

ClassNK



Annual Report 2005

Profile

Nippon Kaiji Kyokai, also known as ClassNK or just “NK,” is a ship classification society. The principal work of the Society’s expert technical staff is to undertake surveys to ensure that the Rules which it has developed are applied to newbuildings and existing ships in order to ensure the safety of these vessels. The rules cover not only hull structures but also safety equipment, cargo handling gear, engines, machinery, and electrical and electronic systems, among others. By the end of December 2005, the Society had 6,396 ships totaling 134,492,993 million gross tons (gt) on its Register. This figure represents approximately 20% of the world merchant fleet currently under class. Although based in Japan, where it has 21 offices, ClassNK has worldwide representation through a network of 75 exclusive surveyor sites in 42 countries. ClassNK surveyors work in shipbuilding and repair yards and at ports across the world, wherever they may be called upon to examine the condition of a ship, so that all of the Society’s services are available worldwide. On the 15th of November 1999, Nippon Kaiji Kyokai celebrated the centenary of its foundation.

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The NK Mission

ClassNK is dedicated to ensuring the safety of life and property at sea, and the prevention of pollution of the marine environment.

To achieve this mission ClassNK will:

- Focus on delivering the highest quality classification services by the highest quality personnel while maintaining its totally independent third party, non-profit status.
- Focus on the development of relevant Rules, procedures and guidance, and maintain and develop its commitment to scientific and technological research, development and education.
- Maintain and develop its global operations in line with the needs of those using its services.



Chairman's Message



Welcome to the 2005 Nippon Kaiji Kyokai Annual Report. It was a very good year for ClassNK.

Operational Backdrop

Despite the global phenomenon of terrorism striking yet again, in such places as London and Bali, and an even a greater number of natural disasters, such as the ravaging of the U.S. Gulf coast by Hurricane Katrina, a major earthquake in the northeastern part of Pakistan and severe typhoons in Japan, shipping continued the boom conditions it enjoyed in 2004.

On the economic front, the various countries of East Asia maintained a high level of growth, expanding more than 7% for the year, with China leading the way at about 9.3%, while the West continued its upward swing from the previous year.

In macroeconomic terms, Japan continued to experience a state of mild deflation, though by the end of the year, the consumer price index rose for the first time in two years, stock prices recovered with the Nikkei average reaching the ¥16,000 level for the first time in five years, and the rate of real economic growth recovered to 2.7%.

Record Prosperity

Against this backdrop of economic conditions in Japan and overseas, the global maritime industry, which affects us directly, enjoyed another year of record-breaking prosperity.

It is estimated that newbuilding activity in both Japan and Korea reached around 16 million gt each, plus about 7 million gt in China, with the global total reaching some 47 million gt, greatly exceeding the record set in 2004.

Not surprisingly, under these prosperous conditions the Society was also able to prosper. About 12.4 million gt of newbuildings entered NK class in 2005, exceeding the 2004 record of 9.7 million gt by more than 20%. All told, the Society currently has about 134.5 million gt of ships under class representing more than 20% of the total world commercial fleet. We were also very fortunate that there were no major casualties of any ship under NK class.

With the survey and audit of an expected 14 million gt of newbuildings in 2006, on top of class maintenance surveys for more than 134 million gt of existing ships to take care of, I believe NK will be extremely busy for the foreseeable future.

New Challenges

Yet at the same time that we deal with this workload, we must also strive for qualitative improvements in our work.

Thus, I believe it is necessary for us to continue our excellent research and development programs, further develop our IT systems and services, enhance our survey network, and continue to cultivate new markets even more aggressively.

In particular, it is important for us to strengthen our overseas support from Japan to provide high-quality services to shipbuilders and shipowners with respect to technical services for new shipowners and

requests for surveys in South Korea, China, and amongst other up and coming shipbuilding nations.

Of the 14 million gt of newbuildings expected to enter NK class in 2006, some 1.5 million gt, or just over 10% of the total, are scheduled to be built in Korea, China, and elsewhere. So, I believe that we all must make every effort to carry out the quantitative and qualitative activities mentioned above even more efficiently.

Internally, we need to maximize the technical potential of NK, while externally we must provide even higher quality services to our clients so as to maintain and enhance the integrity and good reputation of the Society to ever higher levels.

Internationally, I am also proud to say that NK also played a leading role in the development of the Common Structural Rules (CSR), which IACS has been developing since the year before last. The CSR were adopted by the IACS Council in December and are to enter force in April 2006.

I believe that especially in times of high growth such as now, it is important that the Society constantly works to attain the best management that is possible.

To that end, all management and staff of NK, including myself, board members, general managers, managers, and other members of the staff, thank you for your support in 2005 and assure you that again in 2006 we will always do our best to provide the best service we can to all NK stakeholders.

January 2006



Kenji Ogawa
Chairman and President

NK At a Glance



The first Malaysian Committee meeting

New Malaysian Committee

The first meeting of a new Malaysian Committee was held in July 2005. Nine members of the committee attended under the chairmanship of Sham-sul Azhar Abbas of Malaysia International Shipping Corporation Berhad, and membership certificates were presented to all members.

Service Sites Established

New Service sites were established in:

- Amman, covering Jordan, Syria, and Lebanon, with a new Office established on the 1st of July
- Santos, Brazil, with a Representative Office under the jurisdiction of the Rio De Janeiro Office established on the 1st of July

Charitable Support

The Society made a contribution to disaster relief efforts in the wake of the earthquake off the coast of Sumatra and the Indian Ocean Tsunami, making charitable donations totaling the equivalent of 4 million yen in support of the reconstruction efforts taking place. It was decided that the charitable support would consist of contributions from the following overseas branch offices in the stricken areas to local funds. The donations via all three offices were 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

International Exhibitions

The Society participated in three major international exhibitions in 2005:

- NOR-SHIPPING 2005 in Oslo, Norway, on 7-10th of June
- GASTECH 2005 in Bilbao, Spain, on 14-17th of March
- Marintech China 2005 in Shanghai, China, on 6-9th of December



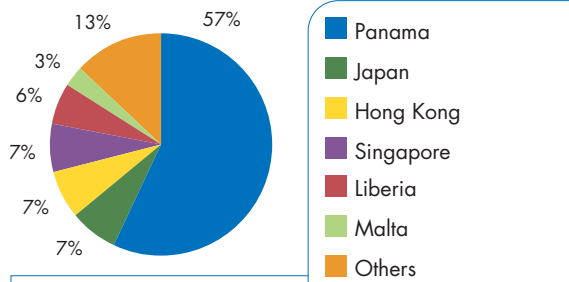
NOR-SHIPPING 2005 in Oslo, Norway



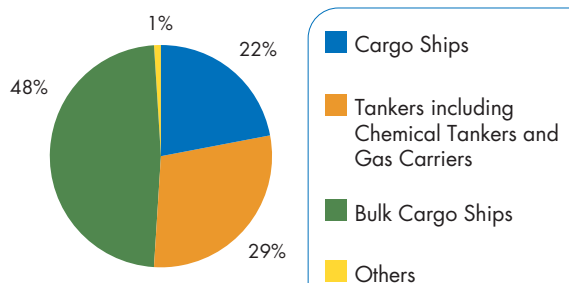
GASTECH 2005 in Bilbao, Spain



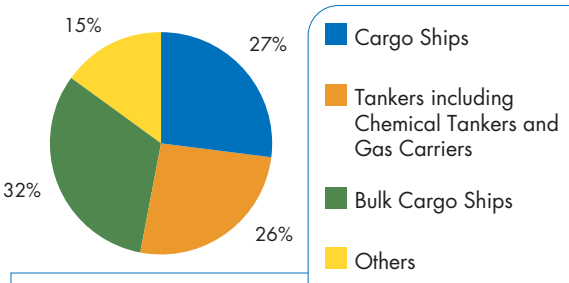
Marintech China 2005 in Shanghai, China



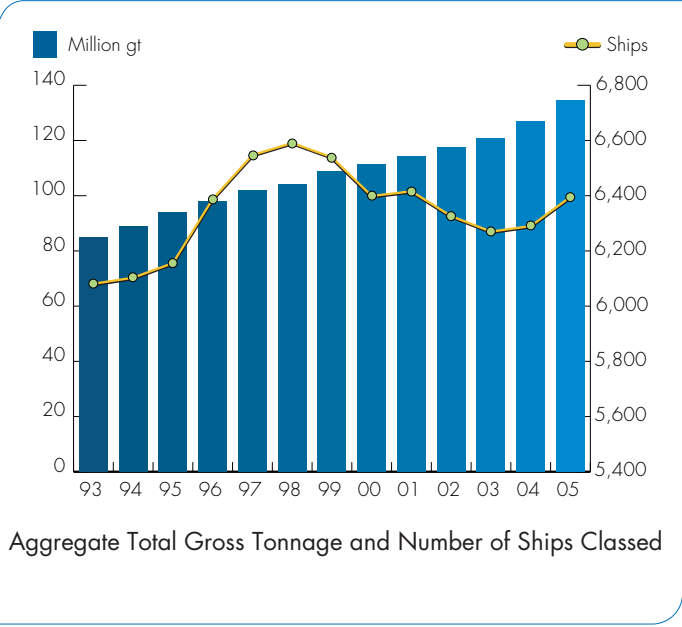
Breakdown of NK-Classified Fleet by Flag
(As of end of 2005: Total gross tonnage)



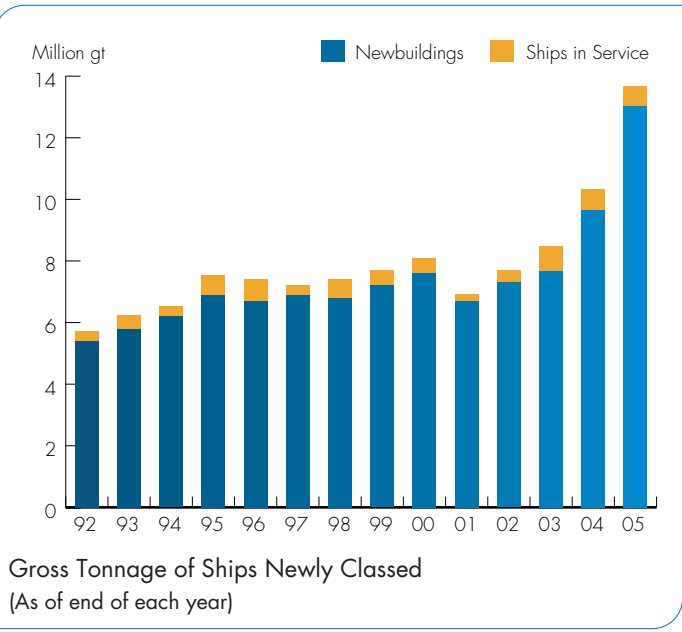
Breakdown of NK-Classified Ships by Type
(Total 134,492,993 gt)



Breakdown of NK-Classified Ships by Type
(Total 6,396 ships)



Aggregate Total Gross Tonnage and Number of Ships Classed



Gross Tonnage of Ships Newly Classed
(As of end of each year)

Establishment of Classification Committee

As part of the ongoing structural reform of the Society, the Act of Endowment of the Society was partially revised and a Classification Committee was newly established. The Classification Committee deliberates and decides upon various matters concerned with the survey and registration of vessels.

Record Newbuildings

At 424, the number of newly constructed vessels classed by the Society increased by 22% over the previous year (347), and the 12,408,135 gt classed represented an increase of 2,744,723 gt, or 28.7%, over the 9,663,412 gt added in the previous year. This was a new record for the Society.

NK in ACTION



ClassNK continued to expand and solidify its operations in 2005, classing more vessels and expanding its international presence

The Classed Fleet

The number of NK-registered ships as at the end of December 2005 totaled 6,396, or 106 more than the total for 2004. The total gross tonnage of NK-registered ships as at the end of December 2005 was 134,492,993 gt, up 7,596,925 gt on the total for the previous year. The average age of the NK fleet was 10.8 years.

Additions to the Register during the year numbered 455 ships, of 13,041,986 gt, 56 ships more than joined in the previous year and 2,696,270 gt more than joined in the previous year. Both these totals were a record for the society.

A total of 349 ships, of 5,455,359 gt, left the Register, 28 fewer than left last year, but representing 1,192,967 more gross tonnage than “lost” in 2004. Of those ships, 53 were removed for reasons of noncompliance with the Society’s rules, 17 were scrapped, and the remaining vessels are known to have transferred to other classification societies. On balance, these figures once again support the



ALTAIR TRADER

A 299,985 dwt oil carrier built by Mitsui Engineering & Shipbuilding Co., Ltd., for Fortitude Shipping Navigation S.A.



CHEMROAD WING

A 32,051 dwt oil/chemical carrier built by Kitanihon Shipbuilding Co., Ltd., for Eternal Sunlight S.A.

trend seen over the last few years of the Register tending towards fewer but much larger vessels. The number of NK-registered ships flagged outside Japan as at the end of December 2005 and their breakdown was 5,400 ships, or 84.4% of the total, and their gross tonnage was 124,879,740 gt, or 92.9% of the Register. Their ports of registry were diverse, spread across 64 nations and territories. Nevertheless, ships flying the flags of Panama, Japan, Liberia, Singapore, and Hong Kong accounted for over 75% of the total number and more than 80% of the total gross tonnage that was classed by the Society.

Newbuildings

At 424, the number of newly constructed vessels classed by the Society increased by 22% over the 347 of the previous year. The 12,408,135 gt classed represented an increase of 2,744,723 gt, or 28.7%, over the 9,663,412 gt added in the previous year, once again a record for the Society. In terms of the number of ships, these newbuildings represent 93.1% of the ships added to the Register and

95.1% of the additional gross tonnage. Shipbuilders outside Japan built 124, or 29.4%, of the 424 vessels, up from 25.4% in 2004.

Domestic Newbuilding Highlights

With 2005 a record year for newbuilding for the Society, it would be impossible to fairly and fully describe the activities of all 21 domestic offices in this report. However, below are selected highlights from a number of NK's busiest offices.

Northern Japan

In the far north of Japan, Hakodate Dock Co., Ltd., constructed several vessels to NK class, including the *African Robin*, a 31,982 dwt bulk/lumber carrier with No. 1–5 cargo holds of double-hull construction, for Orient Line Co., Ltd. Kitanihon Shipbuilding Co., Ltd., built two chemical tankers of interest, the 32,051 dwt *Chemroad Wing*, the second of four sister ships for Eternal Sunlight S.A., and the newly designed 30,058 dwt *Bow Architect*, built for Taiheiyo Kaiun Co., Ltd., and Friend Shine Shipping S.A.



NIZWA LNG

A 145,469 m³ (at -163°C, 98.5% tank capacity) LNG carrier built by Kawasaki Shipbuilding Corporation for Oryx LNG Carrier S.A.



KAIYU

A 1,703 dwt tug/work boat built by ISB Co., Ltd., for Offshore Operation Co., Ltd., in March 2005. Will fix Towing/A.H. Winches, Sharkjaw/Tow Pins as AHT&S and also will be completes DP system by Mid Mar 2006.

Tokyo

The Tokyo Branch Office is one of the largest NK offices. Though mostly handling a vast number of in service surveys, it also had its fair share of interesting newbuilds. They included the *Altair Trader* a 299,985 dwt oil tanker built by Mitsui Engineering & Shipbuilding Co., Ltd., for Fortitude Shipping Navigation S.A. (c/o MOL Shipmanagement Asia Pte. Ltd.). This was the first Mitsui-built Malacca Double Max with the Class Notation: NS*(Tob)(ESP)(PS-DA,PS-FA).

Another vessel of note was the *Kaiyu* an innovative 1,703 dwt anchor handling tug and supply boat built by ISB Co., Ltd., for Offshore Operation Co., Ltd., which has a dynamic positioning system and a sounding device capable of measuring to a depth of 10,000 meters.

Yokohama

Despite its proximity to Tokyo, the Yokohama Office is also extremely busy, serving Japan's second largest city. After a five-month hiatus, IHI Marine United Inc. resumed the local building of

NK-classed vessels, and a new shipbuilding schedule for NK class ships up to 2009 has now been fixed, totaling 15 ships (Future-52, two ships, Future-56, eight ships, and Future-87 (double-hull), eight ships).

Similarly, Sumitomo Heavy Industries Marine & Engineering Co., Ltd., in Oppama started building two NK-class Afra-max tankers at the end of 2005 after an almost two-year break.

In another sign of the scope of the shipping boom, Kanasashi Heavy Industries Co., Ltd., in Shimizu started new shipbuilding for the first time in seven years, building a 9,600 gt general cargo vessel.

Nagoya

In the Nagoya area, a new block building business has commenced at IHI SA Tec. Co., Ltd., a subsidiary of Ishikawajima-Harima Heavy Industries Co., Ltd., at the latter's Aichi works. Many blocks have been already delivered, including a super-block (the mid body of a 76 type bulk carrier) for the Marugame Works of Imabari Shipbuilding Co., Ltd.

One newbuild of interest was the *Lyra Leader* a 21,453 dwt car carrier built at Toyohashi Shipbuilding Co., Ltd., for Shohjin Shipholding S.A. The ship was fitted with the first electric fuel injection diesel engine (Eco Engine) made by Mitsubishi Heavy Industries, Ltd.

Onomichi and Innoshima

The big news in the Onomichi and Innoshima area was the opening of the new NK Innoshima Office in October 2005. Also in Innoshima, Naikai Zosen Corporation's Innoshima Shipyard merged with Nichizo-IMC and started construction of a series of NK-class container carriers.

Koyo Dockyard Co, Ltd., in Onomichi built the 180,201 dwt bulk carrier *Cape Flamingo* for Zodiac



IKAN BAYAN

A 75,777 dwt bulk carrier built by Sanoyas Hishino Meisho Co., Ltd., for N.C.N. Corporation.

Maritime Agency, while Tsuneishi Shipbuilding Co., Ltd., built the 52,454 dwt bulk carrier *Fujisuka* for Kambara Kisen Co., Ltd. This was the second vessel semi-built in Tsuneishi Shipbuilding's China workshop, underscoring an increasing trend for the construction of hull blocks at overseas workshops.

At the other end of the scale, a small shipyard in Mukaishima island started construction of an NK-class ocean-going tugboat for the first time, and new ocean-going vessels are being delivered at small shipyards in Osaki-Kamishima. Koike Shipbuilding Corp. also built its first NK-class vessel, the 3,460 dwt gas carrier *Soon Yang*, for Konet Shipping Co., Ltd.

Hiroshima

Hiroshima was symbolic of the boom in newbuilding, as two hull block manufacturing shops were newly started or reopened due to increasing hull block manufacturing. Similarly, Nakatani Shipbuilding Co., Ltd., built its first foreign-flagged, international voyage vessel, an oil carrier, the 3,644 dwt *Lukianos*, which was built for Laki Tanker SA.



KATSURAGISAN

A 311,620 dwt oil carrier built by Kawasaki Shipbuilding Corporation for Rhapsody Shipping S.A.

Kure

At the other end of the size spectrum, IHI Marine United in Kure built the 299,990 dwt double-hull VLCC oil carrier *Aquarius Wing* for Glint Shipping S.A. Another interesting locally built vessel was the 13,324 dwt Ro-Ro type general cargo ship *Aqua Blue*, notable for its aft rampway, built by Kegoya Dock Co., Ltd.

Kita Kyushu

In Kita Kyushu, Amakusa Shipyard Co., Ltd., started building a general cargo carrier, the 2,957 gt *Sdl Rokko*, its first NK-classed and foreign-flagged vessel. The Sasebo Office oversaw the construction of the first NK-classed vessel with the notation HMS.R (Hull Monitoring System Recorder) on the 76,759 dwt bulk carrier *Ariana* at Sasebo Heavy Industries Co., Ltd. This was for N J Goulandris Ltd. of Greece.

Nagasaki

Further south in Nagasaki, Fukuoka Shipbuilding Co., Ltd., took over the Chouei Shipyard facility as its new Nagasaki Yard, and built its first ship at the

yard, the 19,774 dwt chemical tanker *Bunga Kantan Satu*, for Throni Pte. Ltd. The most high-profile newbuild in the area, however, was no doubt the *Chikyu*, a 57,987 dwt Deep Ocean Drill Ship built by the Nagasaki Shipyard & Machinery Works of Mitsubishi Heavy Industries for the Japan Agency for Marine-Earth Science and Technology and delivered on the 25th of July 2005. This is the most advanced vessel of its kind in the world and has been featured in the *ClassNK Magazine*.

Sakaide

In Sakaide, Kawasaki Shipbuilding built the *Katsuragisan*, a Malacca Max 311,620 dwt oil tanker, for Mitsui O.S.K. Lines, Ltd. This vessel was newly designed to maintain a maximum carrying capacity in shallow waters, and the fuel oil tanks of the vessel have been surrounded by void spaces to prevent oil leakages in the event of accidents.

Additionally, two LNG carriers, two Cape-size bulk carriers and two VLCCs were delivered. They included another first for the Kawasaki yard, the *Energy Advance*, a 147,624 m³ LNG carrier, built for



ENERGY ADVANCE

A 147,624 m³ LNG carrier built by Kawasaki Shipbuilding Corporation for Tokyo LNG Tanker Co., Ltd.

Tokyo Gas Co., Ltd. The vessel is a sister to *Energy Frontier*, which had the largest carrying capacity in the world when built, and was the first to apply for an ice-class notation since the owner plans to use it in the Sakhalin project in the near future.

The Sakaide Shipyard of Kawasaki Shipbuilding, working with Shin Kurushima Hashihama Dockyard Co., Ltd., built the *North Pioneer*, a 1,938 dwt LNG carrier, for Japan Liquid Gas Transport Co., Ltd., and the Japan Railway Construction, Transport and Technology Agency.

The *North Pioneer* is the second compact LNG carrier specifically designed for domestic coastal service after the *Shinyu Maru*, which was built in 2004. The design of the horizontal-type cylindrical tanks limits them to carrying a cargo under pressure for seven days but eliminates the need for dealing with boil-off gas and allows the use of a diesel engine.

Imabari

The Imabari Office, being among the NK's busiest, was even busier than usual. The area boomed during 2005, a key issue being industry development and staffing due to the aging workforce.

In response, the Imabari Training Center for Shipbuilding Skills was opened in March 2005 and started operations in April. Shipbuilders and subcontractors in the Imabari area established this training center to deal with these issues. NK has been very happy to contribute to this center and support its activities.

Imabari Shipbuilding constructed a newbuilding dock. The *Maple Creek*, a 53,474 dwt bulk carrier built for E.K. Line S.A., became the first ship built there. Shin Kurushima Dockyard Co., Ltd., also renovated its No. 1 Dock in 2005 and the 209 m x 30.64 m dock now has a 150 t crane and a con-



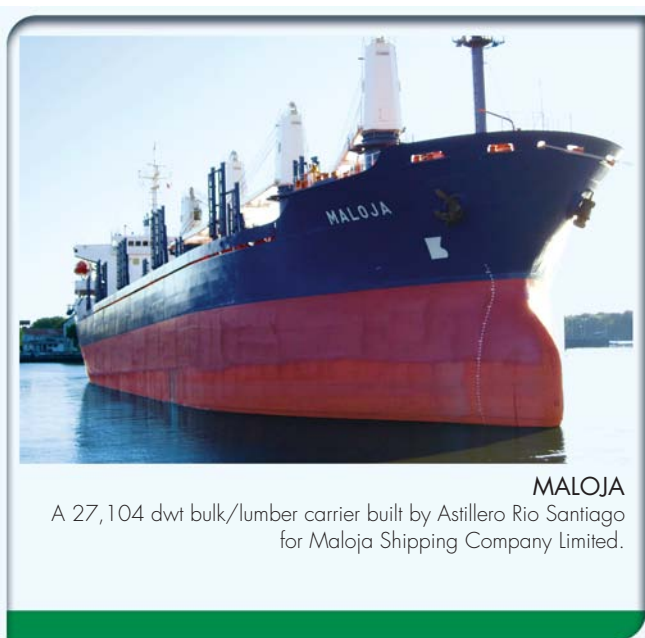
NORTH PIONEER
A 2,512 m³ LNG carrier built by Kawasaki Shipbuilding Corporation.

struction capacity of 25,500 gt to handle chemical and product carriers.

Shin Kurushima Dockyard also produced the 17,738 dwt *Felicity Ace*, a vehicle carrier with a carrying capacity of around 6,400 cars, for Aurora Car



AQUARIUS WING
A 299,990 dwt oil carrier built by IHI Marine United Inc. for Glint Shipping S.A.



MALOJA
A 27,104 dwt bulk/lumber carrier built by Astillero Rio Santiago for Maloja Shipping Company Limited.

Maritime Transport S.A. Not to be outdone, at the Marugame Headquarters of Imabari Shipbuilding the No. 2 Dry-Dock was lengthened (80 m to 370 m x 57 m) in order to increase shipbuilding capacity. By applying semi-tandem launching at the dock, the shipyard aims to increase the total number vessels built per year from 20, to 30, within three years.

Overseas Newbuilding Highlights

NK has a network of 75 overseas offices, the newest of which is the Amman Office in Jordan, which was opened in July 2005. This office covers Jordan, Lebanon, and Syria, and reports that the first six months of operations went smoothly. The number of surveys undertaken by the office has been increasing steadily.

Argentina

Further south, the Buenos Aires Office in Argentina oversaw the construction of the *Maloja* a 27,104 dwt bulk carrier. This is the third sister ship in a series of five contracted to local shipyard Astilleros Rio Santiago, and was built for Maloja Shipping

Company Limited. The office is now conducting surveys on the bulk carrier *Madrisa*, the fourth in the series of five, as well as twelve river barges at local shipyard SABB S.A. in Rosario, Argentina. The river barges were contracted by Paraguayan owner NAVEMAR S.R.L, which holds a DOC issued by NK.

Brazil

Also in South America, the Santos Representative Office was established under the jurisdiction of the Rio De Janeiro office.

Vietnam

No doubt the latest hotbed of new shipbuilding in Asia is Vietnam, where NK has offices in Haiphong and Ho Chi Minh (sub-Office). NK has been working with a number of yards, and numerous vessels have now been delivered, including the *Tay Son 2*, the *Tay Son 3*, and the *Tay Son 4*, all general cargo vessels of around 13,000 dwt built at Ha Long Shipyard for Vietnam National Shipping Lines.

Productivity at the Ha Long Shipyard has been greatly improving. The shipyard can now deliver these newbuildings at three-month intervals.

Another positive development was the construction of the *Au Co 1*, a 6,540 dwt general cargo vessel, for Vietnam National Shipping Lines at Pha Rung Shipyard. This was the first newbuilding at a yard that had previously only carried out ship repairs.

China

In China, 14 newbuildings were delivered in 2005, with plan approval undertaken at the plan approval section of the Shanghai Office, with assistance from Head Office.



SHANGHAI HIGHWAY

A 15,413 dwt vehicles carrier built by Kawasaki Shipbuilding Corporation (NACKS) for Skipjack Marine S.A.

Two Capesize bulk carriers, nine Handysize bulk carriers, two 5,000-car PCCs, and a 7,000 dwt bulk carrier were delivered. Among these, the *Shanghai-Highway*, a 15,413 dwt PCC, was the first PCC to be built by Kawasaki Shipbuilding Corporation (NACKS) for Japanese owner Skipjack Marine S.A. (Taiyo Nippon Kisen Co., Ltd.).

The 53,591 dwt Bulk Carrier *Matsumba* for Elegance Navigation Ltd. (Meadway Shipping & Trading Inc.) was the first vessel that shipyard Dayang Shipbuilding Co., Ltd., has constructed since the reorganization of its operations.

Another first was the *Sider Sky*, a 7,300 dwt bulk carrier built for Duna Shipping Inc. (Gestion Maritime Internationale), which was the first vessel built to NK class at Ningbo Xinle Shipbuilding Co., Ltd.

Malaysia

Malaysia is another fast developing shipping market where NK now has four offices undertaking a wide variety of interesting projects. Among them is the *Ajang Ikhtiar*, a 654 dwt tug & anchor handling

multi purpose vessel equipped for external fire fighting, built by Bonafide Shipbuilders & Repairs Sdn. Bhd. for Ajang Shipping Sdn. Bhd. In yet another sign of its growing importance, NK established and held the first meeting of the Malaysian Committee under the chairmanship of Shamsul Azhar Abbas.

The Philippines

The Tsuneishi Heavy Industries (Cebu), Inc., yard in the Philippines continued to impress, with 11 bulk carriers of 52,300 dwt delivered, including seven built to NK class and five built in a new slipway. This second slipway, 250 m x 41 m, with a capacity of 100,000 dwt, was formally inaugurated by the Philippines' President Gloria Macapagal Arroyo in January 2005.

Singapore

A 32,937 dwt container carrier built for Wan Hai Lines Singapore Pte Ltd, the *Wan Hai 311*, was the first vessel built with the Class Notation (PS-DA & FA) (PSCM) at Jurong Shipyard Limited.



DELFA

A 53,594 dwt bulk carrier built by Dayang Shipbuilding Co., Ltd., for Meadway Shipping & Trading Inc.



WAN HAI 505

A 52,146 dwt container carrier built by China Shipbuilding Corporation (CSBC) for Wan Hai Lines (Singapore) Pte. Ltd.

Thailand

The Bangkok Office also achieved its first order for a newbuilding ship to be classed with NK. The Marine Department of the Merchant Marine Training Center placed an order for a 4,300 gt overseas training vessel at Italthai Marine Ltd. The building con-



TOYOFUJI MARU

A 5,490 dwt vehicles carrier built by Mitsubishi Heavy Industries, Ltd., for Toyofuji Shipping Co., Ltd.

tract was signed in September 2005.

Taiwan

Taking advantage on the resumption of newbuilding activities last year, the Taipei Office oversaw the classing of four new patrol vessels and one multipurpose work boat for the Subic Bay Metropolitan Authority, at Lung-Teh Shipbuilding Co., Ltd., as part of a Japanese overseas development aid project.

Meanwhile, the Kaohsiung Sub-Office classed the *Wan Hai 505*, a 52,146 dwt container carrier, at the Kaohsiung yard of China Shipbuilding Corp., the first of six such vessels to be built for Wan Hai Lines Singapore.

Turkey

The Turkish shipping industry is developing apace, with several Turkish owners building to NK class in Japanese yards, including Yasa Holding S.A. at Mitsui Tamano and Tsuneishi. In support of this rapid development, in 2004 NK established the Turkish Committee, which met for the second time in 2005.

Survey Activities and Approvals

In Japan, a total of 3,423 surveys were carried out, while in other areas 9,257 surveys were conducted, for a grand total of 12,680.

In 2005, 20 Radio Service Companies were approved around the world, bringing to 203 the total number of companies approved at the end of 2005.

In 2005, other newly approved firms totaled:

1. In-water survey of ships: 18
2. Thickness measurements on ships: 12
3. Surveys and maintenance of fire extinguishing equipment and systems: 19

4. Servicing of life saving appliances: 10
5. Tightness testing of hatches with ultrasonic equipment: 1

Material and equipment approvals were as shown in the table below. One such approval was the first Approval of Manufacturing Process of Rolled Steels for Hull through the Bangkok Office and awarded to Sahaviriya Plate Mill Co., Ltd. It manufactures hot-rolled steel plates from steel slabs and has an annual capacity of 600,000 metric tons. The approval was completed in accordance with the requirements of 1.2 Part K. of the Rules. The Certificate of Approval of Manufacturing Process of Rolled Steels for Hull issued by EQD was handed to Mr. Wit Viriyaprapaikit, CEO of the Sahaviriya Group, by the general manager the NK Bangkok Office in September 2005.

PSC Activities

The number of surveys for PSC by flag states has been increasing recently at ports around the world.



CHALLENGE PREMIER
A 45,897 dwt oil carrier built by Shin Kurushima Dockyard Co., Ltd., for NYK Bulkship (Asia) Private Limited.

The Survey Department recorded and analyzed the issues identified by PSC and published the *Annual Report on Port State Control 2004* in order to improve the quality of NK vessels and the management systems of ship management companies.

| Material and Equipment Approvals | | |
|----------------------------------|-----------------------|----------------|
| | Item | Volume/Number |
| Materials | Rolled Steel | 4,073,420 tons |
| | Cast/Forged Products | 114,026 tons |
| Marine Equipment | Main Engines | 1,963 |
| | Boilers | 756 |
| | Deck Machinery | 2,226 |
| | Engine Room Machinery | 25,258 |
| | Anchors | 1,393 |
| Freight Containers | Chains | 13,690 |
| | Cooling Machine Units | 1,484 |



EQUULEUS LEADER

A 20,141 dwt vehicles carrier built by Imabari Shipbuilding Co., Ltd., for Zeeman Marine Corporation.

GOOD MAINTENANCE ON BOARD SHIPS was also updated to include amendments to international conventions and it was published on the NK website.

Technical Services

The number of Statements of Compliance issued under the CAP program (Condition Assessment Program) totaled 25 vessels, while those for Anti-Fouling Systems on ships totaled 860. The Society also issued approvals for the Ballast Water Management Plans of 33 vessels.

From May 2005, NK started to issue Engine International Air Pollution Prevention Certificates on behalf of flag states to enforce MARPOL 73/78 Annex VI., relating to NOx.

NK also issues voluntary Statements of Compliance at owners' requests. The number of International Air Pollution Prevention Certificates issued was 2,164, while the number of Statements of Compliance was 792.

The number of registered vessels in ETAS (Emergency Technical Assistance Service) increased dramatically with the coming into force of MARPOL Annex 1 Reg. 37 (from the 1st of January 2007) and the requirement for a Vessel Response Plan announced by the USCG in February 2005.

By the end of 2005, a total of 366 vessels had registered, including 112 vessels in 2005. This total includes 295 tankers (including chemical tankers), 46 bulk carriers, and 25 other assorted vessels for 95 different owners.

In ship recycling and reuse of materials and equipment, appropriate attention to preservation of the environment is very important. In December 2003, the IMO adopted IMO Guidelines on ship recycling (Res. A 962(23)), and vessels that meet the requirements in terms of controlling and managing hazardous materials onboard the vessel are eligible for a so-called Green Passport.

The first NK-issued statement of compliance for the Green Passport was issued for the *Verrazano*



HARSANADI

A 14,271 dwt oil/chemical carrier built by Asakawa Shipbuilding Co., Ltd., for Harsanadi Maritime Limited.

Bridge, a 65,038 dwt container carrier built by Hyundai Heavy Industries Co., Ltd., for SCORPIO LINE SHIPPING S.A. and managed by “K” Line Ship Management Co., Ltd.

Amendments to MARPOL 73/78 and the IBC Code will come into force on the 1st of January 2007. These amendments regulate modified requirements relating to ship type and pollution categories for noxious substances in line with new hazard criteria.

ClassNK has introduced a new service called PrimeShip-CHEMISYS, developed in order to assist NK clients deal appropriately with these new requirements. PrimeShip-CHEMISYS was designed to assist clients in meeting the new manual requirements and offers advice on appropriate cargoes for chemical tankers.

Assessment and Registration of Quality Management and Safety Management Systems

For the ISM code, the number of newly registered companies in 2005 was 23, bringing the total to 578.

The number of newly registered vessels in 2005 was 701, bringing the total number of registered vessels as of the end of 2005 to 4,196. NK now has ISM Authorizations from 58 countries.

One service offered by NK is the assessment and registration of quality systems based on the ISO 9000 series of quality standards, as well as assessment and registration of environmental management systems based on the ISO 14001 standard.

For ISO 9000/9001, the number of newly registered suppliers in 2005 was 17, bringing the total to 366, while for ISO 14001 the number of newly registered suppliers in 2005 was 25, which brought the total to 83. A breakdown of these totals is as detailed below:

For ISO 9001

| | |
|-----------------------|-----------|
| Shipyards | 47 |
| Ship Owners/Operators | 69 |
| Makers | 217 |
| Others | 33 |
| <hr/> Total | <hr/> 366 |

For ISO 14001

| | |
|-----------------------|----------|
| Shipyards | 10 |
| Ship Owners/Operators | 33 |
| Makers | 36 |
| Others | 4 |
| <hr/> Total | <hr/> 83 |

For the ISPS code, the number of newly registered vessels in 2005 was 582, bringing the total number of registered vessels as of the end of 2005 to 3,360.



YUGAWASAN

A 302,481 dwt oil carrier built by Mitsubishi Heavy Industries, Ltd., for New Grace Maritime S.A.

NK now has ISPS authorization from 43 countries. A breakdown of the number of vessels registered by flag is listed in the table below.

Cooperative Technical Developments

A floating production, storage and offloading (FPSO) system development project to produce, store, and offload natural gas hydrate (NGH) at sea, is ongoing in cooperation with Mitsui Engineering & Shipbuilding, the National Maritime Research Institute and Ocean Engineering

Research, Inc. (with support from the Ocean Policy Research Foundation). Under the 2005 plan for this project, basic designs were developed for the equipment used to offload NGH pellets from the FPSO to an NGH shuttle tanker, and for the mooring arrangements that secure the shuttle tanker in place at the time of offloading. In addition, a safety assessment (HAZID) meeting was held concerning the offloading equipment, at which the Society played a central role.

Number of Approved ISPS Code Vessels

| Flag | Number of Ships | Flag | Number of Ships |
|------------------|-----------------|------------------------------|-----------------|
| Bahamas | 77 | Marshall Islands | 42 |
| Belize | 2 | Myanmar | 4 |
| Cyprus | 90 | Netherlands Antilles | 3 |
| Dominica | 1 | Panama | 2,013 |
| Georgia | 3 | Philippines | 76 |
| Greece | 34 | Saudi Arabia | 2 |
| Hong Kong, China | 229 | Singapore | 241 |
| Japan | 140 | St. Vincent & The Grenadines | 42 |
| Kuwait | 1 | Switzerland | 3 |
| Lebanon | 2 | Thailand | 58 |
| Liberia | 93 | Turkey | 48 |
| Malaysia | 3 | United Arab Emirates | 1 |
| Malta | 129 | Vanuatu | 23 |
| | | Total: | 3,360 |



CHIKYU

A 27,161 dwt Deep Ocean Drill Ship built by Mitsubishi Heavy Industries, Ltd., for Independent Administrative Institution, Japan Agency for Marine-Earth Science and Technology.

Areas covered included verifying the safety of the basic design of the system and noting points requiring particular attention regarding safety as development of the project proceeds in the future. The multi-year plan for this development project is to continue in 2006 and onwards with the aim of achieving practical application at an early date.

Construction of the *Chikyuu* Deep Ocean Drill Ship was completed at the Nagasaki Shipyard & Machinery Works of Mitsubishi Heavy Industries in July last year. The ship was delivered to the Japan Agency for Marine-Earth Science and Technology, which had ordered the vessel.

The *Chikyuu* is the most advanced Deep Ocean Drill Ship in the world and is capable of drilling 7,000 meters into the ocean floor in waters 2,500 meters deep (ultimate target depth is 4,000 meters). The ship is expected to deepen our understanding of the mechanisms behind the occurrence of earthquakes and thus help bring to light past changes in the environment.

The ship was built to NK class and, as such, the Society provided technical advice during the planning stage and carried out registration survey and related activities during construction. The Society will continue to provide support once the ship begins operations through the conduct of periodical surveys, as well as participation in research committee and other activities.

NK Quality Assessments

As part of the IACS QSCS Annual Audit program, annual audits were carried out at 10 Head Office locations, the drawing approval section at the Singapore Office, and at three locations overseas based on the 5th Issue of the IACS QSCS. Vertical Contract Audits were also carried out on the surveys of 11 ships.

Three regular maintenance audits were conducted in accordance with certification based on ISO 9001:2000. The third was carried out at eight Head Office locations and six survey offices, the fourth at eight Head Office locations and seven survey



FPSO SYSTEM

A computer-generated image of a floating production, storage and offloading (FPSO) system that the Society is jointly developing to produce, store, and offload natural gas hydrate at sea.



VANCOUVER BRIDGE

A 65,002 dwt container carrier built by Hyundai Heavy Industries Co., Ltd., for Vancouver Bridge Shipholding S.A.

offices, and the fifth at five Head Office locations and five survey offices.

One Vertical Contract Audit was carried out on the surveys of one ship by MCA, and audits were carried out by the Greek Government at the Piraeus



HEBEI PHOENIX

A 173,587 dwt bulk carrier built by Bohai Shipbuilding Heavy Industry Co., Ltd., for Hebei Phoenix Shipping Co., Ltd.

Office, by the Dutch Government at the Rotterdam Office, and by the Turkish Government at the Istanbul Office.

Training

ISM Probational Auditor Training

From 2005, the venue for this training course for ClassNK exclusive surveyors from offices outside Japan was moved from Head Office and carried out at three venues outside Japan. The people in charge of this training course (six persons from each region) were appointed after completion of their “train-the-trainer” course for this program at NK Head Office in February 2005.

For exclusive surveyors in Japanese branch offices, this training course was held at Head Office in August (Module 1) and October 2005 (Modules 2 to 5). To date, 527 ClassNK exclusive surveyors have attended the ISM Probational Auditor Training Course since its commencement in 1994.

Maritime Security Auditor Training

As was the case in 2004, MSA training courses were held both inside and outside Japan for a total of 24 persons. The courses were at NK Head Office (15 persons from domestic branch offices), in Singapore (for five persons), and in London (for four persons). In Singapore, three surveyors from MARINA (in the Philippines) also took the course.

Training for the Appointment of Surveyors

In 2005, various training courses and programs, including a practical training course on marine engines at Yanmar Co., Ltd., were conducted for a total of 115 exclusive surveyors.

Train-the-OJT-Trainer Course for Experienced Exclusive Surveyors at Mainland China Offices

In 2005, the training course for general refresher training at Head Office (Refresher Training for Surveyors Assigned at Offices Outside of Japan for exclusive surveyors who have been with ClassNK for at least several years) was not held, but the above OJT trainer course was carried out for six persons nominated from each office in mainland China. The objectives of the training were to train OJT trainers at each office in the region and develop OJT training materials and new IT systems for survey records.

Internship Training Program for Yokohama National University Graduate Students in Master's Course

Following a request from Yokohama National University, as a first trial for ClassNK, a one-week internship training program in hull structure design was held for two graduate students at NK Head Office between the 12th and 16th of September 2005.

International Cooperation

Following a request from the Vietnam Register (VR), training on classification surveys during construction for three VR exclusive surveyors was carried



MORNING HARUKA

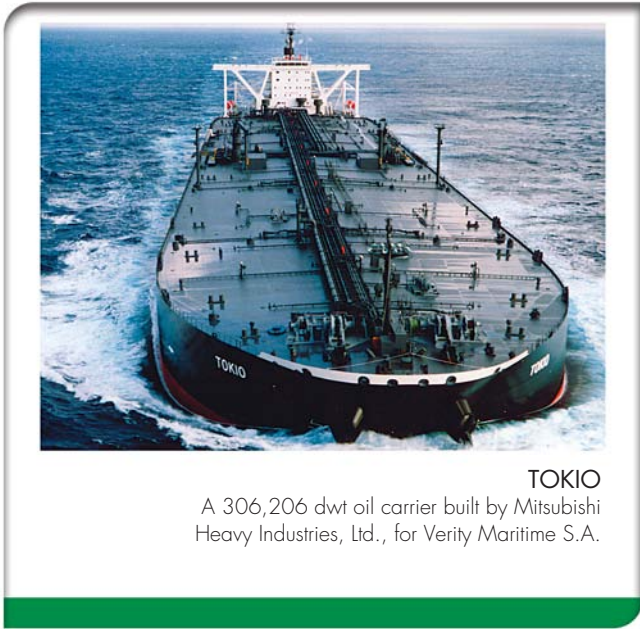
A 47,407 dwt oil carrier built by Onomichi Dockyard Co., Ltd., for Nakata Maritime Corporation.

out at ClassNK's Haiphong Office for six months from August 2005.

Following a request from Japan International Cooperation Agency, 21 classes on class surveys were conducted at the Group Training Course in International Maritime Conventions and Ship Safety Inspection 2005, which was held by the Ship Research Centre of Japan from July through



Training for the appointment of surveyors



The Rules

Since the core of a ship classification society's technical credibility is its rules, the Society constantly reviews and revises the many Rules, Regulations and Guidance.

In addition to keeping the rules up to date with constantly changing statutory requirements, the Society also focuses on reviewing its rules so it can incorporate the results of its research and development activities.

The full list of the Rules and Guidance established and/or amended by the Society in 2005 includes:

Rules and Guidance for the Survey and Construction of Steel Ships

- (1) Docking Survey, Continuous Hull Survey, etc. (Rule and Guidance Part B)
- (2) Ambient Temperature for Electrical Installations (Guidance Part H)
- (3) Degree of Protection for Electrical Equipment (Guidance Part H)
- (4) Electrical Installations for Ships Carrying Dangerous Chemicals in Bulk (Guidance Part R)

September 2005 for 10 participants from various developing countries.

Following a request from the Tokyo MOU Secretariat, five classes on the SOLAS and MARPOL conventions were given at the 15th Basic Training Course for Port State Control Officers in the Asia-Pacific region, held by Tokyo MOU in June 2005.



1. London Technical Seminar
2. New York Technical Seminar
3. Hong Kong Technical Seminar

- (5) Dangerous Zone for Ships Carrying Liquefied Gases or Dangerous Chemicals in Bulk (Rule and Guidance Part N, S)
- (6) Corrosion Addition for Steel Hatch Covers (Rule Part C, CS)
- (7) Protection of Internal Combustion Engines Against Crankcase Explosions (Rule and Guidance Part D)
- (8) Safety and Alarm Devices for Emergency Diesel Engines (Rule Part D, Guidance Part H)
- (9) Emergency Operation of Main Steam Turbine (Rule Part D)
- (10) Torsional Vibration of Shafting (Rule and guidance Part D)
- (11) Means of Access (Rule Part C, CS, Guidance Part B, C)

Rules and Guidance for Marine Pollution Prevention Systems

- (1) MARPOL ANNEX VI

Rules for approval of manufacturers and service suppliers

- (1) Approval of Service Suppliers



YASA NESLIHAN

An 82,849 dwt bulk carrier built by Tsuneishi Corporation for Nouvelle Shipmanagement Co.



2005 ClassNK Technical Research Conference

Guidance for the approval and type approval of materials and equipment for marine use

- (1) Protection of Internal Combustion Engines Against Crankcase Explosions

Technical Seminars

Providing up to date technical information to NK clients is an important function that is achieved through a variety of methods, including technical seminars and meetings.

The 2005 ClassNK Technical Research Conference was held in a total of five locations across Japan, starting with Tokyo, followed by Fukuoka, Onomichi, Imabari, and Kobe. There were numerous participants from among shipowners, shipyards, machinery and equipment manufacturers, government, and other groups at each session.

Technical seminars were also held at a number of overseas locations, such as Singapore, Hong Kong, London and Istanbul, and were also featured as part of most NK overseas committee meetings.



TOPFLIGHT

A 52,544 dwt bulk carrier built by Tsuneishi Corporation for Azalea Shipping S.A.

Local NK staff are often asked to share their expertise with local authorities. For example, at the invitation of the Director (Admiral) of the Brazilian Port Authority Directorate, the general manager of NK Rio de Janeiro presented a lecture on SOLAS (Chapter I) Certification and Surveys (Harmonized



MT. FASTRON

A 30,770 dwt oil carrier built by PT. PAL Indonesia for PT. Pertamina (PERSERO).

System) at the Brazilian Navy’s premises as a part of the regular PSCO course for Navy officers of ROCRAM’s(*) member countries (South American and Portuguese-language countries, including Angola, Mozambique, and Cape Verde), which was held this year in Brazil.

(*) ROCRAM (Rede Operadora de Cooperação Regional de Autoridades Maritimas) is an acronym that literally means: Operating Net of Regional Cooperation of Maritime Authorities.

General

The ClassNK100 Awards were established to mark the 100th anniversary of the founding of the Society. The awards are issued in recognition of outstanding postgraduate research and a certificate of merit and monetary award are presented. The 2005 recipients were as detailed below:

- Myung-il Roh, who completed a Master’s degree at Seoul National University
The title of the award-winning thesis was as follows: A Method for Modeling the Initial Design of Ship Hull Structures taking into consideration the Relationship between Various Parts of the Structure.
- Mr. Jun-Kwan Seo, Pusan National University, who completed a Master’s degree
The title of the award-winning thesis was: A Benchmark Study on Ultimate Strength Predictions of Ship Stiffened Plate Structures-Using ALPS/ULSAP.
- Mr. Zhou Qin Jun, Shanghai Jiao Tong University
The title of the award-winning thesis was as follows: Wave Overtopping Simulation in a Fluent Numerical Wave Flume.



PACIFIC OAK

A 203,212 dwt bulk carrier built by Universal Shipbuilding Corporation for MTO Maritime, S.A.

- Mr. Ashish Kumar Chaudhury (First Prize) and Ms. Deepti James Madathany (Second Prize) Indian Institute of Technology, Chennai
The titles of the award-winning theses were as follows:
 - First Prize: Reliability Analysis of Offshore Jacket Structure at Bombay High.
 - Second Prize: Hull Form Development and Resistance Optimization of High Speed Displacement Catamarans.

A ClassNK100 Award has been newly established at Cochin University of Science & Technology.

Dr. T. Zhu, a senior researcher from the NK Research Institute was invited to Harbin Engineering University (HEU), China, to attend the Ceremony of Conferment of a guest professorship. Dr. Zhu gave a special lecture at HEU in March 2005 that was regarded very highly. Consequently, he was appointed to a guest professorship. Dr. Zhu gave a memorial lecture of assumption as a guest professor, the theme of which was Histories and Roles of the Classification Societies/IACS/IMO and

Construction, Background and Vision of the Rules and Regulations, presenting the global activities and leadership of ClassNK. Over 250 3rd and 4th year students attended.

The Chemical Distribution Institute (CDI) requested the cooperation and assistance of IACS in the assessment of Marine Packed Cargo (MPC), and four surveyors from the Tokyo Office were appointed as auditors. The *NYK Antares* was the first NK-class vessel audited for assessment in the CDI-MPC scheme.

In September, Hong Kong's first and only Maritime Museum was officially opened by Chief Executive Donald Tsang, celebrating the Maritime Industry's importance in the establishment and development of Hong Kong. NK was pleased to contribute to this very worthy project, which was mostly funded by private shipping interests.

The Hong Kong office also hosted a range of other special events including the 30th Hong Kong Committee and the 3rd Hong Kong Technical Committee meetings.



MOL PARADISE

A 72,968 dwt container carrier built by Koyo Dockyard Co., Ltd., for Cypress Maritime (Panama), S.A.

Research Center Activities in Detail

NK has a long and proud history of innovative and practical research, with the NK Research Institute celebrating its 50th anniversary in 2005 (see page 28). The results of NK's research programs are routinely made public through publications and the annual Technical Research Conference, which in 2005 was held at the Nippon Kaiun Club in Tokyo on the 28th of November. In addition to presenting the results obtained thus far from research undertaken by the Research Institute, reports were also presented on Guidelines on Shafting Alignment Taking into Account Variation in Bearing Offsets while in Service. A detailed list of current and ongoing research projects is presented below.

| Title of Research | Outline of Research |
|---|--|
| Study on the structural reliability of a ship (Second year of a three-year plan) | Utilizing the outcomes of the fundamental study on the clarification of uncertainties hidden in the strength assessment procedure, a framework for the structural strength assessment procedure was studied based on the structural reliability theory. Further, a method to be able to evaluate the structural strength of a ship objectively and rationally was examined by a trial calculation using a pilot model. |
| Study on inspection and maintenance for the assessment of aged ship hull integrity (Last year of a three-year plan) | Some basic data regarding on strength degradation due to corrosion was obtained by these experiments. A procedure to predict corrosion conditions based on the updated corrosion model was developed, and a prediction system which includes this procedure is now being investigated. In addition, the fatigue life prediction method based on the monitoring of fatigue damage was examined based on the analysis of the stress measurements and the observation results of the specimen, applied to a container ship. |
| Study on wave loads acting on ship structure (Second year of a three-year plan: Third stage) | Full-scale stress measurements on a large container ship were carried out for two-and-a-half years and the results showed our estimation tool for hull girder forces (including torsional force) can accurately estimate the stress response of ships in waves. |
| Study on the assessment method of ultimate strength for hull structures (Last year of a three-year plan) | Numerical and experimental studies on wave loads acting on ship structures were conducted for the development of design loads in consideration of three-dimensional effects, nonlinearity due to waveheight, impact effects, and hydro-elasticity, etc. By clarification of the ultimate strength of ship structures such as hull girders, primary members and local members, more rational strength criterion were proposed and reflected in the structural standards. |
| Study on preventive maintenance of marine engines and machinery (Last year of a three-year plan) | Research was undertaken to find and develop monitoring methods using appropriate sensors, for diagnostic indication of damage, to apply to condition monitoring systems on main engines and machinery in engine rooms. Another study was done to find the causes of, and countermeasures for, explosive fire damage in exhaust gas manifolds and main engine turbochargers with the results presented in a paper at a number of conferences. |

| Title of Research | Outline of Research |
|---|--|
| Investigation on life assessment for marine machinery (Last year of a two-year plan) | A study dealing with life prediction and reliability assessment of machinery in engine rooms, including main engines/turbines, main boilers and shafting as well as propellers was undertaken in order to apply RCM (Reliability-Centered Maintenance) and RBM (Risk-Based Maintenance) to class surveys. As a part of the results, the phenomenon and mechanism of FAC (Flow Accelerated Corrosion) on piping systems for main or auxiliary boiler plants was clarified for fossil fuel and nuclear power plants, and a maintenance guidance will be published soon. |
| Studies on analytical methods relating to combustion characteristics of marine fuel oils and degradation of lubricating oils in 4-stroke diesel engines (First year of a three-year plan) | An investigation was undertaken to establish a diagnostic technique for adequate combustion of fuel oil, from the viewpoints of ignition delay/combustion periods, etc., and to develop a diagnostic technique on the degradation of lubricating oils for bearings of 4-stroke diesel engines. The results clarified the correlation between the flame retardation and carbon/hydrogen ratio of fuel oil and were presented in a paper. |
| Studies on assessment of the strength of main engine structure (Second year of a three-year plan: Second stage) | A study has been performed to clarify the influence of hull deformation on main propulsion shafting including the main engine under both light and fully loaded conditions, with structural analysis using the Finite Element Method and confirmation by actual measurements on the vessel. The results were summarized as Guideline on Shafting Alignment Taking into Account Variation in Bearing Offsets while in Service, a paper presented at some conferences. Another study was undertaken to clarify the stress conditions on crankshafts at the pin fillet part of recent large 2-stroke diesel engines. The results led to the amendment of the relative Rule requirements for non-destructive examination of crankshafts and presentation of a paper at some conferences. |
| Studies on reliability-based evaluation of marine machinery and systems (Last year of a two-year plan: Second stage) | An investigation was undertaken to establish a safety assessment procedure for marine machinery and systems based on the reliability method and to improve accountability and transparency in the classification rule-making process by applying this procedure. The results led to the publication of Guidelines for Evaluation of Marine Machinery System Reliability. |
| Survey of the strength of steel plate of 50 mm or more in thickness (First year of a one-year plan) | The effect of plate thickness on fatigue and the fracture toughness of heavy thick steel plate was reviewed by an extensive literature survey and some useful findings were obtained, especially that the existing data on fracture toughness is arranged according to the concept of use of material grades for hull structural members in the present class Rules. |
| Study on the strength of welded joints for ships (Second year of a three-year plan: Second stage) | The relationship between buckling strength and the condition of grooving corrosion at fillet welded joints was investigated by model tests and FE analyses. Fatigue tests of welded joints of stainless steel were done to investigate the effect of weld geometry improvement methods. A conversion-equation between Charpy impact energy and fracture toughness (critical CTOD) of steels for ship structures was also investigated by a literature survey. |
| Study on corrosion of ship structural members (First year of a two-year plan: Second stage) | An empirical formula to describe the tensile strength of structural members with pitting corrosion has been developed based on the tensile test results with artificially pitted specimens obtained in the first stage of this study. An estimation method for ultimate strength of pitted plates under compression and shear has been also proposed based on the results of FE analyses. |
| Field tests on an actual ship | A series of stress measurements on a large container ship was undertaken. |

Research Institute Celebrates its 50th Anniversary



THE RESEARCH INSTITUTE of the Society celebrated the 50th anniversary of its foundation in August 2005. At the time when the Research Institute was established in 1955, the scale of operations of the Society was much smaller than today, with only 963 ships under class of some 3.3 million gt. Since then, the ship classification work of the Society has expanded steadily to the point where a total of 6,396 ships totaling 134.5 million gt were under class as of the end of 2005.

During the 1950s, when the Research Institute was first founded, great efforts were being made to build ever-larger ships in response to the growing volume of marine transport. It was also a decade when welded steel structures were being newly adopted. Research at that time was conducted not only by the Society, but also by (and in cooperation with) academies, shipbuilders, steel producers, and many other interested parties. Moreover, associated research was also carried out into the development and introduction of testing equipment and facilities as well as into the development of sensors.

The Research Institute was established in recognition of the importance of technical research to the work of ship classification. The work of the Research Institute was and still is aimed at conducting research that serves as a technical foundation, ensuring the soundness of the work of ship classification, as well as research to improve the overall standard of naval architecture and shipbuilding technology. During its 50-year history, the Research Institute has been actively involved in the growth and development of ship classification, conducting a wide range of research that has served as the technical foundation of this development. The major research themes pursued in the early days of the Institute are summarized below.



Full-scale measurement for double-bottom construction of a cargo ship in 1964.

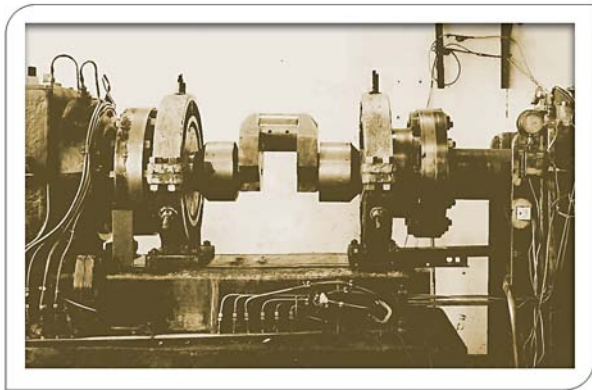
Hull-Related Research

Research into transverse strength: As ships became larger, there was great concern for transverse strength evaluation beyond that of longitudinal strength. However, since transverse strength analysis consisted of two-dimensional analysis, there was a pressing need to develop an analytical method that would make it possible to consider three-dimensional effects, that is, the effect of longitudinal members on overall strength. As practical computers had not yet been developed, an analysis approach was researched in which the hull structure was replaced with a beam framed structural model as a method that could be practically used. Here, the concept of the span point was introduced and based on the idea for this accurate calculation method. A significant contribution was made to the realization and practical use of a transverse strength analysis technique.

Machinery-Related Research

At the time of founding of the Research Institute, efforts were being made to increase the output of main engines, as ships were becoming larger. In conjunction with this, efforts were made to develop new models of high-output steam turbines and diesel engines and to improve shafting systems and auxiliary machinery. The Research Institute was actively engaged in related work.

Research on the strength of solid crankshafts: The Research Institute conducted numerous tests on an array of crankshaft forms and scantlings in order to understand the characteristics of crank pin fillet stress with respect to the bending and torsional loads acting on solid crankshafts. The systematic testing of full-size crankshafts was not seen in other countries at the time. From this research, it was possible to obtain fairly uniform methodologies for determining the



Testing crankshaft fatigue in 1967.

equivalent strength of different types of crankshafts having different arm scantling ratios. These results were used in the strength calculations for crankshafts in the Rules.

Research on the bending fatigue strength of large scale shafts: Since the influence of the scale effect was expected to be significant on the rotating bending fatigue strength of shafts, the Research Institute designed and developed the largest scale cantilever rotary bending fatigue test machine in Japan when it was first established in order to carry out large-scale bending fatigue tests. Fatigue tests on smoothed specimens, fatigue tests on stepped shafts, corrosion fatigue tests in sea water, and fatigue tests of force-fitted shafts were conducted using this machine. Results were used to prevent breaking failure of the shaft at the force-fitted propeller boss. In addition, the results became the basis for propeller shaft equations in the Rules.

Materials-Related Research

The period when the Research Institute was established was a time when a major transformation was taking place in shipbuilding from the use of rivet connections to welded steel structures as ships became ever larger. Because of this, characterization of the brittle and ductile behavior of steel plate became an important topic of concern.

Large-scale double-tension tests: The Research Institute developed a large-scale double-tension testing apparatus devised by the University of Tokyo that reproduces the propagation of brittle fractures in order to research the properties of these fractures on various types of steel material. After successfully developing the testing apparatus, which took about one year, the Research Institute carried out brittle fracture tests on an extensive variety of steel materials. The data obtained was used to develop standard values for the Charpy impact test, which is used to measure material toughness.

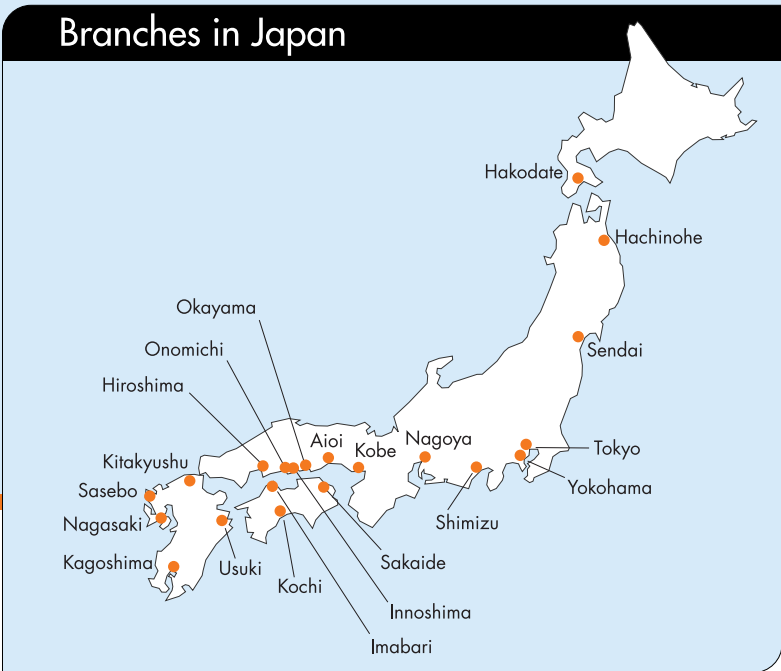
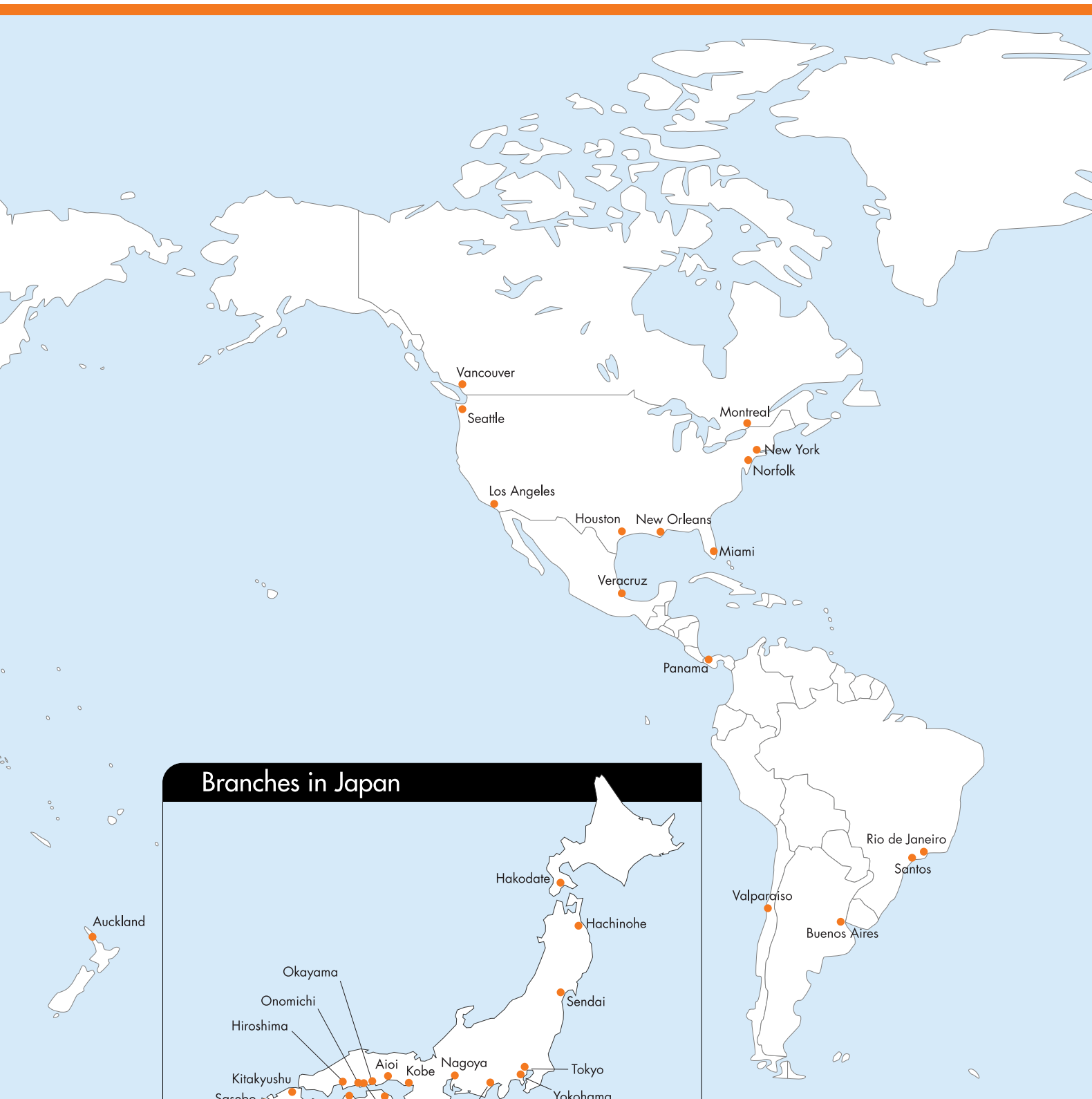
The Research Institute played an important role in promoting the enhancement of technical standards in the development of the shipbuilding and steel industries as one role of classification societies. At the same time, it can also be said that its research also formed the technical basis for rationalization of the Rules of the Society.

As the Society approached its 100th anniversary as a ship classification society in 1999, it undertook the RULE C100 project aimed at reformulating the basic requirements concerning structural strength from the perspective of examining and completing technical and structural rules suitable for the 21st century based on both experience gained until then and current technical knowledge. Through the project, the Research Institute functioned as the central core for this work and became the driving force in guiding the project to successful completion. The Research Institute carried out a wide range of research and development activities concerning loads, structural response, strength evaluation and corrosion additions and compiled, arranged, and released the results as the *Technical Guide Regarding the Strength Evaluation of Hull Structures*. Further work was done to develop these guidelines into a form that could be utilized in practical applications as technical guidelines, which resulted in the development of the respective *Guidelines for Direct Strength Analysis* and *Guidelines for Fatigue Strength Assessment* for tanker structures, bulk carrier structures, and container carrier structures.

The further pursuit of research will help raise technical standards and lay the technological foundation for achieving the key goals of the work of ship classification, such as promoting the safety of life and property at sea and protecting the marine environment, while contributing to the safety of the next generation of ships.

Service Network





NK in International Affairs

NK has always been an internationally oriented Society. In addition to more than 20 offices in Japan, the Society has over 75 service sites in 42 countries. One important aspect of the Society's international relations relates to our capacity to undertake Statutory surveys on behalf of foreign Governments. The number of countries that have authorized ClassNK to carry out surveys on their behalf and issue certificates based on international conventions was 99 as of December 2005. Gibraltar was newly authorized.

Another important activity is the NK contribution to the International Maritime Organization (IMO). Either as a member of a Japanese Government delegation or a representative of IACS, NK participated in the following meetings during 2005:

- Sub-Committee on Fire Protection (FP)–49th session
- Sub-Committee on Ship Design and Equipment (DE)–48th session
- Sub-Committee on Flag State Implementation (FSI)–13th session
- Sub-Committee on Bulk Liquids and Gases (BLG)–9th session
- Maritime Safety Committee (MSC)–80th session
- Marine Environment Protection Committee (MEPC)–53rd session
- Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF)–48th session
- Sub-Committee on the Carriage of Dangerous Goods, Solid Cargoes and Containers (DSC)–10th session

The outcomes of NK participation in such major meetings as those of the Marine Environment Protection Committee are advised to NK clients through a variety of methods, primarily the NK Technical Information bulletins and, for example, by updating the website-based IMO International Convention Calendar.

Also of major importance are our IACS-related activities.

NK made a significant contribution to work on the development of CSR for bulk carriers and tankers which was finalized in 2005. As a result, the CSR (for Bulkers and Tankers) were adopted as IACS CSR at the 52nd Council Meeting held in December 2005. Also in 2005, the IACS structure and process for the development and review of technical and CSR matters was changed to a panel structure. The panels consist of hull, machinery, statutory and survey panels with subsidiary groups to these panels to be called, where it is necessary, to examine related matters. NK will chair the Hull Panel for three years from 2006.

ClassNK also participated in the following IACS meetings:

- IACS CEO Meeting: 1 time
- Council: 3 times
- Quality Committee: 2 times
- General Policy Group: 2 times
- Panel Meeting: 9 times
- Project Team Meeting: 4 times
- Small Group: 4 times
- Joint Working Group with Industry: 7 times
- IACS Common Structural Rules: 26 times

The NK London Office plays an important role in NK's international affairs by virtue of its physical proximity to IACS as well as the IMO and numerous other international maritime organisations.

The office organised a seminar on MARPOL Annex VI for the maritime community in London along with an ad hoc meeting of the British Committee attended by about 40 participants from a wide range of interests.

Other meetings were arranged with industry, particularly INTERTANKO, OCIMF, International

Chamber of Shipping, and others to increase the profile of NK, especially in relation to its role in developing the IACS Common Structural Rules. A new office was established in Newcastle and will officially become a local area representative office from the 1st of January 2006.

Overseas Committee meetings are an important avenue for the two way exchange of information and advice between NK and key industry and regional stakeholders. The full list of NK Committee meetings held during 2005 is as follows:

NK Committee meetings held during 2005

| | Date | Venue |
|---------------------------------------|--------------|--------------|
| The 14th Greek Committee | 3 February | Piraeus |
| The 2nd Turkish Committee | 7 February | Istanbul |
| The 3rd Hong Kong Technical Committee | 7 April | Hong Kong |
| The 6th Taiwan Committee | 12 April | Taipei |
| The 10th China Technical Committee | 21 April | Shanghai |
| The 16th Korea Committee | 19 May | Fukuoka |
| The 2nd Singapore Committee | 17 June | Singapore |
| The 3rd British Committee | 5 July | London |
| The 1st Malaysian Committee | 22 July | Kuala Lumpur |
| The 15th Danish Technical Committee | 2 September | Copenhagen |
| The 12th China Committee | 14 September | Beijing |
| The 12th Korea Technical Committee | 29 September | Busan |
| The 5th Taiwan Technical Committee | 14 October | Taipei |
| The 31st Hong Kong Committee | 20 October | Hong Kong |
| The 3rd Philippine Committee | 7 November | Manila |
| The 3rd Thai Committee | 8 November | Bangkok |
| The 9th Singapore Technical Committee | 10 November | Singapore |
| The 3rd Indonesia Committee | 17 November | Jakarta |

Authorizations Granted to ClassNK for Ships Other than Passenger Ships

| Areas/Countries | LL | SOLAS | | | | | MARPOL 73/78 | | TM |
|---------------------|----|-------|----|----|-----|------|--------------|-----|----|
| | | SC | SE | SR | SMC | ISPS | IOPP | NLS | |
| Algeria | * | * | * | * | | * | * | * | * |
| Antigua and Barbuda | • | • | • | • | • | | • | • | • |
| Argentina | * | * | * | * | | | | | |
| Aruba | * | * | * | * | * | | * | * | |
| Australia | • | • | • | • | | | • | • | • |
| Bahamas | • | • | • | • | • | • | • | • | • |
| Bahrain | • | • | • | • | | • | • | • | • |
| Bangladesh | • | • | | | | | • | | • |
| Barbados | • | • | • | • | • | • | • | • | • |
| Belgium | • | • | | | * | * | | | |
| Belize | • | • | • | • | • | • | • | • | • |
| Bermuda | * | * | | | | | | | * |
| Bolivia | • | • | • | • | • | | • | • | • |
| Brazil | • | • | • | • | • | | • | • | • |
| Brunei | • | • | • | • | • | | • | • | • |
| Cambodia | • | • | * | * | • | | * | • | * |
| Canada | • | | | | | | | | |
| Cape Verde | • | • | • | • | • | | • | • | • |
| Cayman Islands | • | * | * | * | * | | • | • | • |
| Chile | * | * | * | * | | | * | | * |
| Cuba | * | * | * | * | | | | | |
| Cyprus | • | • | • | • | * | • | • | • | • |
| Denmark | • | • | • | • | • | • | • | • | • |
| Djibouti | • | • | • | • | | | • | • | • |
| Dominica | • | • | • | • | • | * | • | • | • |
| Dominican Republic | • | • | • | • | | | • | • | • |
| Ecuador | * | * | * | * | | | * | * | |
| Egypt | • | * | * | * | * | • | * | | * |
| Equatorial Guinea | • | • | • | • | * | • | • | • | • |
| Fiji | * | * | * | * | | | * | | * |
| Gambia | * | * | * | * | | | * | | * |
| Georgia | • | • | • | • | • | • | • | • | • |
| Ghana | • | • | • | * | | | • | | • |
| Gibraltar | • | • | • | • | * | * | • | • | • |
| Greece | • | • | • | • | • | • | • | • | • |
| Honduras | • | • | • | • | • | | • | • | • |
| Hong Kong | • | • | • | • | • | • | • | • | • |
| Iceland | • | • | • | • | • | | • | • | * |
| India | * | * | * | * | | | * | * | |
| Indonesia | • | * | * | * | | | * | * | * |
| Iran | • | • | • | • | | | • | • | • |
| Iraq | * | * | * | * | | | | | |
| Ireland | • | * | | | • | • | • | • | |
| Isle of Man | • | • | * | * | * | * | * | * | • |
| Israel | • | • | * | * | * | | * | | • |
| Jamaica | • | • | • | • | • | • | • | • | • |
| Japan | • | • | • | | • | * | * | * | |
| Jordan | • | • | • | • | | • | | | |
| Kenya | • | | | | | | | | |
| Kiribati | * | * | * | * | | • | * | | * |

Abbreviations: • Authority has been delegated
 * Authority has been delegated subject to some conditions
 LL International Load Line Certificate
 SC Cargo Ship Safety Construction Certificate
 SE Cargo Ship Safety Equipment Certificate

| Areas/Countries | LL | SOLAS | | | | | MARPOL 73/78 | | TM |
|------------------------------|----|-------|----|----|-----|------|--------------|-----|----|
| | | SC | SE | SR | SMC | ISPS | IOPP | NLS | |
| Kuwait | • | • | * | * | * | • | • | • | • |
| Lebanon | • | * | * | * | | * | | | |
| Liberia | • | • | • | • | • | • | • | • | • |
| Libya | • | • | • | • | • | • | • | * | * |
| Luxembourg | • | • | • | • | • | • | • | • | • |
| Madeira | • | • | • | • | | | • | • | • |
| Malaysia | * | * | * | * | * | • | * | * | * |
| Maldives | • | • | • | • | • | | • | | • |
| Malta | * | * | * | * | • | * | * | * | * |
| Marshall Islands | • | • | • | • | • | • | • | • | • |
| Mauritius | • | • | • | • | • | • | • | • | • |
| Mexico | * | * | * | * | | | * | | * |
| Morocco | • | * | * | * | * | | * | * | * |
| Mozambique | • | | | | | | | | |
| Myanmar | • | • | • | • | • | • | • | • | • |
| Namibia | • | • | • | • | | | • | • | • |
| Netherlands | * | * | * | * | * | * | * | * | |
| Netherlands Antilles | * | * | * | * | * | * | * | * | |
| Oman | • | • | • | • | | | | | • |
| Pakistan | • | • | | | * | | • | • | • |
| Panama | • | • | • | • | • | * | • | • | • |
| Papua New Guinea | • | • | • | • | | | • | | • |
| Paraguay | * | * | * | * | * | | | | * |
| Philippines | • | • | • | • | • | • | • | • | • |
| Portugal | * | * | | | | | * | | |
| Qatar | * | * | * | * | * | • | * | * | * |
| Saudi Arabia | • | • | • | • | • | • | • | • | • |
| Seychelles | • | • | • | • | • | • | • | • | • |
| Singapore | • | • | • | • | • | • | • | • | • |
| Solomon Islands | • | • | • | • | | | | | • |
| Somalia | • | | | | | | | | |
| South Africa | • | • | | | | | • | • | |
| Sri Lanka | • | • | • | • | | | • | | • |
| St. Vincent & the Grenadines | • | • | • | • | • | * | • | • | • |
| Switzerland | • | • | • | • | * | | • | • | • |
| Tanzania | • | | | | | | | | |
| Thailand | * | * | * | * | * | | * | | * |
| Tonga | • | • | • | • | | | • | • | • |
| Tunisia | • | * | | | | | • | | |
| Turkey | • | * | * | * | • | • | • | • | * |
| Tuvalu | • | • | • | • | • | • | • | • | • |
| U.A.E. | • | • | • | • | • | • | • | | • |
| Uganda | • | | | | | | | | |
| U.K. | • | * | * | * | * | | * | | • |
| Uruguay | * | * | * | * | | | | | |
| Vanuatu | • | • | • | • | • | • | • | • | • |
| Venezuela | * | | | | | | | | |
| Vietnam | * | * | * | * | * | | * | * | * |
| Yemen | • | | | | | | | | |

- SR Cargo Ship Safety Radio Certificate
SMC Safety Management Certificate
ISPS International Ship and Port Facility Security Certificate
IOPP International Oil Pollution Prevention Certificate
NLS International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk
TM International Tonnage Certificate (1969)

| ADVISORY COUNCIL | | | |
|-------------------------|-------------------|----------------|-----------------------------------|
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| | Lua Cheng Eng | Chairman | LCE Consulting Pte Ltd. |
| | Sumate Tanthuwant | Chairman | Regional Container Lines Group |
| | Kou Ming Koo | Chairman | Valles Steamship Company, Limited |

HONG KONG COMMITTEE

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| | Peter Cheng | Peter Cheng Naval Architect & Marine Consultant Ltd. |
| | Raymond Pao | Regent Shipping Ltd. |
| | Li Hua | Sinotrans Shipping Limited |
| | Kenneth K.W. Lo | Teh-Hu Cargocean Management Co., Ltd. |
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| C.A.J. Vanderperre | Univan Ship Management Ltd. | |
| David C. C. Koo | Valles Steamship Co., Ltd. | |
| Sabrina S. M. Chao | Wah Kwong Shipping Holdings Ltd. | |
| Jim Nelson | Wallem Shipmanagement Ltd. | |

KOREA COMMITTEE

| | | |
|----------|----------------|--|
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| | Hyun Yung-Won | Hyundai Merchant Marine Co., Ltd. |
| | Choi Kil Seon | Hyundai Mipo Dockyard Co., Ltd. |
| | Lee Youn-Jae | Hyundai Samho Heavy Industries Co., Ltd. |
| | Jang Hak-Se | Korea Line Corporation |
| | Kim Jing-Wan | Samsung Heavy Industries Co., Ltd. |
| | Jeong-Hwa Lee | SK Shipping Co., Ltd. |
| | Jong-Chul Lee | STX Pan Ocean Shipping Co., Ltd. |

GREEK COMMITTEE

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|----------|--------------------------|---|
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| | Prokopis N. Karnesis | European Navigation Inc. |
| | Kriton Lendoudis | Evalend Shipping Co. S.A. |
| | Michael E. Veniamis | Golden Union Shipping Co. S.A. |
| | Ghikas J. Goumas | J. G. Goumas Shipping Company S.A. |
| | Dimitris Z. Kritsas | Kritsas Shipping S.A. |
| | Panagiotis C. Laskaridis | Laskaridis Shipping Co., Ltd. |
| | Diamantis P. Diamantides | Marmaras Navigation Ltd. |
| | Thanos Crassaris | Springfield Shipping Co. Panama S.A. |

| | |
|--------------------------|--------------------------------|
| George S. Livanos | Sun Enterprises Ltd. |
| Constantinos J. Martinos | Thenamaris Ships Management |
| Panagiotis N. Tsakos | Tsakos Shipping & Trading S.A. |

CHINA COMMITTEE

| | | |
|----------|-----------------|--|
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| Members | Xu Zi Qiu | China Shipbuilding & Offshore International Co., Ltd. |
| | Lu Yi Bin | China Shipping (Group) Company |
| | Zhang Xi Ping | China State Shipbuilding Corporation |
| | Han Cheng Min | COSCO Container Lines |
| | Ge En Hua | Hebei Ocean Shipping Co., Ltd. |
| | Yang Jian Ming | Jiangsu Ocean Shipping Co., Ltd. |
| | Yan Ming Yi | Shanghai Shipping (Group) Company and China Shipping Development Co., Ltd., Tanker Company |
| | Tian Zhongshan | Sinotrans Shipping Limited |

INDIAN COMMITTEE

| | | |
|---------------|-----------------------|---|
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| Vice Chairman | R. L. Pai | Reliance Industries Limited |
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| | Ashok V. Chowgule | Chowgule & Company Ltd. |
| | Ajoy Chatterjee | Directorate General of Shipping, Ministry of Shipping, Government of India |
| | Madhusudan P. Dhanuka | GEE Limited |
| | Atul J. Agarwal | Mercator Lines Limited |
| | H. Ansari | National Law University |
| | S. Govindrajan | Progressive Shipping Consultancy Services (PVT) Ltd. |
| | K. M. Sheth | The Great Eastern Shipping Co., Ltd. |
| | R. K. Mitra | The Shipping Corporation of India Ltd. |

TAIWAN COMMITTEE

| | | |
|----------|---------------------|---|
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| Members | Danny Wang | Cheng Lie Navigation Co., Ltd. |
| | Kuang-Nan Fan | China Shipbuilding Corp. |
| | Donald K. L. Chao | China Steel Express Corporation |
| | Jei-Yuan Chen | Chinese Petroleum Corp. |
| | Shang-Wen Liao | Eastern Media International Corporation |
| | Huang Chin-san | Evergreen International Corp. |
| | Loh Yao-fon | Evergreen International Storage & Transport Corp. |
| | Joseph J. M. Jhu | First Steamship Co., Ltd. |
| | Huang Mei-Hsiung | Glory Navigation Co., Ltd. |
| | Harvey Chiu | Hsin Chien Marine Co., Ltd. |
| | Michael M. K. Hsiao | Mingtai Navigation Co., Ltd. |
| | Lan Juin Der | Shih Wei Navigation Co., Ltd. |
| | Mathias K. Y. Chen | Sincere Industrial Corp. |
| | Fred C. P. Tsai | Sincere Navigation Corp. |
| | I. Y. Chang | Taiwan Navigation Co., Ltd. |
| | Nobuyoshi Morimoto | TMT Co., Ltd. |
| | C. K. Ong | U-Ming Marine Transport Corp. |
| | C. C. Lin | Unison Marine Corp. |
| | Chao-Hon Chen | Wan Hai Lines Ltd. |
| | Lan Chun Sheng | Wisdom Marine Lines S.A. |
| | David C. H. Liu | Yang Ming Marine Transport Corp. |

BRITISH COMMITTEE

| | | |
|----------|----------------------------|--|
| Chairman | J. G. Davis CBE | IMIF (International Maritime Industries Forum) |
| Members | Robert Houston | Anglo-Eastern Ship Management (UK) Ltd. |
| | Enys Dan | BP Shipping Limited |
| | Epaminondas G.E. Embiricos | Embiricos Shipbrokers Ltd. |
| | Philip D Atkinson | Graig Ship Management Limited |
| | Alan P. Davey | Shell Shipping Technology |
| | F. M. Marchant | The Peninsular and Oriental Steam Navigation Company |
| | Ray McNamara | V. Ships UK Ltd. |
| | Vivek Puri | Wallem Limited |
| | Peter McIntosh | Wellington Underwriting |

INDONESIA COMMITTEE

| | | |
|----------|-------------------------|---|
| Chairman | Widihardja Tanudjaja | PT. Berlian Laju Tanker Tbk |
| Members | Choy Ngee-Sheng | GBLT Shipmanagement Pte. Ltd. |
| | Oentoro Surya | INSA (Indonesia National Shipowner Association) |
| | Joewanto Karijodimedjo | IPERINDO (Shipbuilding & Offshore Industries Association) |
| | Sopardi Somantri | PT. Adnyana |
| | Andy A. Mallian | PT. Arpeni Pratama Ocean Line |
| | Kasim Arifin | PT. Bumi Perkasa Bahtera |
| | Djoko Mulyanto | PT. Djakarta Lloyd |
| | M. Affandi | PT. DKB Jakarta |
| | Hendrato | PT. Gesuri Lloyd |
| | H. Soenarto | PT. Gurita Lintas Samudra |
| | Teguh Arya Putra | PT. Humpuss Intermoda Transportasi Tbk. |
| | Adwin H. Suryohadiprojo | PT. PAL Surabaya |
| | Dedeng Wahyu Edi | PT. PERTAMINA (PERSERO) |
| | A. L. Soebagio Windoe | PT. Samudra Indonesia Tbk. |

THAI COMMITTEE

| | | |
|----------|-------------------------|--|
| Chairman | Sutep Tranantasin | Regional Container Lines Group |
| Members | Warawan Nganthavee | Asian Marine Services Public Co., Ltd. |
| | Bhumindr Harinsuit | Bhureemas Navee Co., Ltd. |
| | Wirat Chanasit | Italhai Marine Ltd. |
| | Chanet Phenjati | Jutha Maritime Public Co., Ltd. |
| | Suraphon Meesathien | Nathalin Co., Ltd. |
| | Amares Phulsawat | Phulsawat Group |
| | Jaipal Mansukhani | Precious Shipping Public Co., Ltd. (Great Circle Shipping Co., Ltd.) |
| | Wittawat Svasti-Xuto | PTT Public Co., Ltd. |
| | Voravit Visitkitjakarn | Sang Thai Shipping Co., Ltd. |
| | Chanwit Anakkul | Thaioil Marine Company Ltd. |
| | Yodchai Ratanachiwakorn | Thoresen & Co., (Bangkok) Ltd. |
| | Teruo Kondo | Unithai Shipyard & Engineering Ltd. |

PHILIPPINE COMMITTEE

| | | |
|----------|-----------------------|--|
| Chairman | Arben E. Santos | Southwest Maritime Group of Companies |
| Members | Roy A. Alampay | Baliwag Navigation, Inc. |
| | Vicente T. Suazo, Jr. | Department of Transportation & Communications, Republic of the Philippines |
| | Rogelio A. Torres | Eastern Shipping Lines, Inc. |
| | Ko-Lin Toh | Keppel Philippines Marine, Inc. |
| | Michael G. Bernardino | Loadstar International Shipping, Inc. |
| | Doris Magsaysay Ho | Magsaysay Maritime Corporation |
| | Edgardo G. Lacson | MIS Maritime Corporation |
| | Kenji Kawano | Tsuneishi Heavy Industries (Cebu), Inc. |

TURKISH COMMITTEE

| | | |
|----------|----------------------|---------------------------------------|
| Chairman | Yalcin Sabanci | Yasa Holding S.A |
| Members | Necdet Aksoy | Akmar Holding S.A |
| | Ali Umur | Aktif Shipping |
| | Bilge Bayburtlugil | Aygaz Anonim Sirketi |
| | Esref Cerrahoglu | Cerrahgil A. S. |
| | Akin Falay | Cornships Management and Agency Inc. |
| | Serdar Akcali | Denak Ship Management & Agency |
| | Suleyman Pasli | Ditas Tanker and Marine Operations |
| | Orhan Karademir | Genel Denizcilik Nakliyatı A.S. |
| | Sadan Kaptanoglu | H.I. Kaptanoglu Shipping Group |
| | Suha Izmiriligil | Hasatmar Ship Management S.A. |
| | Bedri Ince | Ince Shipping and Trading Co. Inc. |
| | Murat Edip Karahasan | Karahasan Group of Shipping Companies |
| | Tamer Kiran | KIRAN Group of Shipping Companies |
| | Faruk Miras | Korfez Shipping and Trading Inc. |
| | Serif Ozdaglar | Nemtas A.S. |
| | Murat Dortbudak | Odin Shipmanagement |

SINGAPORE COMMITTEE

| | | |
|----------|-------------------|--|
| Chairman | David T E Lim | Neptune Orient Lines Ltd. |
| Members | Tong Chong Heong | Keppel Fels Limited |
| | Tay Lim Heng | Maritime and Port Authority of Singapore |
| | Aloysius Seow F S | Ocean Tankers (Pte) Ltd. |
| | Teo Joo Kim | Pacific Carriers Limited |
| | Teo Cho Keng | Pacific International Lines Pte Ltd. |
| | K. K. Tan | SembCorp Marine Limited |

MALAYSIAN COMMITTEE

| | | |
|---------------|----------------------|--|
| Chairman | Shamsul Azhar Abbas | Malaysia International Shipping Corporation Berhad |
| Vice Chairman | Nordin Mat Yusoff | Malaysia International Shipping Corporation Berhad |
| Members | Lim Leng Pin | Aurora Tankers Sdn. Bhd. |
| | Hemant Pathania | Barber Ship Management Ltd. |
| | Billy Tan Gim Hoe | Ecoship Sdn. Bhd. |
| | David Tan | Everise Maritime Sdn. Bhd. |
| | Halim Mohammad | Halim Mazmin Bhd. |
| | Dennis Liong | Hub Shipping Sdn. Bhd. |
| | Wan Yusoff Wan Hamat | Malaysia Marine & Heavy Engineering Sdn. Bhd. |
| | Muhamad Azmi Alwi | Nepline Bhd. |
| | Aziz Ishak | Petronas Maritime Services Sdn. Bhd. |
| | Mohd Azubir Adam | Sutrajaya Shipping Sdn. Bhd. |

DANISH TECHNICAL COMMITTEE

| | | |
|----------|---------------------------|---------------------------------|
| Chairman | Preben Terndrup Pedersen | Technical University of Denmark |
| Members | Mogens Fynbo | A/S Dampskibsselskabet Torm |
| | Carsten Melchior | BIMCO |
| | Anne Skov Struver | Danish Maritime Authority |
| | Valdemar Ehlers | DFDS |
| | Flemming Schmidt-Andersen | Lauritzen Kosan A/S |
| | Erik Moller | Lauritzen Tankers A/S |
| | Peter Sunn Pedersen | MAN B&W Diesel A/S |
| | Peter Tang-Jensen | Odense Steel Shipyard Ltd. |

KOREA TECHNICAL COMMITTEE

| | | |
|----------|---------------|--|
| Chairman | Sung-Won Kang | Pusan National University |
| Members | Sang-Woo Lee | Dae Sun Shipbuilding & Engineering Co., Ltd. |

| | |
|----------------|--|
| Kyu-Won Park | Hanjin Heavy Industries & Construction Co., Ltd. |
| Sung-Nyun Kim | Hyundai Heavy Industries Co., Ltd. |
| Hyun-Sang Shim | Hyundai Samho Heavy Industries Co., Ltd. |
| Jae-Sung Choi | Korea Maritime University |
| Hyung-Yong Lee | Samsung Heavy Industries Co., Ltd. |
| H. K. Leem | STX Shipbuilding Co., Ltd. |

CHINA TECHNICAL COMMITTEE

| | | |
|-----------------|---|---|
| Chairman | Lu Zhi Ping | Shanghai Merchant Ship Design & Research Institute |
| Members | Zhang Yong Jian | China Ocean Shipping (Group) Company |
| | Luan Fu Kai | China Ocean Shipping (Group) Company |
| | Wang Jin Xiang | China Ocean Shipping (Group) Company |
| | Zhao Zhan Jun | China Ship Design & Research Center Co., Ltd. |
| | Cao Zhi Teng | China Shipbuilding Trading Co., Ltd. |
| | Lin Zhi Shui | China Shipping (Group) Company |
| | Li Xue Qiang | China Shipping Container Lines Co., Ltd. |
| | Pu Li Fei | China Shipping International Trading Co., Ltd. |
| | Huang Pei Lin | COSCO Bulk Carrier Co., Ltd. (Tianjin Ocean Shipping Company) |
| | Zhang Ming Hua | COSCO Industry Company |
| | Qiu Xin Yao | COSCO Ship Management Co., Ltd. |
| | Hong Ying | COSCO Shipping Co., Ltd. (Guangzhou Ocean Shipping Company) |
| | Yang Wei Zan | Dalian New Shipbuilding Heavy Industry Co., Ltd. |
| | Li Jun Bao | Dalian Ocean Shipping Company |
| | Zhang Zhen De | Dalian Shipyard Co., Ltd. |
| | Li Yi Wen | Guangzhou Maritime Transport (Group) Co., Ltd. |
| | Zhou Zhi Hao | Guangzhou Shipyard International Co., Ltd. |
| | Lou Dan Ping | Hudong-Zhonghua Shipbuilding (Group) Co., Ltd. |
| | Yang Shi-Ming | Jiangnan Shipyard (Group) Co., Ltd. |
| | Hu Ke Yi | Jiangnan Shipyard (Group) Co., Ltd. |
| | Luo Jian | Jiangsu Ocean Shipping Co., Ltd. |
| | Zhu Yue Chen | Liaoning Bohai Shipyard |
| | Yu Bao-Jun | Marine Design & Research Institute of China |
| Tokio Yamashita | Nantong COSCO KHI Ship Engineering Co., Ltd. | |
| Liu Haijin | New Century Shipbuilding Co., Ltd. | |
| Sun Wen Tian | Qingdao Ocean Shipping Company | |
| Jin Yun Long | Shanghai Ship & Shipping Research Institute, Ministry of Communications | |
| Xu Hui | Shanghai Shipping (Group) Company | |
| Zhang Ming Xian | Shanghai Shipyard | |
| Tao Ying | Shanghai Waigaoqiao Shipbuilding Co., Ltd. | |
| Feng Guo Ying | Sinotrans Shipping Limited | |
| Zhang Li Feng | Xingang Shipyard | |

SINGAPORE TECHNICAL COMMITTEE

| | | |
|----------|-----------------|--|
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| Members | Robert Sumantri | Altus Shipping and Logistics Pte. Ltd. |
| | Liu De Tian | COSCO (Singapore) Pte Ltd. |
| | Seow Tan Hong | Jurong Shipyard Pte Ltd. |
| | Nelson Yeo | Keppel Shipyard Limited |
| | Wong Len Poh | Maritime & Port Authority of Singapore |

| | |
|----------------------|--|
| Hiroaki Kubo | MOL Shipmanagement Asia Pte Ltd. |
| K. K. Kumar | NYK Shipmanagement Pte Ltd. |
| Teh Eng Hua | Ocean Tankers (Pte) Ltd. |
| Phua Cheng Tar | PACC Ship Managers Pte Ltd. |
| Chia Che Kiang | Pacific International Lines Pte Ltd. |
| Ng Sing Chan | Pan-United Shipyard Pte Ltd. |
| Kenneth Kee | Petroships Pte Ltd. |
| Mok Kim Whang | Singapore Technologies Marine Ltd. |
| Tadic Tonci | Tanker Pacific Management (Singapore) Pte Ltd. |
| Arun K. Ahluwalia | V. Ships Asia Pte. Ltd. |
| Chung Yau Yu Vincent | World-Wide Shipping Managers Pte Ltd. |

TAIWAN TECHNICAL COMMITTEE

| | | |
|----------|--------------------|---|
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| Members | K. C. Lin | Cheng Lie Navigation Co., Ltd. |
| | Hsiung Lee | China Steel Express Corporation |
| | Shieh-Jye Chuu | Chinese Petroleum Corporation |
| | C. S. Chen | Deryoung Maritime Co., S.A. |
| | Michael L. Y. Pan | Eastern Media International Corporation |
| | Kuo Wen-ben | Evergreen Marine Corp. (Taiwan) Ltd. |
| | Johnny J. Ho | First Steamship S.A. |
| | Anthony Lin | Formosa Plastics Marine Corporation |
| | Guo I-Lung | Glory Navigation Co., Ltd. |
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