



The future lies in high end Nippon Yakin Kogyo

Nippon Yakin Kogyo is a manufacturer of flat products such as sheet, coil, and plate. Based in Tokyo - literally an inner-city facility - the company has its own nickel ore smelting plant to produce nickel alloys and high grade stainless steels. With ambitious plans to become one of the world's top five producers of high grade alloys, the company is investing in technology and strategies to take it to the top. Stainless Steel World spoke to Mr Yoichi Saji, Company President, about his plans for the company's future.

By Sjef H. Roymans and Joanne McIntyre

“One of the things which make us unique is that we do every process, from melting to manufacturing the final product, in just one plant” says Mr Saji. “This means that we can offer a short delivery time which satisfies our customers.” An all-in-one facility is not the only thing that makes Nippon Yakin unique however. “Around the globe environmental problems are becoming more severe. Japanese environmental regulations are

very strict and this is particularly so in built up areas. Our main plant in Kawasaki has already achieved the standards outlined in the Kyoto Protocol. In addition our inner city location means that we must comply with the city ordinance which is even more severely restricted. The achievement was recognised at an ISSF-11 meeting held in Kyoto in 2007” says Mr Saji proudly.

High grade alloys for



New AOD vacuum unit which is under construction with steady steps for starting operation in next January.

think about. The mines are operated and controlled by a small group of companies who control the market price. Therefore not only the price but also the availability of raw materials can be problematic. We are in a better position than many other companies because about 25-30% of the nickel we need is manufactured by our own company. In addition approximately 30-40% of the nickel we use is obtained from scrap. The remainder is made up of primary nickel” explains Mr Saji.

Targets markets

“The markets which we target are mostly outside of Japan; China, Europe, North America, South Korea and Taiwan. Many of our customers are either overseas or firms based in Japan who work on overseas projects. Our focus on producing high grade alloys is in line with a clearly defined strategy. For the Chinese market where we can expect significant market growth, we have liaison offices in Shanghai and Hong Kong to collect information from end users. We also have a liaison office in Singapore, but for other Asian countries, Europe, America, and Oceania where we don’t have offices. Our sales and technical persons periodically visit customers to talk about our company and our products. We exhibit at trade shows in America, Europe, and China to raise our profile among potential customers and to stay in contact with existing customers.”

Following a period of strong growth - the company achieved record profits in the last fiscal year - Mr Saji reveals that a change in the sales organisation may be the cause of this. “We currently have offices in Shanghai, Hong Kong, and Singapore but now it’s time to think

Capital investment

While the company produces a wide range of materials it is increasingly focusing on raising its sales of high grade alloys in addition to producing conventional type 304 and 316 stainless steel. A major step to improving its productivity and shorten delivery times even further was a recent five billion yen (USD 43.6 million) investment in a new AOD vacuum refining unit. The new equipment will be in operation by January, 2008.

“This investment allows us to conduct AOD refining in a vacuum” explains Mr Saji, “thereby reducing the refining time for low carbon material, which is essential for improving corrosion resistance. AOD vacuum refining will allow us to increase production capacity, realise a shorter delivery time for orders with a wide variety of requirements, and decrease overall costs.”

As any alloy manufacturers knows, investments are not the only large cost companies face today; raw material availability and price remain volatile and at times problematic. “Upstream of the plant the availability of raw materials is the most important issue that we have to



The Kawasaki plant seawater environment exposure test site.

about expanding further. We are looking at opening offices in India as that area promises strong growth for us in the future. While we would like to be more active in the US, especially in the nuclear energy industry, American anti dumping regulations make it difficult for us to increase exports of high grade alloys so there is some limitation on further growth there.”

“A key part of our future marketing strategy will be to use Webinar to make live presentations on our website to customers around the globe using the Internet. Any



Inside an LNG tanker which is made of Fe-36%Ni alloy.

readers wishing to receive information about Webinar are welcome to contact us by email at: project.planning@nyk.co.jp.”

The company has also prepared multilingual catalogues for its customers' convenience, in English, Chinese, Korean and Japanese.

“In order to make our proprietary alloys easy to use worldwide, we are in the process of registering them with worldwide specifications such as ASTM, ASME, AWS, and TUV. Some alloys have already been registered and we will soon achieve complete registration.”

Booming sales

In the past three years Nippon Yakin has worked hard to increase the proportion of high grade alloy sales to total sales from about 20% to 50%. “We’re striving to achieve this target by March 2008 when the ongoing medium-term three year plan will end. Beyond this period our focus will remain firmly fixed on increasing our sales of high grade alloys.”

The strategy is certainly paying off as the company expects to achieve its best profit ever in this fiscal year which ends in March 2008. “During the fiscal year of 2006 our net income increased by 2.5 times compared to the previous year while this year it is expected to increase by 20-25%. This is a very good time for us. Our profit margins have almost doubled this year so we are confident that our business strategy is a success which will carry us forward to an even more successful future”

says Mr Saji with a smile. “Our high end alloys are being used around the world for a wide range of applications.” Some of the applications are better known than others, such as in chemical plants for which Nippon Yakin provides a wide variety of alloys from standard grade to highly corrosion resistant nickel alloys. With the growing global concern about sustainability, a flue gas desulphuriser (FGD) is an essential piece of equipment for new coal fired electric power plants. “Highly corrosion resistant materials such as duplex, super austenitic, and Ni-Cr-Mo alloys are required for this application due to the severely corrosive environment created by chloride ions. While China and Korea are the main markets for FGD sales, they are also constructed in Europe and the USA.”

“We’re developing a market for our products in order to correspond with the FGD construction in Asia” explains Mr Saji. “Chemical plant applications have certain demands such as corrosion and heat resistance, and our high grade alloys can meet these requirements. We are propelling the development of our market step by step by accumulating data about corrosion and heat resistance which we plan to disclose on our internet site.”

“Pure nickel products are produced for caustic soda plants, and in fact we are the only company in the world able to manufacture five feet wide pure nickel plate. We used to manufacture pure nickel plate through an ingot casting process followed by slab forging, but today we manufacture it by slab continuous casting which has

made us highly competitive by achieving cost and delivery time reduction" explains Mr Saji proudly. The oil and gas industries are also significant markets. Nickel alloys are used to clad pipes for oil and gas drilling, while its Fe-36%-Ni alloy is used for LNG carrier tanks. "As Duplex and super austenitic stainless steels are used for oil and gas drilling applications, these applications are key targets for us. The low thermal expansion coefficient makes Fe-36%-Ni alloy ideal for LNG carrier tanks. We have built a solid reputation for our timely technical advice in workability, weldability, and corrosion resistance to ship owners and shipbuilding yards" says Mr Saji.

A world of alloy applications

One of the niche markets which Nippon Yakin services is the international market for sheath heaters.

Manufactured in Fe-Cr-Ni-Ti-Al alloy, the material provides good oxidation resistance and is characterised by superior workability. "Our share of the market for sheath heaters in China, Europe, and the US is increasing largely due to our detailed correspondence with regards to workability, weldability, etc. China in particular is a rapidly growing market for this product as we are able to take advantage of its close proximity" explains Mr Saji.

"Plate heat exchangers are another application where we can take advantage of our wide variety of corrosion resistant alloys from stainless steel to nickel alloys including pure nickel. Because the world market is faced with a shortage of titanium we are developing our market for high nickel content corrosion resistant alloys to replace titanium and reduce material cost. Among our corrosion resistant alloys, our proprietary 7.5% molybdenum containing super austenitic stainless steel (UNS N08354: Fe-23Cr-35Ni-7.5Mo-0.2N) is a superior stainless steel which has better corrosion resistance than 6Mo stainless steel. It's also more cost effective than nickel alloys. With this product we are targeting applications using sea water with heat exchangers which is a severely corrosive environment."

Fe-36%Ni and F-42%Ni are also used for precision tools for airplanes. While televisions and personal computers are being replaced by FPD, which used to be the major applications for Fe-36%Ni. The expansion of the aircraft industry has actually increased demand for this alloy.

"Our alloy is characterised by its low sulphur content which makes it very resistant to high temperature cracking during the welding process. We also have a strongly competitive delivery time due to our continuous casting followed by hot rolling process. The Boeing Company is greatly appreciative of our steady delivery accomplishments for their orders."

The company also manufactures several grades of band hoop material from austenitic stainless steel based on the requirements of the welding material manufacturer. Among these are high chromium (up to 26%) and high sulphur content (up to 60ppm) 309 type stainless steels which improve the corrosion resistance of welded parts and the flowability of slag during the welding process. "The high chromium and sulphur contents mean that high temperature workability is very limited due to delta

ferrite precipitation which in turn makes the alloy very difficult to manufacture. However we have overcome this difficulty by using superior hot rolling technology to manufacture materials with 15% or more delta ferrite" explains Mr Saji.

Another area the company is expanding into is stainless steel water tanks which are increasingly used in municipal water purifying plants, office buildings, and housing complexes in Japan. "The upper part and the roof of the tanks in which vapour phase exist are made of duplex stainless steels containing 22% or 25% chromium. This is because chloride ions in the sodium hypochlorite used for sterilising the water mean the material has very poor corrosion resistance. The use of stainless steel for this application is increasing because it has better durability than conventional coated carbon steel and concrete, and a more aesthetically pleasing appearance. The use of large size tanks is also increasing as cities store more water for use in case of an emergency; some of the tanks use more than 100 tons of duplex stainless steel." In Japan it is also becoming popular to increase the durability of offshore steel structures such as seaport piers by protecting steel pipe piles with seawater corrosion resistant stainless steel. "This is a market which we expect to expand significantly in the next few years" says Mr Saji. "The current expansion of the Haneda airport - the biggest airport in Japan - is utilising 6Mo super austenitic stainless and even 7.5%Mo stainless steel (UNS N08354) for areas where crevice corrosion may occur."

Recognising that the production of offshore steel structures will play an important role for the company in years to come, Nippon Yakin recently developed a seawater environment exposure test site at its plant. Seawater is pumped from a neighbouring canal then sprayed onto test samples to demonstrate the corrosion resistance of these super stainless steels in seawater. Currently the company is exposing steel pipe piles protected by super stainless steel to get basic data of long term exposure.

With such a wealth of applications it's no wonder that Nippon Yakin Kogyo calls itself a specialized metals manufacturer; high performance alloys are the path that this company will take for a successful and profitable future.

Facts & Figures

Name:	Nippon Yakin Kogyo Co., Ltd.
Founded:	1925
Headquarters:	Tokyo, Japan
Employees:	1,021
Products:	Stainless steel, nickel alloy, and iron-nickel alloy plates, sheets, coils
Key markets:	Chemical, petrochemical, energy, food, carrier, construction, and electronics industries.
Turnover:	JPY 155.2 billion (USD 1.353 billion, fiscal year of 2006)
Home page:	www.nyk.co.jp