

The shape of things to come

Comprising five different ferry brands, SHK Line Group is Japan's leading ferry operator. Yasuo Iritani explains to Philippe Holthof why the company is at the forefront of autonomous shipping in a country that is contending with labour shortages and environmental challenges



Unlike their European peers, Japanese ferry operators have arrived late to the party when it comes to alternative fuels. Exactly 10 years after the introduction of Viking Line's Viking Grace, the world's first large ro-pax ferry powered by LNG, Japan's MOL Ferry introduced Sunflower Kurenai on 13 January 2023. To be followed by sister ship, Sunflower

Murasaki, in May, Sunflower Kurenai is the first large LNG-powered ro-pax ferry to operate in Japanese waters. SHK Line Group, however, is maintaining a 'wait-and-see' attitude to the fuel.

The pathway towards net-zero greenhouse gas (GHG) emissions is a long one and whilst LNG was initially proposed as the solution for meeting the 0.1 per cent sulphur cap in Sulphur

Emission Control Areas (SECAs), its impact on GHG emissions is highly dependent on methane slip at the production, distribution and operational levels. Japan is not a 0.1 per cent SECA yet which may partially explain why SHK Line Group and other domestic ferry operators have been hesitant to burn LNG as an alternative, cleaner fuel. According to SHK Line Group president Yasuo Iritani, there is good reason why his company has not implemented LNG propulsion yet.

"From an environmental standpoint, LNG is currently a good alternative fuel," he says. "However, the unstable supply chain for LNG remains a huge problem. Our conventional ferries primarily operate long-distance routes at rather high service speeds, so we really need a lot of fuel [storage space]. This, combined with short port stays, makes LNG operation extremely challenging. Rather than walking down the LNG path, we primarily look at methods to reduce fuel consumption and our carbon dioxide footprint."

Fuel efficiency is at the heart of the design of SHK Line Group's latest generations of ferries. This is why Shin Nihonkai Ferry's 2017-built



The signature atrium on SHK Line Group's latest generation of ro-pax ferries



Hamayu and sister ship Soleil were built for Tokyo Kyushu Ferry and serve the new 527-nautical-mile route between Yokosuka and Shinmoji during the summer season

vessels, Lavender and Azalea, were both equipped with the Mitsubishi Air Lubrication System, which blows air bubbles from the bottom of the vessel's hull to reduce friction and – Mitsubishi claims – increase energy efficiency by 10 per cent. However, SHK Line Group opted not to install the technology on Hankyu Ferry's 2020-built Settsu and Yamato ferries, or Tokyo Kyushu Ferry's 2021-built Hamayu and Soleil.

“The system has proved to be ineffective on fast conventional ferries with a thin hull,” explains Iritani. “Hull optimisation is the name of the game. The naval architects who designed the 23.5-knot Settsu, managed to achieve a six per cent increase in energy efficiency compared to earlier vessels, whilst the vessel is equipped with two ultra-economical Wärtsilä 14V31 main engines.”

SHK Line Group's efforts to decrease environmental pollution extend beyond improving energy efficiency. The ferry conglomerate pioneered the use of exhaust gas cleaning systems (scrubbers) among Japanese ferry operators. Settsu was Japan's first ro-pax newbuild to be delivered with a hybrid scrubber. Scrubbers have also been installed on subsequent newbuilds, while six existing

ro-paxes have been retrofitted with open-loop scrubbers.

European – and particularly Norwegian – operators have shown the way forward when it comes to the hybridisation and electrification of ferries, as well as investments in shore power facilities on ships and in port. But what is the situation in Japan?

“We are considering some form of hybridisation as our next generation of ferries may come with batteries,” says Iritani. “We have experience with shore



“The ultimate goal is to develop a fully autonomous Smart Coastal Ferry”

ONE GROUP, FIVE DIFFERENT FERRY BRANDS

SHK Line Group controls five different ferry brands: Hankyu Ferry, Kampu Ferry, Shin Nihonkai Ferry and its Tokyo Kyushu Ferry affiliate, and the freight-only operator Suzhou Shimonoseki Ferry (SSF).

SHK Line Group was founded as Shimonoseki-based Kanko Kisen in 1948 by Toyokuni Iritani. In 1968, he pioneered a ‘Motorway of the Sea’ service between Kokura and Kobe under the Hankyu Ferry banner. Following the success of Hankyu Ferry, Iritani established Shin Nihonkai Ferry in 1969 and today, the brand has eight ro-pax ferries and is the backbone of SHK Line Group's ferry operations. It also controls Tokyo Kyushu Ferry. Both Kampu Ferry and Suzhou Shimonoseki Ferry operate international ferry services, connecting Shimonoseki with Busan in South Korea and Taicang (Taiso) in China, respectively.

SHK Line Group remains in the hands of the Iritani family with the descendants of Toyokuni Iritani standing at the helm of the respective subsidiaries which hold each other's shares.



The planetarium on Hamayu

power but it had no effect for us. Besides the installation cost for shore power facilities, the power delivered to the ships doesn't come cheap. As per our experience it's not a cost-effective solution. As earlier pointed out, many of our services are characterised by long sea journeys and short turnarounds, so the environmental benefits of switching to the onshore grid when alongside is marginal."

In addition to the environmental challenges, Japan is experiencing the effects of an ageing society. More than half of the crew members currently working on ferries are over 50 years old and the industry is struggling to attract younger workers because they are not prepared to be away from home for long periods of time. Automation and artificial intelligence technology could potentially provide a solution to tackle the shortage of deck and engine crew, but passenger ships will probably always require a minimum number of human staff to help evacuate passengers in case of an emergency. SHK Line Group has been an active partner in The Nippon Foundation MEGURI2040 Fully Autonomous Ship Program, a stepping stone towards fully autonomous shipping. In January 2022, Shin Nihonkai Ferry subsidiary Tokyo Kyushu Ferry successfully conducted an autonomous seven-hour trial onboard the 2021-built, 31,408gt Soleil. The industry-first trial was

carried out by a consortium comprising Mitsubishi Shipbuilding (which built Soleil) and Shin Nihonkai Ferry.

"These autonomous trials were part of a one-year project with Japan's Ministry of Land, Infrastructure, Transport and Tourism and the main purpose was to acquire data for practical use," says Iritani. "We were able to collect

"The ferry trip is not just a means of transportation as we have devised ways to enjoy the onboard life"

all required data. When built, Soleil had an automatic manoeuvring system capable of automatically navigating along the planned route, avoiding obstacles based on radar and image analysis system information.

"During the January 2022 trials, Soleil proceeded while judging the situation on the spot, detecting ships ahead and passing them automatically. In addition, it was equipped with various systems that

remotely monitored the engine and also predicted failures. The chief engineer of Mitsubishi Shipbuilding commented that the demonstration of unmanned navigation and its practical application was 50 per cent complete at this stage. However, he also told us that certain operations had to be dealt with manually, something that needs to be addressed in the future. The ultimate goal is to develop a fully autonomous Smart Coastal Ferry."

Operating under the wings of Shin Nihonkai Ferry, Tokyo Kyushu Ferry, is the latest addition to the SHK Line Group portfolio, serving the 21-hour Yokosuka-Shinmoji route since 1 July 2021. Although purpose-built for this new six-times-weekly service, Soleil and sister ship Hamayu were replaced by Shin Nihonkai Ferry's Suzuran and Suisen in November 2022. The latter two vessels are pretty similar in size to their predecessors but have a higher passenger capacity and a somewhat lower cargo intake.

"The new route has been well received in the market on the grounds that there aren't many ferries connecting the Tokyo and Kyushu areas," says Iritani. "The 527-nautical-mile distance is far more comfortable by ferry than by car. We aim to offer a cruise ferry product with typical Japanese facilities such as a large public bath with a view, an

open-air bath, a sauna, a planetarium, and a cinema. The restaurant is very popular, offering a variety of seasonal menus with local ingredients from Kanto and Kyushu.

Soleil and Hamayu now operate on the 'Pacific side' of Honshu and Kyushu. "We have experienced increased passenger demand during the winter season and lower demand during the summer months on this route," says Iritani. "It's just the other way around on the 'Sea of Japan side', which is the very reason for the tonnage swap."

Generally, ferry operations in Japan are entirely different from those in Europe, with food and beverage vending machines often replacing expensive catering staff.

"To a certain extent, the Japanese ferry market follows the European model with utilitarian ro-pax ferries on the one hand and those that aim to offer a cruise ferry-like product on the other," says Iritani. "Admittedly, Japan's cruise ferry culture is a far cry from Europe's and although SHK Line Group has a high penetration in the passenger market, the transport of unaccompanied freight trailers remains our bread and butter. Having said this, we do our utmost to differentiate ourselves from our competitors with the comfort level of our ferries. The ferry trip is not just a means of transportation as we have devised ways to enjoy the onboard life."

"In addition, we are gaining support from families travelling by car," Iritani continues, adding that, just like in other parts of the world, Japanese ferry operators have lost passengers to cheap airlines.

Until early January 2023, SHK Line Group also operated the 1998-built cruise ship Pacific Venus under the Venus Cruise banner. Cruises were suspended during the pandemic and although they resumed in March 2021, SHK Line Group decided to pull the plug on its cruise affiliate, with Iritani blaming the difficult business environment in the wake of Covid-19. **CFR**



Hamayu and Soleil offer cruise ferry amenities, including deluxe suites and public baths. Although public baths are common on Japanese ferries that operate long-distance routes, the outdoor iteration onboard these ships is a new innovation