



The liquefied hydrogen carrier 'SUISEI FRONTIER', which uses stainless steel produced by NSSC for its tanks, won the world stainless Industry Silver Award.

## NIPPON STEEL Stainless Steel Corporation: Delivering value-added products to customers and the world

**NIPPON STEEL Stainless Steel Corporation's (NSSC's) business strategy is to refine its advanced technology to deliver high value-added stainless steel products while also improving the quality and productivity of its generic grades. It communicates closely with customers to propose solutions by using its distinctive products effectively to minimise environmental and economic costs. Stainless Steel World spoke to Mr Akihiko Inoue, Representative Director and President, about the company's business strategy, innovative products, and how it is helping to change the world.**

By Joanne McIntyre

"Our goal is to contribute to society with stainless steel, and we do our utmost to fulfil that role required as a basic material industry, especially in this time of rapid change," begins Mr Inoue. "We appreciate and actively utilise open communication from customers who tell us what they really need. In response, we will continue to improve our capabilities and hope to benefit the world." Unprecedented global developments, such as COVID-19 and Russia's invasion of Ukraine, continue to impact the stainless steel business. Mr Inoue explains:

"For many years, the stainless steel industry has been in a state of oversupply on a global scale, and recent global developments have changed the environment even further. The pandemic is now in its third year, resulting in ongoing supply chain disruptions. Raw materials prices have been volatile, with the cost of nickel, our primary raw material, skyrocketing. All of these factors are resulting in stagnation in the economy, and therefore in demand." "Within Japan, while the demand of broad industrial segments are

expected to undergo recoveries, the slowdown in automobile production casts a shadow over the economic situation, and it is still difficult to predict the outlook for stainless steel demand. In view of such an economic outlook, we are striving to establish a strong business foundation to secure stable profits in any economic circumstances through "Production Facility Structural Measures". The company was upgraded and developed through the succession of the stainless steel sheet business from the former Nippon Steel & Sumitomo Metal Corporation and the former

Nisshin Steel Co., Ltd. Following this succession in 2019, NSSC set about streamlining its operations. "We are in the midst of structural measures to reduce the scale of production by about 20 percent while at the same time optimising efficiencies to vastly improve profitability compared to the time of the succession," explains Mr Inoue.

### Proposition of industry under paradigm change

"An emerging trend we've witnessed is a shift from people valuing objects, such as a big house or luxury car, to valuing experiences, such as activities and having fun. As a result, objects are increasingly becoming mere tools to achieve those goals. An example is the commodification of the car: if you need transport, you call an Uber, and the critical factors are how quickly and cheaply you can complete your journey, not what brand the car is. I believe that as manufacturers, we are now in a situation where we

must demonstrate our significance and contribution to society. This does not necessarily require significant change: after all, if the price is the same, you would prefer a higher-quality item. We must therefore continue to develop the technological advances in which we excel. For example, customers will be pleased if we can manufacture a cheaper, more corrosion-resistant and durable product with the same functionality as an existing product." "There is a broad spectrum when defining the quality of a product, depending on how the end customer will use it," continues Mr Inoue. "As we know the exact characteristics, advantages, strengths and weaknesses of our materials, we can offer suggestions to customers on how they can use the material to their best advantage. Furthermore, we strive to continuously improve the quality of our distinctive products and provide knowledge on how to use them. These two factors allow us to create value."

### Strategic product applications

"While NSSC helps customers to minimise costs with a range of improvements to its products, it also offers a range of distinctive products. Higher strength means thinner, lighter material can be used, higher corrosion resistance extends the lifespan of projects and these characteristics enable us to contribute to creating eco-conscious society," explains Mr Inoue. For example, NSSC's proprietary duplex stainless steels NSSC2120™ and NSSC™2351 have high strength, high corrosion resistance, and improved weldability. A reduction in the proportion of alloying elements combined with other measures has lowered the cost of the alloy while increasing strength and corrosion resistance. In addition, it has price stability. By adding NSSC™2351, which was released as a product to commemorate the integration of NSSC, to NSSC2120™, the company has created a lineup that can replace generic grade stainless steel SUS304 and SUS316.

### Struggle against climate change



NSSC develops products which help in the struggle against growing environmental pressures. One example is the application of duplex stainless steel for sluice gates and land lock gates throughout Japan. They serve as a countermeasure against tsunamis in the event of earthquakes, floods and landslide disasters that are intensifying with global warming, contributing to national resilience. One specific example is the Kamihirai Flood Gate (pictured), Japan's largest stainless steel floodgate. Carbon steel plate floodgates installed to prevent tsunami damage in 1970 was replaced with stainless steel plate by this year. Recently, other examples have begun to appear in Southeast Asia and other countries.





The intake weir of the Makinokuchi Power Station in Miyazaki Prefecture received the ISSF Sustainability Bronze Award.

“Customers get the same performance with less cost thanks to its high strength. It’s a great example of how we are using technology to produce superior products,” Mr Inoue states.

“NSSC2120™ is used in various applications, from infrastructure such as water gates, land locks for tsunami countermeasures, and bridges, to tanks and building materials. NSSC2120™ was used in the intake weir of the Makinokuchi Power Station in Miyazaki Prefecture, which received the world stainless (formerly ISSF) Sustainability Bronze Award. In the past, the weir was constructed from rubber, but it was often damaged by boulders during flooding. Therefore, our alloy-saving stainless steel NSSC2120™, which has excellent wear resistance, was adopted as the material for the gate, contributing to the longevity of the intake weir. In receiving this award, it was rated highly as a pioneering example of the use of stainless steel in the construction of intake weirs for hydroelectric power plants, which are a valuable source of renewable energy.”

Proprietary duplex stainless steel NSSC™2351 has been adopted for chemical tankers. “NSSC™2351 has higher strength and corrosion resistance than SUS 316L with a reduced proportion of rare metals

such as nickel and molybdenum. It is an outstanding high-performance steel grade and is expected to be widely applied to fittings such as parts for food tanks and sewage treatment plants.”

#### Awards for environmentally positive products

“One of our products was recently used in the liquefied hydrogen carrier ‘SUISO FRONTIER’, which won the world stainless Industry



A stainless steel truck frame reduces life-cycle costs and weight, allowing car carriers to carry more vehicles.

Silver Award. The award recognised our contribution to creating new demand for stainless steel as part of our efforts to realise a carbon-neutral society.”

The roof of the Japan National Stadium won the highest award at the 19<sup>th</sup> Japan Stainless Steel Association Awards hosted by the Japan Stainless Steel Association. The roof uses SUS445J2 (NSSC™220M), a highly corrosion-resistant coated ferritic stainless steel sheet.

“Completed in 2019 and representing Japan, the National Stadium is designed as a high quality and long-lasting facility with a lifespan of at least 100 years,” Mr Inoue states.

Painted SUS445J2 (NSSC™220M) stainless steel sheet was selected as the base material to realise this design concept. The corrosion resistance of SUS445J2 (NSSC™220M) exceeds that of SUS316, a generic austenitic high corrosion-resistant stainless steel, and is a resource-saving stainless steel that does not contain nickel. The linear coefficient of expansion of ferritic stainless steel is about 60 percent of that of austenitic stainless steel, which suppresses deformation and distortion due to temperature changes, making it possible to extend the lifespan of roofs. Furthermore, the highest level of white paint was used to reflect sunlight and prevent high temperatures inside the stadium.



The roof of the Japan National Stadium, which is constructed from grade SUS445J2 (NSSC™220M), won the highest award at the 19<sup>th</sup> Japan Stainless Steel Association Awards. Copyright: JAPAN SPORT COUNCIL

#### Carbon neutrality and sustainability

In the company’s goals to achieve carbon neutrality and greater sustainability, Mr Inoue illustrates two ways that NSSC helps its customers. “Firstly, we are reducing the amount of CO2 emitted during production. As the world’s electricity becomes greener, we are working hard to develop technology that meets these challenges. We have set up a working group to look at carbon neutrality in the manufacturing process, including young engineers, who are tasked with carrying out studies on this topic.” “Secondly, our products help our customers achieve carbon neutrality and de-carbonisation; because our distinctive products possess features that help make customers’ products carbon-neutral. An immediate example is double-decker car carriers. The use of NSSC2120™ was especially beneficial for reducing the weight of these trucks, which today are increasingly transporting electric vehicles (EV) that contain heavy batteries. The heavier weight of EVs means fewer can be transported per truck. The adoption of duplex stainless steel reduced life cycle costs and reduced the weight of the truck frame, allowing it to carry more vehicles. This improves transport efficiency, increases fuel efficiency and reduces emissions.”



*“Our goal is to contribute to society with stainless steel.”*

*Mr Akihiko Inoue, Representative Director and President, NSSC*

“New demands in the expanding new energies sector must also be met. I believe the world is urgently hoping for the development of materials that contribute to the hydrogen society expected to play such an essential role in all of our futures. To help achieve this, we have created the New Energy Application & High Alloy Marketing Team. Led by one of our officers, this team is accelerating the process of assessing market needs, conducting research and developing new products. Nearly a year has passed since the team was created; many ideas have arisen, and several have been acted upon. We have developed and commercialised products for the hydrogen environment. We will quickly supplement new demand not only for hydrogen but also for all new energy fields.”

“There is a great deal of uncertainty about energy sources for the future and which way the world will choose to go. We must move quickly to deliver the materials the world needs as soon as that need arises.”

#### Key message

Mr Inoue concludes by reiterating NSSC’s core philosophy. “Our business strategy is to refine our technological advances to deliver high value-added products while also improving the quality of generic grades. We can then propose solutions for using them effectively. Our goal is to contribute to society with stainless steel, so we do our utmost to fulfil that role, especially in this time of rapid change. We continue to improve our capabilities and hope to benefit the world.”