The exhibition room demonstrating applications for high performance alloys.

Nippon Yakin Kogyo implements its plan to become a top producer of high-performance flat products

As a manufacturer of stainless steel and nickel alloys, Nippon Yakin Kogyo is well on its way to realizing its ambitions. Kazuta Sugimori, the company's new president, is overseeing a transformation of the company's sales and R&D departments, and seeks to involve customers more closely in the development of the alloys required to meet the environmental challenges and needs of today's world. Stainless Steel World visited Mr. Sugimori in the company office in Tokyo to find out more.

By Kiyo Vlam and James Chater

In June 2008 Nippon Yakin Kogyo acquired a new president. He is Mr. Kazuta Sugimori, the former managing director, and he was appointed to this position to succeed Yoichi Saji, who became the company's chairman. The changeover occurs at a time when economic conditions are challenging, to say the least. Now seems a good time to rethink the company's long-term strategy. The company offices in downtown Tokyo, far removed from the bustle of the factory floor, seem a good place for strategic reflections, so it is here that Stainless Steel World went to meet Mr. Sugimori to discuss the company's plans.

The principle elements of Mr. Sugimori's plans consist in establishing strengths in manufacturing, sales, procurement and development, as well as motivating employees. He believes strongly that the key to providing added value is innovation. However, although the company is developing new alloys, innovation for Mr. Sugimori has a broader meaning, including radical improvements in delivery times and quality. "The economic efficiency embodied in the materials, the impact

on the environment, these qualities can be regarded as constituting a second level of added value," Mr Sugimori relates. "Creating and spotlighting this added value will generate new demand."
In addition, Mr. Sugimori aims to reduce delivery times. Materials procurement will be synchronised, manufacturing quality will continue to be impeccable, and technologies will be introduced that not only satisfy quality requirements but also reduce the lead times for each process. This will generate higher satisfaction among customers, reduce company inventories, and result in ancillary benefits as well.

Mid-term business plan

Looking further ahead, NYK has a three-year mid-term business plan, launched in FY2008, the goal of which is to become a top global company in the area of high-performance alloy flat products by the end of FY2010. "To achieve this goal," explains Mr. Sugimori, "we plan to enhance sales strength in the area of high-performance alloys, establish a stable supply of major raw materials, and invest in new equipment and systems to manufacture high-performance alloys. By doing this – by establishing an even stronger, more consistent revenue base and by improving our financial strength – we will strengthen the company's operating base as a stainless steel and special steel manufacturer even further.
Concrete indicators marking progress toward these goals have been set: 50% of total sales in the high-performance alloy sector, return on assets of 10%, and a capital adequacy (capital-to-risk) ratio of 40%."
As part of its aim to improve customer satisfaction, close attention will be paid to specifications requested by customers, and these will be reflected in development and manufacturing. To do this, the company has launched a review of sales and of the research and development structure and is focusing efforts on customer support. "The company will improve its equipment to reduce delivery times," adds Mr. Sugimori. "We will also increase quality and develop applications to address environmental and energy issues."
The specific reforms introduced at NYK consist of a broad-based package of interrelated measures: review of sales and R&D structures; customer support through increased awareness; development of new grades in co-ordination with customers; new facilities; and developing eco-friendly applications.

Review of sales and R&D

Overseas sales strength will be boosted through a redesign of the sales structure. In December 2008 an office was established in London to promote sales in Europe and to make it easier to gather information in this market as well as to gain new customers, while a corresponding support structure was set up at the Tokyo headquarters. This arrangement allows immediate response to customer inquiries.
Earlier, in July 2008, a Bangkok office had been established to boost sales strength in Asia. Located close to India, one of a number of promising future markets, it is intended to cover the existing markets of Thailand, Malaysia and Indonesia. Staffing at the existing Shanghai office was boosted in March

AVS equipment in operation producing Nippon Yakin's high performance alloys.

A researcher analyzing high performance alloys using sophisticated electron probe microscopy.

2009 to enhance information-gathering capabilities inside China. Greater attention has also been paid to the North American market. Since April 2009, periodic visits have permitted the rapid gathering of information from customers and helped to ensure rapid responses to customer inquiries and requests.

To reinforce this change in the sales structure, the R&D department has been relocated. In July 2009 this was transferred from the Kawasaki plant facility to the Tokyo headquarters. "The move was made to bring R&D closer to the markets," explains Mr Sugimori. "It will allow R&D to directly address the needs of customers and to forge strong links between these efforts and product development. This has already yielded positive results in terms of the rapid and efficient development of world-class materials."

Customer support

To ensure that customers are adequately informed about the company and its high-performance alloys, more information is being provided through a variety of media. These include an improved website, seminars in China, and preparation of brochures and seminars via the internet. The existing website has been improved with expanded English content. The new URL is www.nyk.co.jp/en/. Seminars are being held in China to support the company's recent sales efforts in this major world market, where offices have already been established in Shanghai and Hong Kong. In September 2008 the company held its first overseas seminar in Shanghai. "This event was attended by 134 participants from 70 companies," says Mr. Sugimori. "Chinese engineering companies, fabrication companies, manufacturers, wholesalers and trading firms were represented. The seminar addressed points to be considered in choosing and using high-performance alloys, including corrosion-resistance and weldability of materials." The company plans to hold more seminars in Europe, the United States and other regions.

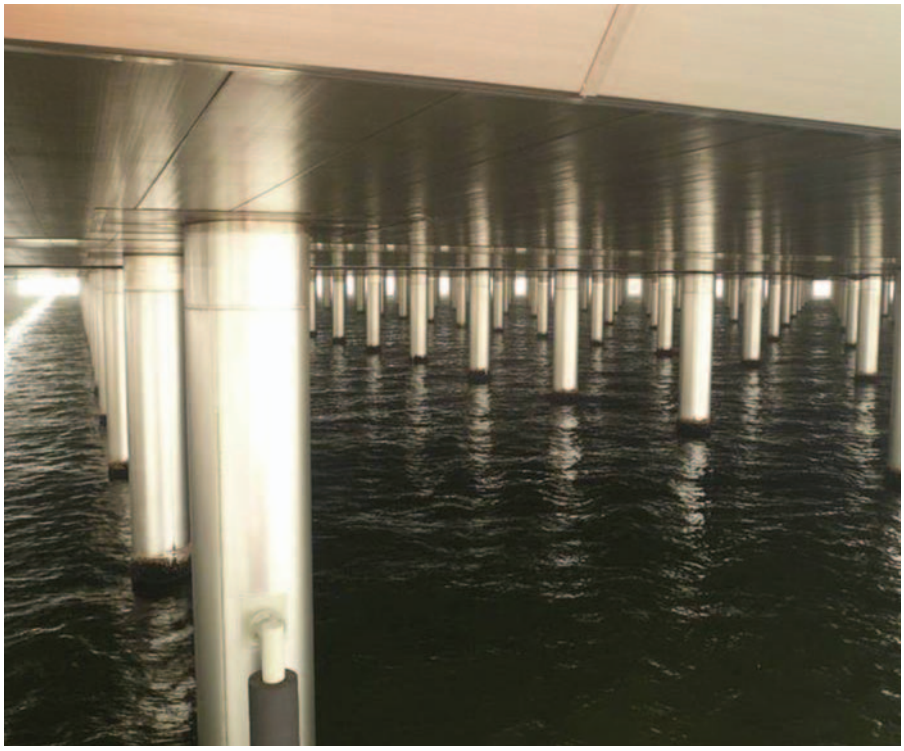
Another way to deepen customer understanding of high-performance alloys is to distribute brochures. For instance, a brochure on high-performance stainless steels has been prepared with the assistance of the Nickel Institute. Brochures have also been written by noted Japanese authorities on a variety of topics, including heat-resistant materials, corrosion-resistant materials and high-strength materials. The brochures, which are now being distributed to customers, can be obtained via the company website or at a company office.

Customer presentations are critical in more clearly delineating the link between customer needs and the company's high-performance alloys. Therefore the company is currently presenting seminars via the internet. These presentations also include timely information, questions, exchanges, and so forth. The company plans to continue this programme, and interested readers are encouraged to send enquiries via the company website or through a company office.

Development of new grades

As part of its reforms, the company undertakes materials development in close co-ordination with customers, based on full discussions with end users. The object is to develop products that meet customer needs. Materials that have resulted from this approach include: materials for band hoops; non-magnetic, soft stainless steel for apparel; and super duplex stainless steel coil.

NYK offers various stainless steel band hoop materials for overlay welding. Mr. Sugimori: "Many of our customers have requested band hoop materials with improved slag removal properties in regard to welding materials, materials with a high ratio of delta ferrite to prevent hot tearing during welding, and high-chromium materials for increased corrosion resistance. Some materials manufactured in coil form are characterised by extremely poor hot workability. We responded by applying



The super austenitic stainless steel marine structure of the Haneda Airport project.

thermo-mechanical treatment, one of our core techniques, to product development."

Copper alloy is widely used in apparel. Still, demand has emerged for a soft, non-magnetic stainless steel, which offers both colour-fast corrosive resistance and press workability during shaping and makes it easier to check for remaining pins in the final inspection of apparel products. A balance between various components was critical in responding to this request, and development proceeded based on direct conversations between the company researcher and the customer. The end result was NAS NM17, a non-magnetic, soft stainless steel.

The company has also started to supply super duplex stainless steel coil. Demand has increased rapidly in recent years for duplex stainless steel, which nevertheless still accounts for only 1% of the total volume of stainless steel produced. The market for high-strength super duplex stainless steel (UNS S32750) has grown, chiefly driven by demand from oil & gas and seawater desalination installations. Demand for thin sheet and tube applications has increased as well as demand for plate, resulting in demand for a super duplex stainless steel coil. Duplex stainless steel is susceptible to embrittlement and is difficult to manufacture in hot processing. Nevertheless, the company succeeded in forming it into a coil and has begun commercial supply of the product.

New facilities

Another cornerstone supporting the sale of high-performance alloys is the introduction of new facilities. "In January last year we started full operation of an AVS (AOD with vacuum system)," Mr. Sugimori informs me. "This allows us to manufacture extremely pure steel with air melting. While we already had AOD and VOD facilities, the AVS system takes advantage of the characteristics of AOD while adding a vacuum function to correct defects. AVS has helped us to reduce our refining time for low-carbon material. This in turn has allowed us to reduce delivery times and improve quality."

Environmental measures (CO_2 reduction)

NYK has pioneered the use of its alloys in a number of environmentally friendly applications, including solar power generation, household kitchenware, nuclear power and marine structures. "The polysilicon used in solar power generation is manufactured using various methods," explains Mr. Sugimori. "One of these, based on the breakdown of raw material gas using heat, uses NAS800H (UNS N08810), which offers outstanding heat resistance in heating chambers."

Gas heaters used in household cooking release offer another application for NYK's alloys. These release significant amounts of carbon dioxide. For this reason sheathed heaters, capable of changing a gas heater into an electric heater, are gaining popularity. While carbon dioxide is also released when generating electricity, the carbon dioxide emitted at power stations is controlled more easily than carbon dioxide emitted from households. "NAS 800L and NAS H840, which offer outstanding heat resistance, are used as covers for sheathed heaters," says Mr. Sugimori.

The emergence of greenhouse gas issues has led to a reconsideration of nuclear power. The core of the BWR reactor incorporates NAS 600M, a material given improved intergranular corrosion resistance by adding niobium to conventional alloy 600.

Finally, marine structures offer scope for NYK's alloys. The expansion of Haneda Airport, Japan's largest domestic airport, is currently under way, with a scheduled completion date of 2010. On the side facing the sea, austenitic grade NAS185N (UNS S31254), with its outstanding corrosion resistance, is being used to coat the legs of piles under the pier which are exposed to tidal water as well as to the portions above the water line. These structures are expected to last 100 years. Crevice structure portions use NAS354N (UNS N08354), which offers even higher corrosion resistance as a coating material to improve resistance to crevice corrosion. These materials also help increase environmental friendliness with respect to life cycle CO_2.

In addition to boosting customer satisfaction, these applications and developments in the area of environmental devices constitute a cornerstone of sales for the company's high-performance alloys. The company plans to continue with additional efforts in the areas of application and development.

Mr. Sugimori concludes that a top global company needs to be aware of the current paradigm shift. "As long as human beings exist, they will always face environmental, energy, food and medical challenges. Our role as a business is to help make a better world, to develop the things people need."