

# Nippon Steel & Sumitomo Metal Corp. – Innovative materials for a changing world



**In the three years since Stainless Steel World last featured Nippon Steel & Sumitomo Metal Corp., the market has changed dramatically. The company continues to adapt and innovate and for the years ahead, continuing to strengthen its manufacturing capabilities, as well as the development of products to address the evolving customer's needs. Stainless Steel World met with Mr. Akira Shirakawa, Senior Manager of Marketing & Customer Service at the company's office in Düsseldorf, Germany, to learn more about the company's plans and how it continues to succeed in an increasingly demanding marketplace.**

*By Joanne McIntyre*



*NSSMC is accelerating its development of high tensile products and highly corrosion resistant seamless pipes and tubes.*

- Strengthening and expanding the global business;
- Continuing to strengthen “manufacturing capabilities” of domestic mills.

Mr. Shirakawa explains; “Adoption of Paris Agreement reinforces corporate responsibility to contribute to the achievement of a sustainable society. NSSMC will develop materials to meet the needs and expand its offer of solutions.”

“High tensile products and highly corrosion resistant seamless pipes and tubes will be more in demand - NSSMC will accelerate development of materials to meet these demands in this new era.”

Mr. Shirakawa continues; “NSSMC is, in fact, the only manufacturer that can produce a steel tube of manufacturable range from small diameter to large diameter in almost all kinds of steel types (carbon steel, stainless steel, nickel base alloy) and all manufacturing methods (seamless, ERW, UO).

### **Manufacturing capabilities of domestic mills**

The foundation of NSSMC’s future strategy will be to expand its offering in the oil and gas, energy, petrochemical, offshore and semiconductor business fields by leveraging its product technology capability, cost competitiveness, and global supply network. Mr. Shirakawa continues; “A key element of this will be meeting overseas demand with a

combination of high-grade exports from Japan.”

Closer to home NSSMC continues to develop a manufacturing framework, strengthening the manufacturing capability and improving these as bases for technology development, cost competitiveness and productivity. NSSMC are committed to providing a stable supply of steel products.



*The company’s future strategic plans on leveraging its product technology capability, cost competitiveness, and global supply network.*

In March, NSSMC released its 2020 Mid-Term Management Plan consisting of a three-year plan for the fiscal year 2018 through 2020. With the world economy expected to remain strong, global steel demand is projected to steadily increase over the long term. The stainless sector will enjoy increased growth in the energy, LNG (generation and demand) and petrochemical industries. With this in mind, NSSMC is working on major initiatives, the three main pillars of which are:

- Delivering materials & solutions responsible for changes in society and industry;



*The company's mother mills in Japan are committed to providing a stable supply of steel products both in Japan and overseas.*

## Speciality tubular products

In the chemical and petrochemical industries, NSSMC has captured a major share in the heat exchanger market by raising the value of products to meet its customer's requests.

The range of manufacturability for tubular products has been expanded (~OD 10 ") and the company is aiming to enlarge its footprint in the piping market as well.

At the time of NSSMC's last cover story in 2015, the company was expanding further into the chemical and petrochemical sectors by focusing on nickel-based alloys, particularly UNS N08825, N06625, and N10276. We asked Mr. Shirakawa how this has progressed.

"The cornerstone of our success is our ability to keep providing solutions to meet customers needs. They require new products with value, reduced costs and shorter lead times. We are confident that we have developed good relationships with customers by adding value with shorter lead times, an expanding product line up, size range, and technical support including R&D etc."

Whilst the oil and gas prices are rising again, NSSMC is not resting on their laurels, but have retained the lessons learnt from those difficult times. The company has learned to become faster than ever before, giving them an ongoing competitive advantage.

## Solutions in response to customer needs

Research and development are extremely important to NSSMC and this is an area where they have made huge investments. "There are a lot of exciting

*"The cornerstone of our success is providing solutions to meet customers' needs."*

possibilities at the moment," says Mr. Shirakawa. "A development which has delivered good results is grade 347AP. This is now being applied to petroleum refineries and chemical plants and has proven to help avoid polythionic acid stress corrosion cracking (PASCC) without PWHT (Thermal stabilization) and neutralization treatment during maintenance work. Metal sulfide scale formed from sulfur in fluid reacts with oxygen which can cause PASCC; a new material was needed to combat this phenomenon. To give you an example of a specific instance, a client had a problem involved in distillation, desulfurization and coker etc in petroleum refineries. The customer was experiencing PASCC due to sulfur in the fluid which had to be prevented. They told us that these units had a door which opens to the outside, thus increasing the sulfur levels, leading to Polythionic acid stress corrosion cracking."

Mr. Shirakawa explained that conventional austenitic stainless steels such as types 316L, 347, 321 etc contain carbon content and chromium carbide precipitates at the grain boundary of the Heat Affected Zone during welding. This position is a prime target for PASCC. The customer had been preventing PASCC by using either/both PWHT for stabilization and/or stress relief and alkaline washing but this entailed a lot of extra work, processing and cost.



*The company continues to invest heavily in research and development; pictured is the Amagasaki plant which has extensive R&D facilities.*

By switching to 347AP (the AP refers to anti polythionic) they were able to significantly reduce their maintenance labour, time and cost. Mr. Shirakawa adds: "This is just one example of how identifying a problem or needs in the market and working with contacts to find a solution, leads to an evolution of a product."

**Petroleum industries**

NSSMC has also been focusing on the offshore industry. "NORSOK, which is becoming the standard requirement for the offshore market, was obtained by our Amagasaki and Wakayama mills for small to medium diameter piping (OD 16") three years ago", explains Mr. Shirakawa. "25 Cr Super Duplex is used wherever high corrosion resistance is required, for example, to protect against corrosion from seawater for FPSOs and platforms as well as in umbilical and in subsea systems. The acquisition of NORSOK means we now have a total marketing tool." The company has purchased coil winding equipment for Umbilical production and is already shipping this commercially.

**Power generation**

The power generation industry has led to significant demand for grades such as SUPER304H and HR3C. "The major part of our speciality steel SUPER 304 H and HR 3 C has been used for the coal-fired power market. However,



*NSSMC's grade HR 6W is an important product for the extremely high temperatures that are produced in modern coal-fired power generation. Ni alloy tubes*

as CO<sub>2</sub> emission reduction is strongly demanded worldwide, both coal and gas power generation are required to have higher efficiency. As the result, a study on severe conditions has been in progress. The industry requires materials that can cope with high-temperature and high-pressure designs; we are developing materials that meet these needs, such as differences in temperature, pressure, corrosion environment, etc. Regarding coal-fired power generation, the maximum is currently 620 °C, but in order to raise efficiency and reduce CO<sub>2</sub> emissions, designs of 650 °C or higher are beginning to appear. The grade HR 6W developed by our company is a key material."

For solar power, steel pipe usage is not large, but materials such as Nickel based alloy HR 6W, Alloy 625, 617 etc. are used. There are currently several solar projects underway, particularly in China. Geographically our company is in an especially powerful position. In the Middle East, Solar projects are expected to reduce the region's dependence on oil. It is a field where growth can be expected in the future."



*NSSMC's Amagasaki and Wakayama mills have both obtained NORSOK certification.*

**Facts & Figures**

Name:	NIPPON STEEL & SUMITOMO METAL CORPORATION
Incorporated:	October 1, 2012 (Business integration)
Production:	Steelmaking and fabrication
Crude steel output:	46 million tons
No. of employees:	24,822
Website:	www.nssmc.com or www.tubular.nssmc.com
Amagasaki works	
Founded:	1919
Products:	Seamless pipes & tubes
Materials:	Carbon, alloy, stainless steels and nickel-based alloy
Dim. pipes & tubes:	6-952.5mm
No. of employees:	699
Oita works Hikari area	
Founded:	1955
Products:	Seamless stainless pipes & tubes
Dim. Pipes & tubes:	6-168.3mm
No. of employees:	1,927