

# 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 64' 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 Hiraiva, 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, Hiraiva 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 Hiraiva president Toshikazu Hiraiva. "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 ICECRETE.

"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."

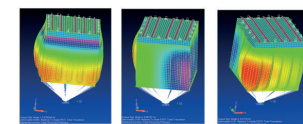
As a specialized manufacturer of gas sensors and modules, Figaro Engineering made heavy investment into its R&D capabilities, allowing the firm to design leading MEMS sensor technology. "Our battery operable sensors can be utilized in wireless and portable devices. To that end, we are expecting to expand 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.

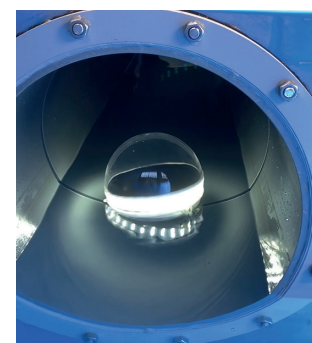
Having already had various successes overseas – Brazil, Sri Lanka and Indonesia to name but a few – NSC's integrated approach provides the backbone of its success. President Kazunori Mayama explains: "So far, we have accumulated knowledge overseas through the work of planning and designing of many water 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.

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