ClassNK Magazine

57th Edition 2005

Special Article

The Super Eco-Ship

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Harvest from the Sea

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An Introduction to **ClassNK Taiwan**

ClassNK

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Chairman's Message

Welcome to the 2005 *ClassNK Magazine*. As always, I am glad to have the opportunity to review and introduce the annual *ClassNK Magazine*, which once again has a broad cross-section of interesting articles.

This year's Special Article looks at the so-called "Super Eco-Ship," another example of the Japanese "modal shift," which is part of Japan's response to global warming as described in last year's magazine. Also as noted last year, there is an increased demand for more and bigger LNG carriers. There are new LNG projects starting all around the world and one important one is the Sakhalin project under development in the northeastern part of the continental shelf of the Sakhalin islands in the Russian Federation. Even though the oil and natural gas extracted through most of these projects is to be transported by ship, the Sea of Okhotsk, through which the ships must navigate, is covered with seasonal ice from late autumn to early summer. Consequently, ships plying these waters must have structures and be fitted with installations capable of withstanding the sea ice conditions. One of this year's technical essays looks at one such ship, the *Energy Frontier*. Also covered in a separate technical essay is NK's new guidance on shaft alignment.

"Focus on Japan" this year visits the NK Nagoya office, Nagoya being the home of this year's World Expo. Naturally enough, the article also takes a wider look at this city at the center of Japan, including visits to two shipyards. Outside of Japan, the NK global office network spans the world, and this year we have included profiles from opposite ends of the globe, the NK Taiwan office and the NK Valparaíso office in Chile, having both sent interesting profiles of their local areas and activities.

This year's "Stories from the Sea" section is titled "Harvest from the Sea," and looks at the topic of edible seaweeds, an interesting topic because I know that while eating seaweeds is perfectly normal and very common in some places, notably Japan, there are also many places where the very idea is unheard of. We also briefly revisit the *CHIKYU*, the most advanced deep-sea scientific drilling ship in the world, for its official launching. Construction of the *CHIKYU* commenced in 1999 when it was first introduced in *ClassNK Magazine* 54.

Topics and Events covered briefly include the 1st Meeting of the Malaysian Committee, NK participation in GASTECH 2005 and NOR-SHIPPING 2005, the establishment of the Amman Office and a local area representative in Santos, Brazil, as well as NK's Contribution to disaster relief efforts in the wake of the earthquake off the coast of Sumatra and the Indian Ocean Tsunami, among others. So, please enjoy reading this year's *ClassNK Magazine*.

Kenji Ogawa
Chairman and President

Development of a New Guidance on Shafting Alignment

ClassNK has recently developed a new guidance on marine propulsion shafting alignment. As is well known, the key engineering feature of marine propulsion shafting is that a heavyweight propeller is fitted at the end of the marine propulsion shafting. For such construction, shipbuilders usually use a slope alignment design in order to disperse the load to each bearing. Similarly, the rules of Classification Societies for shafting alignment have traditionally been concerned mainly with preventing edge loading at the aft end of the stern-tube bearings.

Recently, however, some aft end damage to engine bearings (see Fig. 1) has been seen in Long-Stroke-type 2-stroke main diesel engines. As a classification society, NK could not ignore this, notwithstanding the very rare incidence of damage. In the past, such bearing damage tends to have occurred when the aftmost bearing has overloaded and the second aftmost bearing has not been loaded.

The cause has been presumed to be the result of thermal rises in the main engine and/or changes in the loading condition of the ship. In recent propulsion shafting systems with 2-stroke main engines, however, shafting stiffness has increased relative to the hull structure. Also, it is difficult to design the shafting alignment with enough flexibility for hull deflection (i.e., changes in bearing offsets), and this is considered to be the main cause of bearing damage.

It is well known that main engines exhibit hogging deformation due to thermal rises and/or ships' draft changes from light ballast condition to full load condition (Fig. 2). In order to prevent engine bearing damage, engine manufacturers are now suggesting a pre-sagging installation of engines to shipbuilders.

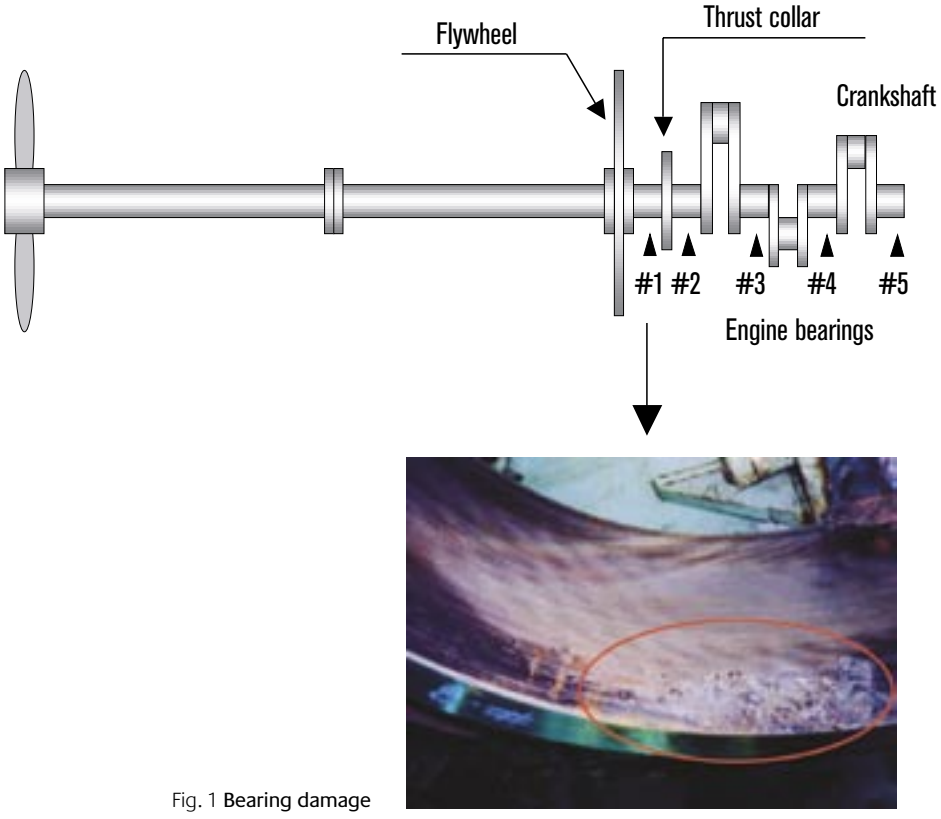


Fig. 1 **Bearing damage**

The aim of a sagging installation in cold conditions is that the alignment of engine bearings becomes straight when in service. In this case, depending on the ship type, secure loading on all bearings is required in service, even though the aftmost engine bearing is in a no-load condition at the installation of the shaft.

ClassNK's new guidance gives some additional check points in the making of the calculation model for shaft alignment. These include:
- The number of engine bearings for calculation should be five or more from aft
- Requiring an equivalent crankshaft model

The above two points are required to produce a calculation model of the actual shafting system as exactly as possible. According to calculation sheets submitted to the Society in the past, only a handful of calculations actually considered all engine bearings.

However, according to NK's investigations, in order to estimate aft engine bearing loads accurately, five or more engine bearings from aft must be calculated. Regarding the equivalent crankshaft model, engine manufacturers are now offering shaft diameters equivalent to those of crankshafts, which are necessary for alignment calculations for each type of engine.

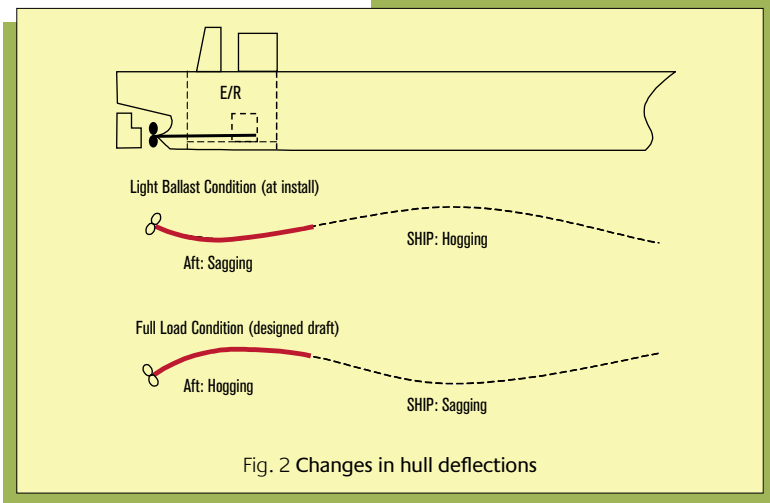


Fig. 2 **Changes in hull deflections**

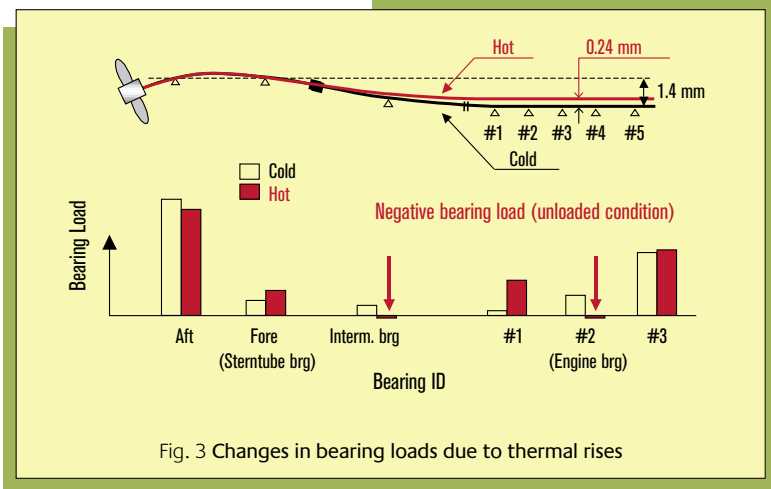


Fig. 3 **Changes in bearing loads due to thermal rises**

The most important point in NK's new alignment guidance is to introduce the following calculation conditions, which cause changes in bearing offsets:
- Thermal rises of the main engine
- Changes in a ship's loading condition (draft condition)

For shafting systems having reduction gears, such as turbine ships, this is the usual way to carry out alignment calculations (i.e., considering thermal rise because of the large changes in bearing offsets due to thermal rises). Although similar calculations are now required for diesel engines in the new guidance, they can be done easily since the requirements are to be applied only for the thermal expansion of engine beds (Fig. 3).

On the other hand, it is more difficult to estimate exact hull deflections due to loading condition changes. However, if relative hull deflection corresponding to the change is calculated, for example, from light ballast condition to full load condition, the estimated result may be accurate enough. ClassNK has developed a simplified estimation formula for this relative hull deflection using past calculations and measurement results, and it is included in the new guidance.

Ice Class LNG Vessels

Several large-scale oil and natural gas development projects known as the Sakhalin Project have been under development in the northeastern part of the continental shelf of the Sakhalin islands in the Russian Federation, some with the active participation of a number of Japanese firms. To date, there have been six such projects, and Japan businesses have been participating in two of them, Sakhalin-1 and Sakhalin-2, both of which are ongoing projects.

Although the oil and natural gas extracted through most of these projects is to be transported to each respective destination by ship, the Sea of Okhotsk, through which the ships must navigate, is covered with seasonal ice from late autumn to early summer. Consequently, ships plying these waters must have structures and installations capable of withstanding the sea ice conditions.

One such vessel is the *Energy Frontier*, an LNG carrier with the largest loading capacity in the world at the time she was delivered in 2003 (see photo on page 5). She was built to and equipped with systems and installations that satisfy ClassNK Ice Class Rules requirements, and her sister ship, the *Energy Advance*, was completed in 2005.

A brief introduction is presented, as follows, of these vessels that are to be used to transport LNG from these Sakhalin projects, together with an overview of the development of the associated Ice Class Rules.

The Development of NK's Ice Class Rules

Generally, ice class rules set forth requirements for enhanced hull strength, propulsive force and other factors required of ships navigating in waters covered with sea ice. In addition to these requirements, the design pressures from ice on shell plating, frames, ice stringers, and web frames from a given position on the surface of the hull are also covered.

They also set forth the scantlings of structural members necessary for a given ice class, based on the results of various studies conducted in line with the theory of elasticity using models of hull structures. Different ice class notations are used to distinguish the differing degrees of strengthening or other requirements to operate in ice-covered seas.

One easily misunderstood point is that the ice-strengthened construction (ice class) of a ship does not indicate the ice breaking ability of the ship. Instead, it shows the extent to which the hull structures are strengthened, the level of propulsive power and other aspects required for a ship to operate safely in certain ice conditions or when navigating in ice-covered sea lanes that have been opened to navigation. Ice breakers as most people understand them would be classed separately with different special requirements.

The history of the NK Ice Class Rules dates back to the first ice rules developed by the Society in 1949. At that time, there was only one ice class notation, for which only an increase in hull plate thickness was stipulated. In 1969, the Canadian Government developed new *Rules for Ice Strengthening (General Service)*, which stipulated four classes based on the *Arctic Shipping Pollution Prevention Regulation* issued that same year. Similar rules were then developed in 1977 for the Baltic Sea area, that were based on the *Finnish-Swedish Ice Class Rules* (FSICR) of 1977, which also stipulated four ice classes.

As a result, the Ice Class Rules of the Society consisted of these two sets of rules for a number of years. Later in 1985, the NK Rules were revised to reflect changes in FSICR '85, and the NK ice class notations were standardized into five notations. These included the four ice classes described in FSICR, which in decreasing order of stringency consisted of IA Super, IA, IB, and IC, and to these was added a fifth notation, ID, based on the ice class in the original NK Rules. These five notations form the basis of the five ice class notations currently stipulated in the Rules of the Society, which have since been revised several times to reflect subsequent changes in the FSICR.

The *ENERGY FRONTIER*

The *Energy Frontier* was newly designed and built by Kawasaki Shipbuilding Corporation as the first in a series of LNG carriers for Tokyo LNG Tanker Co., Ltd. This vessel has an enlarged large tank capacity of 145,000m^3 (a cargo capacity that is 10,000m^3 greater than the conventional capacity 135,000m^3 carriers also built by Kawasaki), making her the biggest MOSS-type LNG vessel in the world when she was delivered in 2003. She is fitted with four MOSS-type independent spherical cargo tanks with an actual total LNG containment capacity of 147,591m^3. Despite the increased cargo capacity, Kawasaki has designed the new vessels to have similar length and draught dimensions to those of their conventional LNG carriers, allowing them to continue to visit all the various LNG terminal ports of the world.

The hull has been built with steel of a grade that satisfies the requirements of the U.S. Coast Guard (including for Alaska) and ClassNK for navigation in ice. The LNG tank insulation system installed around the tanks consists of the so-called Kawasaki Panel System, which provides increased insulation performance, reducing the boil-off rate to about 0.10% per day. The ship is also fitted with a forced vaporizing system as well as an automated ballast water exchange system. The wheelhouse is fully equipped with advanced electronic navigation and control equipment, with all systems integrated into one conning station to enable centralized operation of the vessel, and windows have been placed around the wheelhouse so as to afford 360° visibility. The vessel has the Installation Notation Character "BRS1" for navigation bridge systems.

A sister vessel, the *Energy Advance*, was also completed in March 2005, by Kawasaki for Tokyo LNG Tanker. Both vessels have obtained an Ice Certificate from the Central Marine Research & Design Institute in Russia, certifying them as large LNG vessels that may navigate under ice conditions in Aniva Bay, Sakhalin and La Perouse Strait.

The *Energy Frontier*

The Super Eco-Ship

Artist's concept of Super Eco-Ship

Regular readers of *ClassNK Magazine* will recall last year's story on global warming and modal shift. The so-called Kyoto Protocol is an international agreement that came into force on the 16th of February 2005 as one way of addressing the problem of global warming. One tangible outcome of its adoption by Japan has been the efforts being made to encourage modal shift, including a shift from land-based rail and truck transportation to seaborne modes of shipping and distributing goods in the transport sector in Japan.

Against this backdrop, work has been proceeding under the leadership of the Ministry of Land, Infrastructure and Transport in cooperation with industry and other stakeholders on the Super Eco-Ship Project. This is a national research and development project aimed at designing and constructing a next-generation coastal ship for domestic service in Japan that is capable of highly efficient sea transport and also reduces the impact on the environment. The project will culminate with the conduct of demonstration trials of a test ship in sea areas and then the introduction into actual service of a Super Eco-Ship. Both people-friendly and environmentally friendly, the Project should also help to facilitate the revitalization of coastal shipping in Japan.

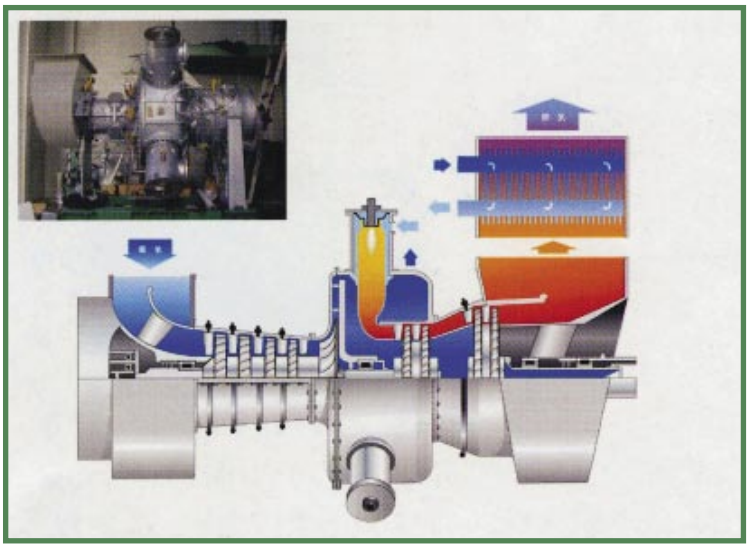


Fig. 1 Cross-sectional schematic view of the SMGT (inset photo shows actual test engine) from a Japanese-language National Research Marine Institute brochure entitled, *Research and Development of the Next Generation Super Eco-Ship*

A number of innovative technologies have been incorporated into the design of the Super Eco-Ship. These include the use of an electric propulsion system powered by a highly efficient super marine gas turbine (SMGT), contra-rotating pod propellers, and a new low-resistance hull form that takes advantage of the freedom offered in arranging the propulsion equipment, which is one key benefit of the pod propeller propulsion plants.

Various user-friendly support systems that can be expected to enhance efficiency while streamlining shipboard operations have also been incorporated in the Super Eco-Ship. They include systems that reduce the amount of maintenance work that needs to be done onboard ship, thereby making it possible to realize a reduction in the crew number while at the same time ensuring safe navigation and ship operation. They also include systems to reduce oil leakage and spillage that can occur as a result of human error during loading and unloading, which could contribute to marine pollution. One example is the use of improved centralized computer control and the use of electric rather than hydraulic-powered systems.

At present, most ships use diesel engines as their main onboard propulsion system. Nevertheless, gas turbines offer many benefits over diesel engines. First, NOx emissions emitted from a gas-turbine are significantly lower than those from a diesel engine due to differences in the combustion characteristics of the two types of engine. Gas turbines are also smaller and lighter, have lower noise levels and less vibration, and are easier to maintain. They are also very powerful for their compact size and are highly reliable.

In spite of these advantages, the use of these engines in marine applications has in fact been limited for economic reasons, such as higher fuel costs, higher component costs and other factors. Thus, a cleaner, greener, more highly efficient next-generation SMGT engine that has been designed to overcome these limitations will be used in the demonstration Super Eco-Ship. This engine is one response to calls for improvements in the operating efficiency and onboard environment of coastal ships as well as for reductions in manpower onboard and is also intended to encourage the expanded use of gas turbine engines onboard marine vessels (Fig. 1).

Fig. 2 Full-scale model of contra-rotating pod propellers for test use

Fig. 3 View of testing of full-scale model of contra-rotating pod propellers

The SMGT achieved a thermal efficiency of more than 38% during shop tests, which is significantly better than the performance of traditional industrial gas turbines. In addition, the SMGT has also been designed to be compatible with the use of type-A heavy marine diesel oil, taking into consideration the types of fuels currently available for ship use (major technical characteristics of the SMGT are summarized in the Information Box)

The design plans call for electric motor-driven, contra-rotating pod propellers to be adopted as the propulsion system of the Super Eco-Ship. A full-scale model test of the contra-rotating pod propellers was carried out in July 2004 (Figs. 2 and 3). Usually, the adoption of an electric propulsion system makes it possible to reduce the size of the machinery space thanks to the compact size of the engine system itself and the greater degree of freedom that becomes possible in laying out machinery and equipment, and as a result, the amount of cargo space can be expanded.

Further, the adoption of an electric propulsion system also makes it possible to reduce the amount of engine maintenance work that needs to be done, and low energy operation resulting from improved power management and lower vibration due to the constant speed operation of the electric generator motors becomes easy. The adoption of contra-rotating pod propellers also makes it possible to achieve improvements in propulsion system efficiency due to the contra-rotating effect resulting in greater freedom in ship design. The adoption of a new hull form that takes full advantage of these innovative characteristics in the Super Eco-Ship also makes it possible to realize substantial improvements in propulsive efficiency.

The adoption of an SMGT with the above features in the Super Eco-Ship makes it possible to realize a 90% decrease in NOx emissions, a 60% decrease in SOx emissions and a 25% decrease in CO_2 emissions, while at the same time significantly reducing the need for engine maintenance onboard the vessel. Moreover, the use of an SMGT also makes it possible to reduce the amount of fuel consumed by about 30% compared with conventional gas turbine engines.

Similarly, propulsive efficiency can be increased by as much as 10% with the adoption of contra-rotating pod propellers and the adoption of an optimal hull form. Safe and reliable operation is expected to improve with the adoption of a LAN-based control and instrumentation system, as well as various other systems. They include navigation support, berthing support, loading and unloading support, and mooring support systems, all of which have been specifically designed to help realize a safe reduction in the amount of manpower needed onboard while improving operational efficiency.

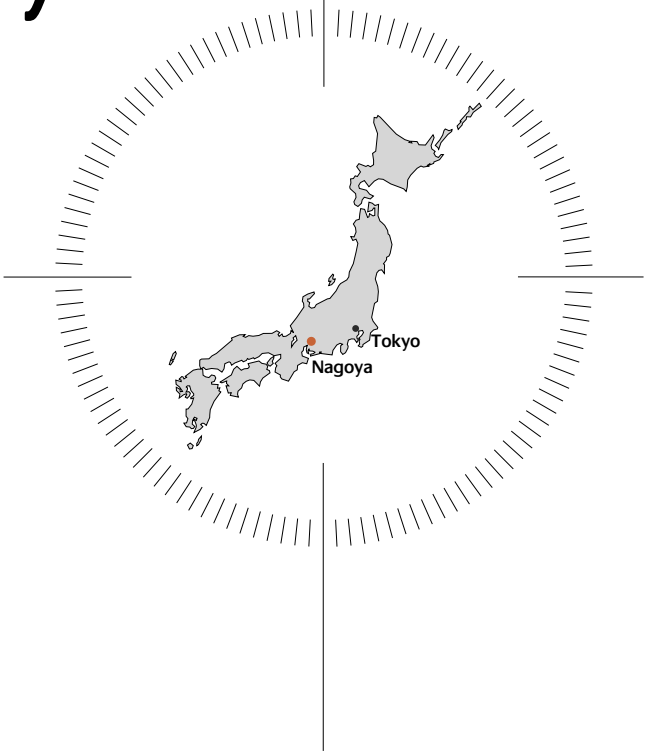
At the request of the Ministry of Land, Infrastructure and Transport, ClassNK has actively contributed to the realization of this project by assessing the safety and other aspects of the Super Eco-Ship at the design stage from the perspective of ship classification.

Information Box

1) The combustor utilizes a dry, pre-vaporizing and pre-mixing lean combustion (dry low NOx: DLN) method in which neither water nor steam is injected into the combustor. Further, supplemental firing after the main com bustion stage helps to reduce NOx levels by increasing combustion efficiency.
2) A regenerative cycle approach has been adopted using a compact, highly efficient plate fin-type regenerated heat exchanger (recuperator) to improve both thermal efficiency and fuel consumption. This system recovers heat from the exhaust, which is then used to pre-heat the air delivered to the compressor prior to combustion.
3) The compressor consists of a four-stage axial flow compressor, adopted for the low-pressure range, and a single-stage centrifugal compressor, adopted for the high-pressure range, for a total compression ratio of 8:1.
4) In order to enhance efficiency further, the design temperature at the turbine inlet is about 1,200°C, which is 50° to 100°C higher than that in comparable class gas turbines. As a result, it was also necessary to develop cooling blades with a very high cooling efficiency.
5) In order to better withstand the rigors of ship use, research was also conducted into the development of measures to protect each part against corrosion and into the development of structural bearings and seals capable of enduring the oscillations and movement of the hull, among other things.

Focus On Japan

Nagoya



ClassNK has 21 local offices across the length and breadth of Japan, so one of the more difficult decisions we in the Business Department have to make each year is which one to profile for this magazine. This year, however, the decision was made easy for us by the city of Nagoya and its hosting of the 2005 World Expo, Japan's must-see event of the year.

Originally a castle town on the strategic road between Tokyo and Osaka, Nagoya really is the geographical center of Japan. These days, its strategic location serves not to protect feudal warlords but to strengthen its position as the industrial heartland of Japan. A bustling city of 2.2 million people and the capital of Aichi Prefecture, Nagoya boasts the full spectrum of heavy industry, from chemicals and shipbuilding to such light industry sectors as toys and ceramics. For most of us, however, it is probably best known as the home of Toyota Motor Corporation, undoubtedly one of Japan's most prestigious and best-known companies.

After traveling just 90 minutes by bullet train from Tokyo, we arrived in Nagoya in mid-morning and headed directly to the Nagoya Branch Office. Originally established in 1947 as a sub-branch of the Osaka office, it became a full-fledged branch in 1953 and moved into its current location in 1975. Like most of the other regional NK offices I had visited, the Nagoya Branch Office is both functional, and comfortable for the 20-plus busy staff responsible for all of Aichi, Gifu, Mie and Toyama prefectures, as well as part of Nagano Prefecture.

We were welcomed by General Manager Mr. Yoshihiro Hiraoka, whose recent three years as the Regional Manager for the Middle East, Mediterranean and Black Sea, at the Piraeus Office (in Greece) was reflected in various artifacts decorating his office. As we planned to visit the Expo in the afternoon and expected this to extend well into the night, in place of the regular after-work welcome function Hiraoka san insisted on taking us to experience a local lunch delicacy. *Hitsumabushi* is a famous Nagoya favorite. It is grilled eel glazed with a *teriyaki* sauce on rice and is served with fresh grate-it-yourself *wasabi*, spring onion and *nori* seaweed. It also comes with a special soup.

Even the way to eat it is determined by local tradition. First, you divide the dish into four portions, the first eaten as is or with a little fresh *wasabi*. The second portion is mixed with the spring onion and *nori* seaweed, after which the remaining two portions are infused with the special soup to make a thick porridge. The methodology is quite ingenious and what starts out as a fairly simple offering of eel on rice ends up producing three very different and delicious taste experiences.

Feeling very full and a little guilty over such an indulgent lunch, we headed off to explore the main excuse for choosing Nagoya, the 2005 World Expo. International expositions have been held around the world for over 150 years, the first being the 1851 Great Exhibition in London. Traditionally, they have offered countries chances to show off their best—culturally, technologically and commercially. Many national symbols and

Left: **Nagoya Branch Office staff**

Right: **Nagoya Branch Office**

daily conveniences were born out of world expos, the classic example being the Eiffel Tower, undeniably the most obvious symbol of Paris, built for the 1889 *Exposition Universelle*. The theme of this world expo is Nature's Wisdom, so not surprisingly the expo site, a short trip outside the city, is notable for its open spaces and greenery. Over 150 countries have set up pavilions, then there are commercial pavilions and a number of nature and educational precincts, so with just an afternoon and evening in which to explore, our hardest task was deciding exactly where to visit.

We decided to start with one of the most highly anticipated exhibits, the Mammoth Lab, where on display, behind glass and refrigerated, was a real frozen Mammoth specifically excavated from arctic Siberia and brought to Japan for the Expo. As happy as I was to have only had to line up 15 minutes for entry, I was a bit disappointed to be whisked past on the moving walkway in less than three minutes. So, with my appetite for mammoth not quite sated, we decided to visit the Russian pavilion where they also had full mammoth skeletons on display.

On the assumption that basically all pavilions would offer something of interest, and given our tight time schedule, we decided that the best strategy was to visit any pavilion that offered quick entry. Nevertheless, we did have a few specific targets. Having been unable to convince senior management that they should send me to profile the newly opened NK Amman Office in person, I at least wanted to visit the Jordan pavilion to see what I might be missing. The pavilion offered everything from spa baths featuring water imported by tanker from the Dead Sea to hands-on demonstrations of cultural specialties like a colored sand sculpture in a bottle, all of which made me even more disappointed not to be able to visit in person.

Ten or so pavilions later and evening was not the only thing about to overwhelm us. Clouds had gathered and torrential Japanese summer rain threatened. We abandoned our previous strategy and joined the queue for the Mitsui-Toshiba pavilion, even though it was about an hour's prospective wait, because it was the only one under cover. Our timing proved immaculate as the heavens opened and hundreds more poured in, happily behind us in the queue.

The long wait, however, was well worth it. Visitors are welcomed 20 at a time, and one by one have their faces digitally scanned. They then enter a mini theater to watch a 10-minute animated space adventure where their faces have been digitally super-imposed on the characters and everyone becomes a movie star, if only for 10 minutes. For this writer, being leader of the security detail who saved the day on a space adventure was a nice way to end a long and tiring afternoon and evening at the Aichi Expo 2005.

2005 World Expo in Nagoya

Above: Mr. S.S. Teo (center), Managing Director of Pacific International Lines, with M. Murakami (left), ClassNK Executive Vice President

Left: *Kota Kado* launch

Despite not returning from the Expo until after 10 p.m. the night before, we were up and away on the 8 a.m. bullet train to Toyohashi the next morning. About an hour away from Nagoya by train and then taxi, Toyohashi Shipyard is an immaculately presented site, one of the cleanest and best organized of the dozens of shipyard I have visited.

The General Manager of the Quality Assurance Department, Mr. Norihide Momozaki, warmly welcomed us amid the busy preparations for the morning's christening ceremony and graciously accepted my compliments on the presentation of the yard. We had come for the christening of the *Kota Kado*, a 31,070gt, 3,081-TEU container carrier built for Pacific International Lines Pte Ltd., one of Singapore's leading shipping companies, and a valued NK client that also has members on both the NK Singapore Committee and the Singapore Technical Committee.

The christening went off smoothly with all the attendant pomp and ceremony, whereupon we all traipsed onboard to tour the new vessel. All the facilities were first-rate, with the only equipment yet to be installed being the crew gymnasium!

Dashing back to Nagoya, we rented a car so we could visit a few of the sites and drive to the next day's ceremony. Readers of last year's *ClassNK Magazine* will have learnt that one in 20 residents of Hiroshima depends directly or indirectly for his or her livelihood on Mazda, and I strongly suspect that the figures are at least the same for Nagoya and Toyota.

Although these days Nagoya has a diverse business base, there is no doubt that Toyota is the heart of the city, and we decided the best way to get a feel for this was at the Toyota Museum, a short drive outside the city area. Spread over three levels and featuring over 120 vehicles, the display is nothing short of spectacular, with everything from Model T Fords to the first Toyotas, together with a wide cross section of imported and Japanese makes, chronicling in detail the rise of the automobile, with particular reference to Japan. The new annex adds interest by focusing on the history of the motorization of Japan and the integration of popular culture and lifestyles through different periods before and since World War II.

On the way back, we decided we should visit Nagoya Castle (*Nagoya-jo*). Built in the beginning of the Edo Period (around 1610) for one of the three Tokugawa family branches, the

The first Toyota car

Owari family, Nagoya developed into an important castle town on the road between Tokyo and Osaka. *Nagoya-jo* is famous for the two golden *shachihoko* (gargoyles) that adorn the top of its *donjon* (main keep). That is why it is also known as *Kinshachi-jo*. *Kin* means gold and *shachi* refers to killer whale-type mythical creatures that sit atop the *donjon* and other castle structures.

The castle was almost completely destroyed in the air raids of 1945 and the current ferro-concrete reconstruction dates from 1959. The interior houses an interesting museum displaying Edo period armor, *fusama-e* (paintings on sliding doors) and other art treasures that remained unscathed by the bombing in World War II. The three corner turrets, the second front gate and the massive walls and moat also escaped wartime damage and many of the massive stones in the walls can still be identified with names of the various feudal lords who donated them and engraved their marks upon them.

Nagoya Castle

Our third and last day took us about as far as Toyohashi from Nagoya, but in the opposite direction, to Universal Shipbuilding Corporation's yard in Tsu, an hour and a half drive south of Nagoya, for our second christening in two days. As it was on the way, we decided to drop in to investigate one of the more interesting local industries. Unbeknownst to me, this area, known as Yatomi-cho, is the goldfish breeding capital of Japan. And although I had seen thousands of goldfish over the years, I had never stopped to think of where they all come from. We visited one of the largest breeders, Maluu Co. Ltd., which not only sells to Japanese but is also a major exporter. This was an auction day, when buyers from all over came to bid on hundreds of lots divided by breed, age, and a host of other characteristics. Although we couldn't stay on for the actual auction, we did get an advance viewing and were amazed by the variety and numbers.

The persistent heavy rain that had dogged us since we left Nagoya, threatening to ruin the day's ceremony, miraculously cleared as we drove into Tsu, to the obvious relief of all concerned, none the least me as photographer. The Tsu yard is part of what is now known as Universal Shipbuilding, which grew out of the merger between the shipbuilding parts of Hitachi Zosen Corporation and NKK Corporation in 2002. Universal is now the number one shipbuilder in Japan, completing 24 vessels of 19 million gross tons in 2004 and with an order backlog in excess of 100 ships. This day, we had come to the Tsu yard for the christening of the *Azul Cielo*, a 101,933gt capsize bulk carrier built to NK class for charter to Eurasia International. Despite the absence of the traditional slipway launch, the christening was as impressive as usual, complete with balloons, streamers and fireworks.

With a long drive back to Nagoya and a train to catch back to Tokyo, we forwent the otherwise obligatory ship tour and refreshments and headed back, a busy but very interesting three days in Aichi successfully completed.

Launching ceremony of the *Azul Cielo*

CHIKYU

The *CHIKYU*, the world's most advanced deep-sea scientific drilling ship

In the 54th edition of *ClassNK Magazine*, published in 2002, we profiled the *CHIKYU*, a state of the art deep-sea scientific drilling ship to be built for Japan. It was ordered by the Japan Agency for Marine Earth Science and Technology (JAMSTEC) and was to be built to NK class. Construction of the *CHIKYU* commenced in 1999 and was expected to be completed around the middle of 2005. The ship was to be the most advanced deep-sea scientific drilling ship in the world with a safe and reliable riser drilling system and state of the art dynamic positioning system.

As planned, the *CHIKYU* was delivered to JAMSTEC in a ceremony at the Mitsubishi Heavy Industries, Ltd., Nagasaki Shipyard on the 29th of July 2005. Further sea trials and a training cruise began right after delivery. JAMSTEC plans to open the vessel to the general public in September 2005 in the Tokyo metropolitan area. After that, the current plan calls for the *CHIKYU* to undertake a range of operations under so-called Integrated Ocean Drilling Programs, to commence in 2007.

The Ocean Drilling Programs have several goals, such as studying earthquake generation and plate tectonics and exploring potential new energy resources. These programs will require drilling in deeper water than ever before and drilling deeper into the earth than ever before. Because of this, the *CHIKYU* incorporates the most advanced drilling and positioning technology available. With its advanced positioning technology, the ship will be able to carry out deep sea drilling under, for example, wind speeds up to 23m/sec, and wave heights up to 4.5m, wave periods up to 8.2sec and a surface current of 1.5kt. The *CHIKYU* will be able to drill up to 7km into the earth and in waters up to 2km deep. The setup is variable and therefore the ship will be able, for example, to conduct ocean drilling in areas with faster surface currents, like the Pacific Ocean trough along the Japanese coast, if in combination with milder weather conditions.

JAMSTEC officials and guests at the *CHIKYU* delivery ceremony

FACT BOX:

PRINCIPAL PARTICULARS OF THE *CHIKYU*

Class	ClassNK
Cruising area	Open seas (international waters)
Overall length	210m
Breadth (mld)	38m
Depth (mld)	16.2m
Height (above waterline)	121m
Total height	130m
Draught (mld)	9.2m
Gross tonnage	Approx. 57,087gt
Maximum speed	12 knots
Propulsion system	Diesel-electric propulsion
Max. complement	150 persons (100 crew, 50 researchers)
Cruising range	About 14,800 nautical miles (fully loaded, at 10 knots)
Thrusters	Azimuth thruster : 4,200 kW x 6 Side thruster: 2,550kW x 1
Generators	5,000kW x 6, 2,500 kW x 2 for total of 35,000 kW
Dynamic positioning system	NK DPS-B

Harvest

From the Sea

The seas have for thousands of years provided a seemingly limitless bounty for much of humanity by way of fish, shellfish and a variety of other animals. But as we learn more and more, we have come to realize that the bounty is not limitless, and we have to manage the resources of the seas more efficiently than ever before. One obvious way to better balance our use of this harvest from the sea would be to diversify it, boosting the amounts of non-animal foods we harvest, or even to increase farming them. The general term used by professionals promoting this idea of stepping up the amounts of non-animal foods we harvest is "sea vegetables." This is a broad term, but for most of us it probably boils down to what we all know as seaweeds.

Seaweeds have probably been part of the diet of coastal peoples intermittently for thousands of years. For at least the last several hundred years, seaweeds have been used as staple foods in countries such as China, Japan, and Korea. As people from these countries have migrated around the world, this custom has moved with them, so that today there are many more countries where the consumption of seaweed is not unusual.

On the east coast of the United States of America and Canada, around Maine, New Brunswick, and Nova Scotia, some companies have begun cultivating seaweeds onshore in tanks, specifically for human consumption, and their markets are growing, both in those two countries and with exports to Japan. Seaweeds have nevertheless gained greater popularity in regions like California and Hawaii, where migrant and tourist communities of Japanese are larger and where they have introduced seaweeds to restaurant menus and the like.

Ireland and Northern Ireland are also showing a renewed interest in seaweeds that were once a traditional part of their diet. And according to the Food and Agriculture Organization of the United Nations, in recent years there has even been a strong movement, for example, in France to introduce seaweed into the European cuisine. This has been somewhat successful, although seaweed is still regarded as an exotic component of the menu. Already on the market in many countries around the world are cooking books incorporating recipes using "sea vegetables." With the current trend for consumers to embrace organically grown foods and natural foods from clean environments, seaweeds should receive an increasing acceptance.

Harvesting Irish Moss on the east coast of Canada

The main edible species, and indeed all seaweeds, fall into three groups, distinguished by their basic color, notably, green and blue-green, brown, and red seaweeds. Let's look at a few of the most common edible seaweeds from around the world.

Dulse, dilisk or dillosk (*Palmaria palmata or Rhodymenia palmata*) is traditionally popular in Scotland. It grows in the cold coastal waters of both the Atlantic and the Pacific, is probably the most widely distributed of the edible red seaweeds, and many consider it to be the most delicious. Dulse is extremely rich in iodine, phosphorus, calcium, and contains more potassium than any other food. It can be served in a variety of ways, as a side dish, in soups and salads, as a sandwich ingredient or in powdered form to be used as a spice or flavoring. It was prized by the Celts and the Vikings and has been harvested on beaches at low tide, air-dried, and boiled in soups from Ireland to Iceland well into the 20th century. The people of Scotland, Ireland, and Iceland have been using dulse for centuries, and collect it off their coasts, often with considerable difficulty. These days it is successfully cultivated along the coast of Brittany, in France. Dried dulse is also popular in Canada, where it is available in most major food outlets and where much of the world's supply is harvested in New Brunswick and Nova Scotia. From there, it is exported to Scotland, Ireland, and even to the United States.

Laver (*Porphyralaciniata*) is a reddish purple, crinkly seaweed that is also gathered off the shores of the British Isles. This ancient food has been valued for centuries by the Scots, Welsh, and Irish. When cooked, it turns a greenish brown. In Scotland, it is dipped in oatmeal and fried or made into a puree. The Welsh marinate it in oil and lemon juice and serve it with black pepper on toast. The water in which laver is cooked turns into a thick jelly that, when combined with potatoes and other vegetables, makes a delicious and healthy soup. Laver is not generally available outside of Great Britain and Ireland but, with an increased interest in sea vegetables, it may not be long before it is also offered overseas.

Despite its name, Sea lettuce, otherwise known as sea laver, lettuce laver, or laitue de mer (*Ulva lactuca*) is actually a member of the cabbage family. Its thin, crinkled, lettuce-like leaves change from pale to dark green as they grow and age. It has a mild flavor and when dried, it is similar to spinach in smell and appearance and can be used raw or cooked. It has a worldwide distribution, and is possibly the most widespread, if not the most eaten, of the edible green seaweeds.

Similarly, Irish moss, otherwise called carrageen or Iberian moss (*Chondrus crispus*) is actually a seaweed and not a moss. It is found along the coasts of the North Atlantic in both Europe and North America. It can either be reddish-purple or green in color. Ireland is a major source of the world's supply and is where it is steamed and eaten with potatoes or cabbage. Its most common use outside of Ireland is in the making of rennet-free gelatin (carrageen), preferred by vegetarians since true gelatin is an animal product.

Sea Lettuce, a member of the cabbage family

Japanese Favorites

While the popularity of seaweeds has waxed and waned over the years in some parts of the world, they have always been a popular and important part of the Japanese diet.

Konbu

Japanese kelp, or *kombu*, (konbu), or laminaria (*Laminaria japonica*) is the best-known species of kelp. It has broad, shiny leaves and flourishes in cool waters off the coasts of Japan, Korea, Siberia, and Brittany in Northwest France. It has been cultivated in Japan for about 300 years and elsewhere on a large scale for about 40 years. A rich stock (known in Japan as dashi) can be prepared from kelp because of its high concentration of the flavor-enhancer, glutamic acid. The best varieties of *konbu* grow in the cool pre-coastal waters of the northern-most Japanese island of Hokkaido where their broad, sweet-tasting leaves grow up to 33 feet long.

Nori is the edible seaweed belonging to entirely different families of algae. There are about 30 different red and green seaweeds, mostly of the genus *Porphyra*, sold under the name of *nori*. The most important of these are *Porphyra umbilicalis*, *P. tenera*, *P. yezoensis*, and *P. haitanensis*. *Nori* is important from a culinary and an economic standpoint in Japan, where over 300,000 metric tons of it are harvested each year. Cultivation takes place on raft-like screens. The widely distributed species *P. umbilicalis* is native not only to Japan but also to the coasts of the Atlantic, the North Sea, the Baltic Sea, and the Pacific coasts of North and South America, and the beaches of Hawaii. In Ireland, it is called sloke; and, in Wales, laver, and eaten as a fresh vegetable. To produce *nori* as it is usually purchased, fresh seaweed is chopped, pressed between bamboo mats, and dried either in drying rooms or in the sun. Good quality *nori* is mild-tasting and black in color but with a purple sheen.

Nori

Wakame (*Undaria pinnatifida*) is one of the most important species of seaweed, next to *nori*, on the Japanese menu, and is eaten both dried and fresh. The nutritional value is high, as the leaves consist of 13% protein, as well as containing substantial amounts of calcium. *Wakame* is a brown alga or kelp and grows in water 20 to 30 feet deep. It is usually harvested from boats by means of long hooks and then sold fresh or sun-dried. Since this seaweed is salted for transport, some rinsing usually takes place before eating. The *wakame* is thoroughly rinsed under running water, then placed in boiling water and boiled for 30 seconds, then rinsed in ice water. The leaves are then spread out and depending on use, the hard midrib removed.

Wakame

Hijiki, (*Hizikia fusiformis*) is among the most mineral-rich of plants, containing 14 times as much calcium as cow's milk. It is a highly branched black seaweed and is so tough that after its first drying it must be cooked for up to four hours under pressure before being allowed to dry again. It has a uniquely astringent, but nutty, flavor and is very popular as a snack to nibble on while drinking at a bar or at home. It is also commonly served as a small appetizer while you wait for your first dish to arrive.

Hijiki

An Introduction to the Valparaíso Office

The ClassNK Valparaíso Office was established by Mr. Takashi Kuroda, now General Manager of Sakaide Branch, in 1996, having originally started as a small office in Santiago, moving to Valparaíso in April 1997. By that time Mr. Gustavo Miranda joined as General Manager and Ms. Barbara Manubens as Secretary.

The Valparaíso Office has grown in recent years, adding two additional Exclusive Surveyors, Mr. Fernando Faúndez and Mr. Carlos Peters, and one Office Clerk, Ms. Claudia Rojas. In 2002, it moved to more spacious premises in one of the most modern buildings in the area, located in Viña del Mar.

The Valparaíso Office covers surveys and audit jobs at ports in Chile and Peru. Due to the geographical characteristics of Chile, stretching 4,270km from north to south, the travel times can be very long.

The Valparaíso Region has a mild climate with its economy based on agriculture, mining, light industry and tourism. The region offers a complete variety of outdoor activities, such as camping, hiking, skiing, and fishing. Water sports and enjoying its sandy beaches are two musts, and the local cuisine and the Casino should not be forgotten.

Valparaíso was founded in 1542, and after independence it became one of the most important ports on the Pacific Coast of South America.

Clockwise from lower right:

Ms. Claudia Rojas, Office's Clerk, Mr. Gustavo Miranda, General Manager, Ms. Barbara Manubens, Secretary, Mr. Fernando Faúndez, Exclusive Surveyor, and Mr. Carlos Peters, Exclusive Surveyor

The city of Valparaíso actually consists of two completely different parts. The lower part has characteristic narrow streets around the bay, while the upper part boasts great colorful houses, this being the city with the most character in Chile. Thus, Valparaíso was recently nominated as an example of the Cultural Heritage of Humanity following unanimous approval by the Executive Committee of the United Nations Educational, Scientific and Cultural Organization.

In order to achieve this nomination, basically, three sectors were highlighted:

The first included the Matriz Salvador Church, a National Monument and Typical Zone since 1971, and the Echaurren Square, both located in Cerro Santo Domingo; these were chosen because they were the centers of the first urban settlements starting in the 16th Century.

Matriz Salvador Church

The second sector chosen was the banking sector, reflecting the engine of the port's trading and port activities, which began in the 19th Century.

Finally, the two hills that look out over the Bay of Valparaíso stand out for their beauty. These are Alegre and Concepción

The Turri Clock in the banking sector

hills, where the first colonies of English and German immigrants built their houses along the uneven nature of the terrain. One hill has one of the 15 typical elevators that still work today and which were declared National Monuments in 1998.

Similarly, the trolleybuses, whose routes crisscross the port's historical area, will soon be added to the list of National Monuments. These trolleybuses were inaugurated in 1953 and are among the few that are still operating in Latin America. They are silent and environmentally friendly and they are also one important reason why Valparaíso is now a fine example of the Cultural Heritage of Humanity.

Valparaíso typical elevators

An Introduction to ClassNK Taiwan

Taiwan (formerly known as Formosa) lies only about 160 kilometers off the east coast of the mainland of China in the Pacific Ocean. Shaped somewhat like a tobacco leaf, the island is 394km from north to south and 144km from east to west at its widest point. With a total land area of nearly 36,000km^2, including Kinmen (Quemoy) and various other islands, Taiwan is slightly larger than Belgium.

The total population of Taiwan is nearly 22.9 million people (as of June 2005) and mainly consists of three groups: the Han Chinese, the Kuomintang, and numerous indigenous tribal peoples. Several waves of Han Chinese migrated to the island during the 16th, 17th and 18th centuries, mostly from the mainland provinces of Guangdong (15%; consisting mainly of Hakka Chinese, also known as *Kechia Ren*) and Fujian (70%; consisting mainly of Min Nan and Heluo Chinese, also referred to as *Min Nan Ren* and *Holuo Ren*) and they make up some 85% of the total population.

The Nationalist Kuomintang (the former mainland government who lost to the Communists in 1949) and their families fled the Chinese mainland in 1949 and now make up nearly 13% of the population, while various indigenous tribal peoples and assorted other minorities make up the remaining 2%. Although the official language is Mandarin Chinese (*Putong Hua*), Minnanese, widely known as Taiwanese (spoken by the Min Nan and Heluo Chinese) and Hakka (spoken by the Hakka Chinese (*Kechia Ren*)) are most commonly used in daily life and conversation within each respective ethnic group.

NK in Taiwan

The NK Taipei Office and Kaohsiung Sub-office both opened on the 1st of July 1972 and between them had a total staff of seven (one general manager, one exclusive surveyor and two office staff in Taipei and two exclusive surveyors and one office staff in Kaohsiung). At the time of opening, most of the on-site surveys were carried out at the Port of Keelung, north of the capital city of Taipei, and in the Port of Kaohsiung in the southwest corner of Taiwan. Since then, however new ports have been opened around Taiwan one after another, including the Ports of Taichung, Hualien, Su-ao, and Mailiao as well as the port of Anping in Tainan City. This has also resulted in a gradual increase in the amount of work done by both survey offices, so that now the combined staff totals 15 (10 exclusive surveyors and five office staff).

In addition to the above NK employees, there are also four exclusive surveyors from Japan on long-term assignment to the China Shipbuilding Corporation Kaohsiung Works, who are currently handling newbuilding surveys for ships being built at the yard.

The Major Ports of Taiwan

Keelung

The Port of Keelung is located at the northern end of the island of Taiwan about 40 minutes northeast of Taipei overland by rail and road and is the second largest international port in Taiwan after the Port of Kaohsiung in the south. The port was first established by the Spanish in 1626 as they advanced into Taiwan (Formosa at that time) in competition with the Dutch and sought a supply base for the sea route connecting Japan and the Philippines. However, the area gained prominence in the 19th century and later as it gained greater geographical importance to Western powers. Although the Port of Keelung declined temporarily after World War II because of the interruption in diplomatic relations with mainland China, it recovered from the 1960s on, as the front door to Taiwan in conjunction with the development of the industrial areas that spread through the suburbs of Taipei, and maintained its premier position into the 1990s.

However, there was a limit to how much the port could be further expanded with additional piers due to the natural limits imposed by the topography and mountains surrounding the port area. In contrast, the improvement and expansion of the Port of Kaohsiung proceeded apace, with that port overtaking the Port of Keelung in 1995 as the current number one port in Taiwan.

In order to overcome these limitations and enhance the efficiency of handling the export of industrial goods produced in the industrial areas north of Taipei, the government of Taiwan decided to build a new Port of Taipei at the mouth of the Tan Shui River to the west of Taipei City. As part of these efforts, the Port of Taipei Alliance, which consists mainly of Evergreen Marine, Yang Ming Marine, and Wan Hai Lines, is currently working on a Port of Taipei container terminal project with construction targeted to be completed by 2014.

Left: **China Shipbuilding Corporation Kaohsiung Works**

Top : **Taipei Office staff**

Bottom: **Kaohsiung Sub-office staff**

Kaohsiung

The Port of Kaohsiung is located in the southern part of the island of Taiwan. It is a natural harbor protected from the open sea by the Chi chin Peninsula. Although the port was improved during World War II by the Japanese who used it as a naval port and supply base for their operations in other countries in Southeast Asia, it was expanded in earnest after the war by the government of Taiwan as part of a ports and harbors development and expansion policy. As one of the largest ports in the world, the Port of Kaohsiung currently has 122 piers for commercial use.

Additional mega-terminals are also currently being added to accommodate giant-sized 15,000-TEU container ships, while shore-based cargo handling facilities are also being expanded. Major Taiwan shipping companies Evergreen Marine Corporation, Yang Ming Line, and Wan Hai Lines, established in the 1960s and early 1970s, have played significant roles in building up the position of the Port of Kaohsiung into a major

international port that boasts a container handling capacity exceeding 10 million TEU per year, one of highest in the world. Indeed, the rapid growth of the business efforts of these three companies has been instrumental to powering the expansion and development of Kaohsiung Port.

Keelung Port

Daily Life in Taiwan

The most common means of transport for people in Taiwan is a motorbike or scooter, and the number of registered motorbikes and scooters reportedly equals nearly half the total population of the island. Even though the modern Taipei Rapid Transit system, with its seven train lines, now services the Taipei metropolitan area as a major means of public transport between the suburbs and central city areas, the number of motorbikes and scooters in use still continues to rise steadily.

During the morning and evening commuter rush hour, legions of motorbikes and scooters sweep along the main roadways. A special feature of this traffic is that the instant the light turns green, there is a headlong, mad dash across the intersection much like a big-time auto race. Young women in miniskirts straddle the back of the seat, clinging to the backs of the men driving the bikes while it is just as common to see families of three riding on a single bike, with the child in front and the wife hanging on from behind.

It seems that there is a law in Taiwan requiring that the portion of every building fronting a street be provided as a space for public use as a sidewalk. As a result, many buildings are built in such a way that only the ground floor is built back from the street while all the upper floors directly front the street. Thus, the second and upper floors of most buildings overhang the street-level front of the building.

Kaohsiung Port

The result is a natural arcade along the street where in theory at least pedestrians can conveniently walk along out of the sun and rain. Unfortunately, though, the sidewalks are mainly used to park the hordes of motorbikes and scooters mentioned earlier. This makes the sidewalks too narrow to navigate, so everyone is obliged to walk out in the street after all and they all end up getting wet in the rain instead of the motorbikes and scooters.

Despite the image of the thriving metropolis that is Taiwan, the island is also graced with stunning natural vistas, including the highest mountain peak in East Asia, *Yu Shan* (Jade Mountain), which reaches 3,952m above sea level.

During the period of Japanese rule before WWII, the peak was called *Niitaka-yama* (Mount Niitaka). It became famous during WWII when it was used on 8 December 1940 in the secret code "Climb Mount Niitaka!", which authorized the attack on Pearl Harbor. It is interesting to note that the Tropic of Cancer passes through the summit of this mountain and that further to the east, it passes just north of the Hawaiian islands. Although much of the history of Taiwan has been greatly affected by the flows of events beyond its control, such as by the actions of the great Western Powers and the old Japanese Imperial army, Taiwan still faces many political challenges. And yet, the slopes of *Ali Shan* (Ali Mountain) in the western foothills of *Yu Shan* are graced with trees thousands of years old that are unconcerned with such extraneous affairs, retaining a magical and serenely timeless beauty all their own.

Topics & Events

The first Malaysian Committee meeting

1st Meeting of the Malaysian Committee

The first meeting of the Malaysian Committee was held on the 22nd of July 2005 at the Mandarin Oriental Hotel, Kuala Lumpur. Nine members of the committee were present under the chairmanship of Dato' Shamsul Azhar Abbas. Mr. M. Murakami, Executive Vice President, delivered an opening speech expressing his sincere thanks to all committee members attending the meeting and he highlighted the aims of establishing the Committee.

NOR-SHIPPING 2005 in Oslo, Norway

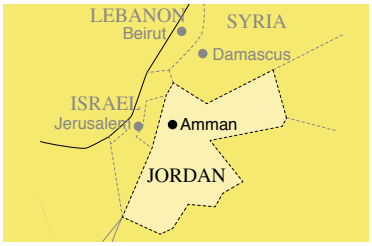
GASTECH 2005

ClassNK participated in GASTECH 2005, which was held from the 14th to the 17th of March in Bilbao, Spain. GASTECH is an international conference and exhibition held every other year for the LNG, LPG, and natural gas industries. The Society had also attended the previous exhibition held in 2003. In addition to the various general activities and technical services of the Society, explanations were given to booth visitors about NK market share, LNG/LPG tankers under class, and actual examples of LNG carriers that had recently entered NK class (the *Energy Frontier* and *Shinjumaru No. 1*), as well as about recent research activities into sloshing in membrane type tanks as well as other topics using display panels.

GASTECH 2005 in Bilbao, Spain

NOR-SHIPPING 2005

NOR-SHIPPING 2005, one of the biggest international maritime trade fairs was held from the 7th to the 10th of June in Oslo, Norway and NK participated in the exhibition as usual. It was very successful, with more than 800 companies and associations participating, and with 20 countries including Japan and Korea having national pavilions. There were also more than 15,000 visitors according to the organizer. At the NK booth, the NK introduction video was shown and various printed materials were prepared for presentation and distribution to the many visitors including ship owners, shipyards and engine builders. Chairman and President Mr. K. Ogawa visited NOR-SHIPPING 2005 in order to promote the presence of NK in Europe.



Amman Office and Santos Local Area Representative Established

Amman Office

On the 1st of July 2005, the Amman Office was established in Amman, Jordan, further expanding the NK survey network in the Middle East. The General Manager is Mr. Jamil Ali Alabdullah Alhussein, and the Office covers Jordan, Lebanon and Syria.

Local Area Representative at Santos

An Exclusive Surveyor has been stationed at Santos, Brazil, since the 1st of July 2005, as the local area representative at Santos. Mr. Daniel Americano Quintela is the resident Exclusive Surveyor under the jurisdiction of the ClassNK Rio de Janeiro Office.

Above:
Annual Report 2004

Right:
An Introduction to ClassNK

Annual Report 2004 and New Edition of *An Introduction to ClassNK* published

The 2004 edition of the *Annual Report* (English and Japanese editions) was recently issued and distributed to parties concerned both inside and outside the Society. The *Annual Report 2004*, contains many articles including reports on the activities of various overseas offices with many photographs and a special article on approval from the Maritime and Coastguard Agency of the United Kingdom to conduct statutory surveys in that nation.

Also, updated editions of *An Introduction to ClassNK* (Japanese, English and Chinese editions) have been produced. The design of the cover was changed and the many services of the Society are introduced. Please note that both *Annual Report 2004* and *An Introduction to ClassNK* can be viewed or downloaded from the Publications section of the ClassNK website. If you would like to receive a printed copy, please contact the Information Service Department directly.

Contribution to Disaster Relief Efforts in Wake of Earthquake off Coast of Sumatra and Indian Ocean Tsunami

The Society made charitable donations totaling the equivalent of 4 million yen in support of the reconstruction efforts taking place in the wake of the major seaquake that took place off the coast of Sumatra on the 26th of December 2004 and the subsequent tidal wave that occurred as a result. It was decided that the charitable support would consist of contributions from the following overseas branch offices in the stricken areas and made to local funds. The donations via all three offices have already been disbursed to each respective fund.

1. Jakarta Office: Indonesian Red Cross Society, the equivalent of 2 million yen
2. Bangkok Office: Donation to Disaster Relief Fund, the equivalent of 1 million yen
3. Mumbai Office: Prime Minister's National Relief Fund, the equivalent of 1 million yen

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