe jacking."

Since its foray into the international market, Yasuda Engineering has also been firmly focusing on the expansion of machinery and equipment factories, as well as the

Technical Department GM. "In order to install the jacking pipe at the specified position and height, surveying at an accuracy of millimeters is required. Before we developed this method, the maximum distance that could be surveyed was about 100 meters in a straight line. However, with the Jyat method, we've made it possible to automatically survey 300 meters or more, and it is also now possible to construct perfectly curved tunnels."

Another innovative solution that Yasuda has focused on is a method to overcome the challenges of laying new pipes amidst crowded underground infrastructure. When reconstructing a pipeline network for large-scale urban redevelopment, a social infrastructure network is often already in place in those cities, with the subterranean area full of existing pipelines of various kinds.

In such a situation, metal obstacles such as PC piles and steel sheet piles left in the ground were previously not able to be excavated easily with existing pipe jacking machines or shield machines.

"It used to take a lot of time and cost because there was no choice other than to change the pipe alignment to avoid these obstacles or to dig up from the ground and remove them," says President Yasuda. "So, in 2011 we developed a Milling Mole method that is equipped with an electromagnetic wave sensor that detects metal and can be cut with a special part to penetrate obstacles. The great benefit of the Milling Mole method is that the metal can be cut into very small pieces by ultra-slow excavation, taken into the machine together with excavated mud, and transported above ground. This is a very effective method for pipe jacking work where obstacles exist on the planned line."

Fast-forward a decade later and the company's most recent R&D efforts are centered around unmanned tunnels (automated pipe jacking), not just for greater efficiency but also to improve safety in the tunnel and address the issue of a shortage of skilled operators in such a niche field like construction.

"Since operating a pipe jacking machine requires specialized skills and knowledge and it takes a long



(From right)

Kazunari Yasuda, Senior Managing Director, **Noboru Yasuda,** Director, **Takeshi Yasuda,** Managing Director

time to train new people as operators, we are working on developing machines that are easy to handle even for inexperienced people," explains Takeshi Yasuda. "At the same time, the development of automatic pipe jacking machines is urgently needed to respond to the impact on the construction industry due to the aging and declining population of Japan."

Looking forward, as well as continuing to innovate to overcome the inherent challenges of the Japanese industry, the company is planning on further expansion overseas to take advantage of developing markets where investment in new infrastructure works and projects are set to experience increased growth.

"There are always risks involved when expanding business overseas, and it is difficult to set specific target countries, but in our expansion plan we would like to cooperate with general construction companies in the Asia region and proceed with business as a specialist in pipe jacking work. Our main target would be the Japan Official Development Assistance (ODA) programs," says Kazunari Yasuda, Senior Managing Director and Overseas Business Division GM.

"We would like to make use of the experience we've gained in Vietnam and the pipe jacking specialists we've managed to cultivate locally in order to expand our business to Southeast Asian countries. We also plan to sell and rent the pipe jacking machinery and equipment manufactured in-house to overseas pipe jacking contractors, while also providing them with technical guidance," explains President Yasuda about the company's plans for the future.

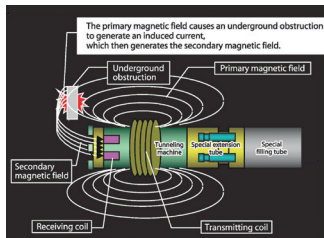


Image of Milling Mole method



Vietnam Package-G project

the field in this niche construction technique, particularly as pipe jacking works will still be required for new water, gas, and electric power supplies to homes and buildings in the future, explains Kyoichi Yasuda, President of Yasuda Engineering.

area of research and development, to support its business expansion. Initially the company purchased and outsourced all its machines, but now has more than 100 different types of in-house manufactured pipe jacking machines.

"Since developing our own machines, we've also developed the Jyat method which can construct a curved underground tunnel over a long distance by performing automatic surveying using a high-spec CCD camera sensor and LED target," says Takeshi Yasuda, Managing Director and Construction and

Okasan Livic supports building of a safer Japan

Okasan Livic, which specializes in construction solutions for Japan's infrastructure development, is focused on developing new products that can build the country's roads and railways while defending the infrastructure from natural disasters.



"We look carefully at construction sites to understand and suggest user needs."

Katsutoshi Ogawa,
President,
Okasan Livic Co., Ltd.

As both a trading company and a manufacturer of construction materials, Okasan Livic is heavily involved in Japan's infrastructure development,



Corrugated pipes

with a focus on public works projects. The typical solutions the company offers include corrugated pipes, liner plates and the multi-anchor reinforced soil wall method, among others.

"At the moment, there are a lot of public facilities in Japan that are not visually appealing, but there are projects that will amend this," says Katsutoshi Ogawa, President of Okasan Livic. "For example, our Metropolitan Expressway runs directly above Nihonbashi – Tokyo's business district and the starting point of National Highway No. 1 – and there are plans to develop the expressway itself as an underground route in order to improve the traditional landscape of the area."

There needs to be both maintenance for old facilities and new construction projects among these public works projects, Mr. Ogawa affirms. "With regard to Shinagawa, the location of our head office, the train station will be overhauled for the new railway line. It will be the starting point of the new Maglev Shinkansen, which will go to Nagoya. As a result, we expect there will be projects in the Shinagawa area for the next ten to twenty years. We supply a lot of the technology needed by the general contractors involved."

In addition to this opportunity for the company, the Japanese government is currently undertaking a large national resilience project, allocating a budget of



Multi-anchor reinforced soil method 15 trillion yen over the next five years. The project aims to reinforce existing infrastructure to prevent damage from natural disasters, of which Japan is notoriously prone. "Our company is trying to supply good techniques and materials for this, including water and sewer pipes and bridge reinforcement and restoration," says Mr. Ogawa.

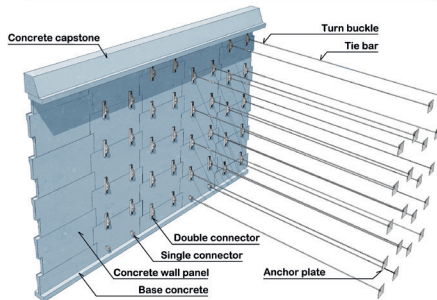
Today, a lot of Japanese general contractors are also working on new infrastructure projects, with Okasan Livic providing products



EDO-EPS method

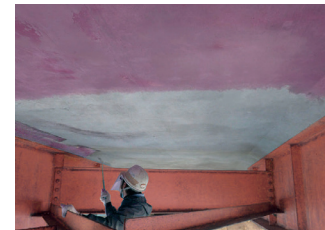
and solutions to enhance productivity and longer durability of infrastructure through technology.

Backside of Multi-anchor reinforced soil wall



"We are the company that provides construction methods as a solution, helping workers complete the project efficiently by themselves with our construction guidance if required," explains Mr. Ogawa.

For instance, EDO-EPS is the company's method that uses very light foam material, helping shorten the duration of the construction work without the need for ground improvement. Due to the high frequency of rain in Japan, the company also offers groundwater tanks, or "Geopools", made of recycled



Innerseal α (alpha)

plastic. In large-scale developments, structures for storing rainwater are often put underground, with Okasan Livic recommending the use of Geopools instead of concrete for speedy construction and greater environmental sustainability.

"With Japanese public works now focusing on national resilience and maintenance, in addition to carbon neutrality and regenerative energy, I think there will be a lot of changes in the infrastructure to align with these requirements and we will try to provide new methods to accommodate that," says Mr. Ogawa.

"The national government is focusing on how to make existing public facilities and infrastructure more durable. As we all know, Japan is a country prone to natural disasters. It's impossible to stop, but at least you can try to mitigate the damage. We have those clear targets, and we are

trying to find solutions with our R&D projects."

With the intensity of heavy rain in Japan increasing due to climate change, soil structures and natural slopes are becoming fragile resulting in more frequent landslide events. Working to address the issue, Okasan Livic has developed a special drainage reinforcing pipe to reinforce the stability of embankments prone to water-logging, particularly near vital infrastructure such as roads and railways.

"Looking back on the history of Okasan Livic, we have been in this field for fifty years and we are providing materials for civil engineering construction. We started with corrugated pipes, and since then we have



Geopool

developed many products and introduced technologies in Japan as well as overseas. We will continue supporting Japanese infrastructure into the future with our construction solutions, aiming to be a company that is loved and trusted — a group of producers with abundant creativity who will strive to realize a safe and secure society."



OKASAN LIVIC CO., LTD.
www.okasanlivic.co.jp

NIKKEN: Contributing to a recycling-based society through rental

Construction equipment rental company **NIKKEN CORPORATION** looks to promote the reuse and sharing of industrial machinery in line with the UN's Sustainable Development Goals (SDGs).



"SDG activities are not something new for us. At NIKKEN, sustainability is underlined by our philosophy to contribute to a recycling-based society through rental."

Seigo Minamioka,
President and CEO,
NIKKEN CORPORATION

Since its establishment in 1967, NIKKEN CORPORATION has been one of Japan's leading construction equipment rental businesses, today renting more than a million units of industrial machinery across the country to clients in the civil engineering and construction sectors. With its commitment to putting "safety and compliance first", the company operates its business through a network



NIKKEN LIFT (aerial works platform) of approximately 250 sales offices throughout Japan as well as facilities where it develops, manufactures, and sells its own products to adapt to the changing needs of customers.

"Alongside civil engineering and construction, we count shipbuilding yards, steel mills, power plants, and railways as the six main sectors of our business," says Seigo Minamioka, President and CEO of NIKKEN. "Whilst forestry is an area which is also being strengthened in terms of our core markets, the railroad business is one of our greatest strengths – we have the largest market share among rental companies in Japan and we are expanding overseas through our affiliates."

"As predominantly a rental company, we are not a manufacturing business, but we can produce in-house. However, it's not mass production, which is why we are already working with some outsourcing companies. We have a lot of projects in the railway sector, so in some cases we outsource the manufacturing to other firms. We do have a nationwide network, which allows us to easily communicate with our partner companies and exchange information quickly."



Fleet control center in Kobe

NIKKEN's international affiliates include PT. Berlian Amal Perkasa in Indonesia, Diamond Rental Myanmar, and T.S.K. Diamond Rental in Thailand, whilst in the used-machinery trading business, there is NDT CORPORATION LTD. in Tokyo, Americ Machinery Corporation in the U.S., and NDT (Thailand) Co., Ltd. in Thailand. "It's important to be working with other companies such as these,



Parade auction of used equipment in Narita

as we have our own limits, and exchanging ideas and strengths with other firms will greatly benefit us," says Mr. Minamioka.



Dual-track vehicle for railway

In the aftermath of the devastating earthquake that struck Japan in 2011, many railroad lines were damaged severely. In order to quickly restore the disrupted logistics network, including the railways, NIKKEN contributed to the early recovery and reconstruction of the affected areas and to the protection of the lives of the regional society by quickly supplying equipment and materials used in the construction work.

"If unfortunately another disaster occurs, we must be able to contribute to the subsequent restoration of infrastructure," says Mr.



Forestry machine

Minamioka. "But SDG activities are not something new for us in general. At NIKKEN, sustainability is underlined by our core philosophy and purpose: contributing to a recycling-based society through rental."

NIKKEN CORPORATION
www.rental.co.jp/english/



NIKKEN also has a history of procuring a variety of products for rental from both domestic and foreign sources from different countries. In recent years, it has purchased equipment to meet renewal work demand and forestry machinery from abroad. The company has also put increased emphasis on its goal of contributing to sustainability through the reuse and sharing of equipment and products in line with the UN's Sustainable Development Goals (SDGs).

"Alongside helping to establish a recycling economy, one of the SDGs that we are focusing on is preventative measures for natural disasters in Japan," explains Mr. Minamioka. "Japan is vulnerable to natural disasters, which is why civil engineering companies are strengthening their presence in disaster prevention activities, with a lot happening in that sector".

Reinforcing the development of the industrial world with energy-saving and originally developed technologies

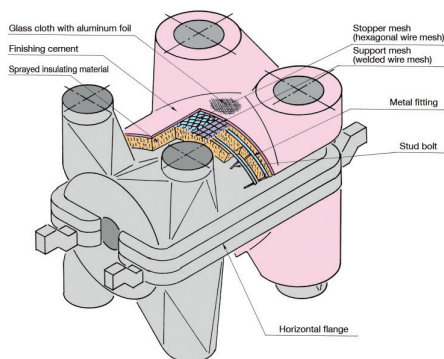


"We are extremely proud that our insulation technology greatly contributes to the realization of a carbon-neutral society and the efficiency of a facility."

Fumio Uchikawa,
President,
Fuji-I-Tec Co., Ltd.

With insulation as its main business, the letter 'I' in Fuji-I-Tec's name represents 'insulation technology', one of several areas in which the company specializes.

"When a plant such as a power generation facility is installed,



Spraying insulating model

we apply insulation, soundproofing, and corrosion-resistant paint. We perform remarkably in these areas, and we will continue to concentrate on these technolo-

gies," company president Fumio Uchikawa proudly states.



Construction site in Hong Kong (CLP Power D-Station)

The power generation industry, in its previous iteration, was an extremely stable one, with highly developed methods and well-honed approaches, meaning companies such as Fuji-I-Tec were able to perfect their business. However, in 2016, the Japanese government decentralized and liberalized the industry, meaning downstream companies were required to reappraise their methods, including Fuji-I-Tec. Furthermore, environmental and energy-saving measures have become paramount, and no more so than in the energy industry. This has provided Fuji-I-Tec with a great opportunity to adapt its originally developed products and services by applying energy-saving technologies, and therefore making a great contribution to the development of the industrial world.

Such a reconfiguration of approach requires a company-wide

that innovative path: "Make it earlier and better".

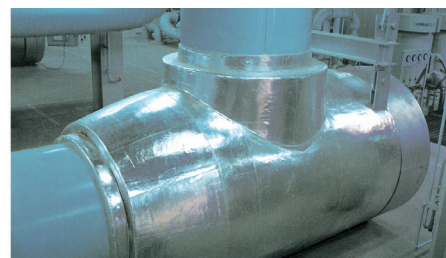
"We want to keep enhancing our comprehensive technological capabilities, aiming to build a company that can provide customers with more satisfaction and reliability in the future," Mr. Uchikawa explains. "For example, we are extremely proud that our insulation technology greatly contributes to the realization of a carbon-neutral society and the efficiency of a facility."

One technology developed to help achieve these goals is Fuji-I-Tec's FIT-type spray method, which is mainly used for large turbines in power generation equipment. It combines mineral wool and a heat-resistant binder, which in turn, creates insulation that is cost-effective and has less of an environmental impact. The conventional insulation method can often be expensive and prone to deteriorate quickly. However, with the FIT-type spray method, the turbine is covered with a cage

adherence to a certain spirit, one which will help Fuji-I-Tec to fearlessly and purposefully head towards its future ambitions. The company's motto provides the underpinning for

and the heat insulating material fills the inside so that a uniform heat insulating layer without gaps can be formed. Therefore, the heat insulation effect is much better than conventional methods. This FIT-type spray method can be applied not only to turbines but also to various types of equipment such as piping, valves and pumps.

An exciting area of growth for Fuji-I-Tec is the company's expansion overseas. With the help of plant construction firm Taihei Dengyo Kaisha, Ltd., which is a



Finished article (spraying insulation)

major shareholder of the company, Fuji-I-Tec has started to make its presence felt in South-east Asian countries.

For instance, it has recently partnered with a company called Kum Shing Group to carry out maintenance work in connection with CLP Power Hong Kong Limited, one of the two electric companies in Hong Kong. With a long-term maintenance contract spanning four-to-five years, the firm is aiming to collaborate with more local companies in Hong Kong.

As recognized by Mr. Uchikawa, a good company ensures high levels of trust from its customers and has an acute awareness of the contribution of its employees to its company, all while creating a work environment that inspires and rewards a job well done. Following these principles, Fuji-I-Tec will continue to contribute to an extremely bright future for all stakeholders.



Head office staff

Committed to contributing to the realization of a sustainable society through iron recycling



"As a member of the iron recycling industry, we would sincerely like to create a carbon-neutral society and occupy an honorable position."

Masaaki Katsuyama,
President,
Fuwa Metal Co., Ltd.

With the immediacy of the climate crisis, it is easy to think of recycling companies as recent ventures, but some, such as Japanese iron recycler Fuwa Metal Co., have over a century of experience.

Founded in 1908, in the decades after Japan first began to modernize after the fall of the Edo shogunate, Fuwa Metal was pushing innovation in the iron recycling sector as the country's domestic steel production grew to surpass even that of the United States in the 1970s, until it



Expanding the business overseas was surpassed by China around the start of the 21st century.

Due to Japan's scarcity of natural resources, manufacturers

For more than a century, Fuwa Metal has contributed to the recycling of resources and the development of the recycling industry as a leading company in the collection, processing and sale of steelmaking raw materials.

have always placed importance on efficiency and recycling, with the country striving to make the most out of every manufacturing process. Fuwa Metal encompasses this philosophy perfectly, collecting, sorting, and processing scrap iron from shipyards, automobile manufacturers, and other sources. This scrap is then made into steelmaking raw materials for new products, creating a sustainable life cycle for the iron after its initial use.

Given the decrease in Japan's consumption of steel in the 1990s, Fuwa Metal diversified into the trading business and has now grown into a three-office operation in the United States since establishing Fuwa Metal USA in 2007. Company



Speedy processing ability

president Masaaki Katsuyama explains that Fuwa Metal helped revolutionize logistics in the USA when it focused on the idea of using empty shipping containers being sent to Asia to transport iron scrap, and it now offers local companies cost minimization solutions through its nationwide alliances built from its offices in New York, Los Angeles, and Texas.

Mr. Katsuyama understands the rapidly changing market and has an eye on setting up an office in Southeast Asia. Having first began importing from Southeast Asia in 1982, the company has strong ties in the area and its overseas division collects information from each country before conveying it to the entire company so quick decisions can be made. As



Pursuing the highest quality

Mr. Katsuyama explains: "When we have a big contract or a meeting, we try to spread the knowledge both in Japan and overseas by appointing our own employees without outsourcing. Based on this 'circle of trust', we would like to foster good relationships with overseas business partners."

As part of the recycling industry, Fuwa Metal understands the need to move towards a more sustainable, carbon neutral world. Indeed, recycling iron scrap raw materials using electric furnaces results in a quarter of the carbon dioxide emissions caused by the blast furnace manufacturing method that manufactures steel from iron ore. This means iron scrap is not simply a sustainable resource, but a trump card for becoming a carbon-neutral world.

At its core, Fuwa Metal is a modern family business, with Mr. Katsuyama the first non-member of the family to become president as the company modernized in 2016. The business retains the strong ties between employees that a family company creates, but with the added benefit of listening to wider views to make decisions. As Mr. Katsuyama details:

"The philosophy inherited from the former president is 'do not hesitate to challenge and don't be afraid of failure.' I would like employees to take on this challenge positively." This philosophy has put the company in good stead, with transactions increasing from 800,000 tons in 2020 to 1.2 million tons in 2021, and projections for a 100,000-ton increase a year for the foreseeable future.

As companies and industries around the world look to shift to more sustainable practices, most are looking forward to find solutions. However, companies such as Fuwa Metal that have the ability to look back on a long history of creating sustainable solutions to help create the future will be key. Fuwa Metal's idea that "people can change the environment" is fundamental and enables the company to coexist and develop with the societies around it. As the company continues to grow, the societies which can benefit from its innovation will also expand, which is for the good of all.



www.fuwa.co.jp/en

Paper technology revolutionizing the field of functional materials

From manufacturing traditional washi paper to advanced filter mediums, Awa Paper has kept pace with changing demands for paper technologies.



"We have global ambitions for our special and functional papers."

Yasuhiro Miki,
President, Awa Paper &
Technological Company, Inc.

Based in Tokushima, an area surrounded by rivers and mountains, Awa Paper is blessed with an abundance of the raw materials necessary for continued success in the paper-making industry. The firm mainly



M-fine Unit

serves the automotive and the water treatment industries, making significant efforts in developing membrane support fabric for Reverse Osmosis membranes in desalination plants. As water scarcity is becoming a more significant issue all over the world, Awa Paper is emphasizing the recyclability and reusability of water, breathing new life into the sector.

Awa Paper aims to provide better features and solutions to com-

panies that want to improve the run-off quality in their wastewater facilities. The company's leading product in water-treatment, M-fine, is a flat-sheet membrane for membrane bioreactors, boasting the guaranteed quality and excellence synonymous with the company's paper filtration technologies.

Awa Paper has also developed a MBR wastewater treatment system called "M-fine Package", designed for small-scale municipal and industrial applications, which can bring benefits such as easy installation, small

footprint, and low maintenance work. This packaged



M-fine Package

system technology could lead to a recycling system, "meguri", a closed-loop sewage treatment system which



M-fine Unit

treats sewage with M-fine filtration technologies, putting the high-quality permeated water through a recycling process that allows it to be reused for flushing toilets, watering gardens or for agricultural use. "meguri" does not require water pipes, nor connection to the grid due to its capacity to run on solar. These cutting-edge products provide an example of Awa Paper drawing on its 100-plus-year history to overcome present and future challenges.



PPE that provides peace of mind

Since 1934, Yotsugi has been a trusted supplier of high-quality personal protective equipment for electrical workers, not only keeping its wearers safe but also ensuring maximum comfort.

Based in Tokyo, Japan, Yotsugi boasts nearly 90 years of experience as a manufacturer of personal protective equipment (PPE), specializing in high-voltage insulating gloves, clothes and boots for electrical workers.

Yotsugi's commitment to quality – a trait typical of Japanese manufacturing – sets it apart from its



EVA Blanket

emerging Asian competitors, says president Naoto Yotsugi: "Consumers pay attention to the countries where their products come from, and they prefer the high-quality products that Japanese companies like us can provide.



TECHNO Factory

"People use PPE to protect their lives, so quality matters more than price. Some Southeast Asian countries might offer a cheaper price, but people understand the importance of durability and the potential risks involved.

"We've earned the trust of our customers at electrical companies by protecting the lives of their employees who work with high-voltage equipment."

Yotsugi PPE offers not only safety but also comfort, Mr. Yotsugi says: "Seeing is believing. Once you try on our products, you'll experience for

yourself how easy it is to move in them. We've consistently received positive feedback from users who say it's easy to operate while wearing our equipment."

With Japan's aging society leading to domestic labor shortages, Yotsugi has established a production plant in Vietnam – a move also aimed at capitalizing on the emerging Southeast Asian market. "Developing countries such as Southeast Asian countries are experiencing a



Rubber glove



Rubber sleeve

boom in infrastructure and growing population density, so our product line-up will be seeing an



"We've earned the trust of our customers at electrical companies by protecting the lives of their employees who work with high-voltage equipment."

Naoto Yotsugi, President &
Director of Yotsugi Co., Ltd.

increase in demand there," Mr. Yotsugi explains.

Yotsugi is also interested in expanding to Europe, North America and South America, as Mr. Yotsugi says: "These markets are large and attractive for developing new sales channels."



Illuminating the path towards unique products of the highest quality

Since its foundation, GENTOS has been offering products and services that are essential in our lives. After introducing flashlights, headlights, lanterns, and other products equipped with white LEDs to the Japanese market, GENTOS is now ready to take on the challenge of diversifying into new markets.

A light failing in our homes means the bothersome task of switching the bulb. But in an industrial setting, lights must ensure the safety of hundreds of workers at a time, otherwise countless lives would be exposed to danger. Therefore, only high-quality lights that have undergone rigorous testing to ensure their reliability should be used, and Japanese manufacturer GENTOS is one of the world's leading companies for such products.

Founded in 1978, GENTOS uses the Japanese philosophy of *monozukuri* to create unique lights which meet the American National Standards Institute's strict standards. The company's products range from



industrial lighting to flashlights, headlights, and lanterns. GENTOS prides itself on being able to provide variations and options with added value to satisfy each customer's needs, as company president Makoto Okazaki explains: "Our extensive knowledge of the industrial applications of LEDs is an advantage for us when it comes to introducing smaller-sized and customized products."

With 20 years of experience in flashlight production, the company has an eye on expanding into the Ameri-



can and European markets, where its superior quality products can help the company to grow.

GENTOS' products not only pass industry testing, but continue to work well in the long run thanks to the quality and reliability for which the company is renowned.

Having established a strong base in both its B2B and B2C operations, GENTOS expanded into Thailand in 2016 where it has manufacturing facilities overseen by Japanese personnel to ensure the *monozukuri* mindset is followed. Mr. Okazaki explains that: "in order to grow as a company, we are



"In order to grow as a company, we are always seeking out new sectors. We will always rise to the challenge even if we lack expertise."

Makoto Okazaki,
President, GENTOS Co., Ltd.

always seeking out new sectors. We will always rise to the challenge even if we lack expertise, and we will continue to do so in 2022." As GENTOS continues to expand and diversify, it will remain a shining light for quality and reliability.

GENTOS®
www.gentos.jp

World leader in gas sensing innovation

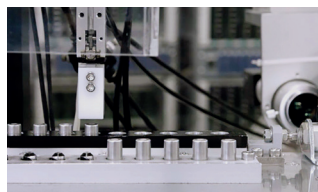
Leveraging over 50 years of expertise, Figaro Engineering offers a wide array of gas sensor products for the detection of explosive and toxic gases, as well as air quality sensors.

Since its founding, Japanese gas sensor manufacturer Figaro has been at the vanguard of gas sensors, beginning commercial production of the world's first semiconductor type gas sensor in 1969, while the company continues to lead the way in top-class reliable gas sensors. As company president Toshihiro Uda explains: "We understand the critical nature of our products that ensure the user's safety. Even low defective rates wouldn't be considered acceptable in Japan, and this rigorous Japanese approach to quality and defects is what distinguishes us."



Office

Figaro's combustible gas sensors are widely used for residential and RV gas detectors in Japan, the U.S.A., Europe, and many Asian countries. The Japanese firm also supplies a variety of air quality sen-



Factory

sors to home appliance, HVAC, and automotive industries around the world; while its industry-leading electrochemical CO sensors have earned the company almost 50% of the global market share.

Figaro's TGS8000 Series is developed by combining its extensive expertise in gas sensing materials with MEMS technology. Their new MEMS type methane sensor has some of the lowest power consump-

tion in the world, while the ultra-compact size of its new CO sensor allows for a wider range of applications with flexibility in gas detector design. These new products can facilitate their usage in battery-operated gas detectors that can be installed anywhere without the limitation of a main power source, bringing gas sensors into the age of IoT and ICT. With indoor air control becoming a priority for customers, Figaro's CO₂ sensors act as indices of ventilation and can help ensure buildings comply with regulations on CO₂ levels.

With a vast distribution network reaching 49 countries and production facilities in China, Figaro is creating safer and more comfortable environments across the world, allowing its customers to relax knowing that industry-leading technology is protecting them.



Toshihiro Uda, President
& Representative Director,
Figaro Engineering Inc.



Gas Sensors

FIGARO
www.figaro.co.jp/en