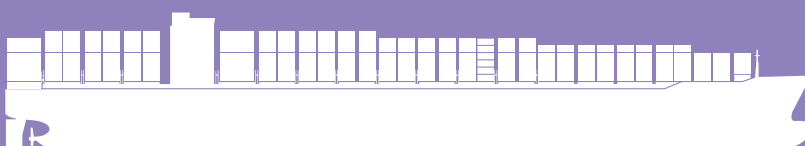


ClassNK

Annual Report 2010



ClassNK Annual Report 2010

The ClassNK Mission

ClassNK is dedicated to ensuring the safety of life and property at sea, and to preventing 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, guidances and procedures, and maintain and develop its commitment to scientific and technological research and development; and
- ⊗ Maintain and develop its global operations in line with the needs of those using its services.

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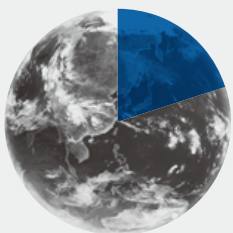
ClassNK

Founded on 15 November 1899, Nippon Kaiji Kyokai, better known as ClassNK or simply NK, is a ship classification society dedicated to

safeguarding life and property at sea and to preventing marine pollution. ClassNK offers a broad spectrum of services as a totally independent third party, non-profit organization. The principal work of the Society's expert technical staff is to conduct surveys of new and existing ships and other marine structures, including hull structures, propulsion systems, electrical and electronic systems, safety equipment, and cargo handling gear, among numerous other areas, to ensure their full compliance with classification rules developed by the Society. It also conducts a wide range of statutory surveys on behalf of more than 100 flag States around the world. Other activities include the audit and certification of safety management systems based on the ISM Code, quality and environmental system assessments based on ISO standards, technical consulting, and an extensive range of cutting-edge R&D projects.

Since its founding 111 years ago, ClassNK has worked tirelessly to fulfill its mission of protecting human life, maritime property and the marine environment. An unmatched commitment to technical excellence and providing the highest level of service has made the Society a world leader in ship classification. As a result, by the end of 2010, the NK register listed 7,347 ships totaling over 179 million gross tons. This number represents some 20% of the world's merchant fleet under class.

Although based in Japan, ClassNK has global representation through a network of 118 exclusive surveyor offices. ClassNK's surveyors work in shipbuilding and repair yards and at ports around the world, wherever they may be called upon to examine the condition of a ship, to ensure that all of the Society's services are available 24/7, worldwide.



Share of
the Global
Merchant Fleet

20%

179.5 million gt

Major Activities

SHIP CLASSIFICATION SERVICES



ISO AND OHSAS ASSESSMENT AND REGISTRATION



TECHNICAL SUPPORT AND CONSULTING



EDUCATIONAL AND TRAINING SERVICES



INTERNATIONAL ACTIVITIES





ClassNK offers a broad range of services that encompass every aspect of ship classification from the approval of vessel and machinery plans to the survey and registration of the ship and ship installations, approval of materials, equipment and outfitting gear, as well as the assessment and registration of ship safety management systems and security systems.



As part of our classification activities, ClassNK has long been involved in the certification of shipyard and manufacturer quality assurance systems. Utilizing this experience, ClassNK has since expanded these activities to include registration and assessment in accordance with the ISO 9001 and ISO 14001 standards. ClassNK's ISO registration activities are accredited by leading accreditation bodies both in Japan and internationally, and ClassNK ISO registration is recognized as a mark of quality throughout the world. The Society has recently added OHSAS certification services to these services, as well.



ClassNK also offers a wide variety of consulting and support services based on the technical expertise we have developed over more than a century of classification experience. These services include technical consulting, appraisal and certification of ships and offshore structures, newbuilding superintendence, inspection of industrial machinery and equipment, tonnage measurement and certification, as well various types of testing, research, and computer analysis.



ClassNK makes its extensive experience, expertise, and technical knowledge available to the entire maritime community via a number of different educational and training programs. These include training programs carried out at the request of the Japanese government and other flag and port administrations, as well technical seminars and the ClassNK Academy Program of courses. ClassNK is constantly expanding its educational and training activities for a broad spectrum of people, from those new to the industry to specialized experts, as part of its efforts to further contribute to the growth and development of the maritime community.



As a global organization, ClassNK maintains membership in a number of international decision and rule making bodies, and contributes to numerous maritime bodies around the globe. ClassNK is an active participant in the International Association of Classification Societies (IACS), and greatly contributes to the formulation of rules and regulations, such as the IACS Unified Requirements (UR) and Unified Interpretations (UI). ClassNK also dispatches experts and researchers to meetings of the International Maritime Organization (IMO), both as representatives of IACS and the Japanese government, among other international activities conducted by the Society.

Chairman's Message

ClassNK continually serves the interests of the maritime community and environmental protection through its resolve to provide customers with meticulous services of the highest quality and pursue research and development of advanced technologies that enhance the technical capabilities supporting those services.

Maritime Industry and Global Trends in Fiscal 2010

The global economy in 2010 continued its slow transition towards recovery which started in 2009 as a result of the massive economic stimulus measures introduced by countries around the world to address the global recession that occurred after the Lehman shock in 2008. Against such conditions, it was also a year in which greater attention had been paid to newly emerging countries such as China, India, and Brazil, each of which exhibited strong economic growth compared with developed countries in the European region that continued to face destabilizing factors such as instability in their financial sectors.

The shipbuilding sector also underwent a major shift during the year with China overtaking Korea for the first time in terms of the volume of newbuildings completed. In fact, China emerged for the first time as the world's largest shipbuilding nation in the world, based on the three major shipbuilding indices of volumes of orders received, completions delivered, and orders in hand being filled. In addition, the expansion of new shipbuilding in China has raised the total global volume of new ship construction to about 100 million gross tons for 2010, an increase of some 30% over the previous record of 77 million gross tons recorded in 2009.

Summary of Activities in Fiscal 2010

Against this background of new global shipbuilding records, the Society also set new records of its own with the entry into class of 585 newly built ships of 17.81 million gross tons during the year, the ninth straight year of record breaking growth. Thanks to the dedicated efforts of all concerned, ClassNK led all other classification societies by breaking the 170

million gross tons under class mark for the first time ever in March 2010. By the end of December 2010, ClassNK listed a total of 7,347 ships under class with a total tonnage of 179,478,084 gross tons. This represents some 20% of the total gross tonnage of the global merchant fleet under class. The total gross tonnage on the NK register is expected to break the 180 million ton mark in early 2011.

The Society has also been putting great focus on enhancing its survey and audit system in recent years in order to provide high quality service to the entire world more rapidly and precisely. The past year has been no exception. Nine new offices were established in various locations across the globe, including in Syria, Peru, Sri Lanka, and Russia, bringing the total number of exclusive surveyor offices in the ClassNK global network to 118 by the end of 2010. In addition, much effort has also been put into further improving the quality of our survey services, which form the core foundation of the work of the Society. This has been done by proactively enhancing the quality and competency of the surveyors themselves with the conduct of more extensive training and guidance both in Japan and around the world.

The Society has also been very active in its international activities. Since assuming the chairmanship of the International Association of Classification Societies (IACS) in July 2010, ClassNK has worked closely with IACS to step up its technical contributions to the maritime community, while promoting greater transparency of its operations, and gaining a better grasp of the views and needs of the maritime community as a whole from a broader and more balanced perspective. This has included engaging in wide ranging discussions with a host of parties across the maritime world to find practical solutions for numerous topics of concern. In



Noboru Ueda
Chairman and President

addition, the Society played an advisory role in the formal establishment of the Association of Asian Classification Societies (ACS) in February 2010. At the same time, the Society is actively working to develop cooperative relations with various members of the maritime community across the globe. The Society also works with the maritime community through various avenues to achieve the smooth development, abolishment, entry into force, and effective implementation of a raft of new conventions and requirements, including those concerned with ship recycling, ballast water management, and the reduction of greenhouse gases.

ClassNK also engages in many research and development projects that are directly related to our ship classification activities. These medium-term projects are carried out as part of a practical R&D program. Much of this work centers on applications to containerhips, LNG carriers, and the marine environment. The results of this work are reflected in the Rules and Guidance of the Society. Their release to the public in this and other ways contributes to the mission of the Society of ensuring the safety of life and property at sea and preserving the marine environment through cutting edge technical research and development.

As the world's largest classification society on a gross tonnage basis, we not only consider protecting the marine environment as a key task but also view protecting the global environment as an essential matter of concern. Consequently, the Society participates in a national program of projects aimed at developing a host of new technologies for reducing GHG emissions. As such, we are proactively working to reduce the environmental loads associated with the marine industry and improve the environment through joint research and development of such technologies in partnership with various organizations throughout the industry.

This year's annual report describes in more depth various aspects of the many operations, international activities, as well as research and development activities undertaken by the Society during 2010.

Serving the Interests of the Maritime Community and Environmental Protection

I sincerely believe that the remarkable achievement of having the largest amount of gross tonnage of ships under class is a testament to the depth of trust that the Society has been able to build over our 111 year history. In order to deepen this trust even more in the future, we will rigorously strive to respond quickly and courteously to our clients while providing detailed service of the highest quality and care possible that best meets their needs. In addition, we will continue to pursue the research and development of advanced technologies in order to enhance the technical capabilities that support our services, as well as contribute to the marine industry and protection of the environment.

In closing, on behalf of everyone at ClassNK, I would like to take this opportunity to convey my sincerest appreciation to everyone for your continued patronage and support of our Society. We also look forward to your continued cooperation and support in the future.

A handwritten signature in black ink, appearing to read 'N. Ueda', with a stylized flourish above it.

Noboru Ueda
Chairman and President

ClassNK at a Glance



Winner of the “The Classification Society Award” at the Lloyd’s List Asia Awards 2010

The Lloyd’s List Asia Awards 2010 ceremony was held in Singapore on 7 October 2010. The awards are presented to selected companies and organizations that have made significantly outstanding contributions to the marine industry in Asia during the previous year. The extent and superior excellence of the activities and services of the Society in the Asian region during the period leading up to the award were most highly regarded, resulting in ClassNK being awarded the “Classification Society Award.”

New Technical Guidelines

As part of its ongoing efforts to improve the safety and reliability of ships at sea, the Society published numerous new technical guidelines in 2010, including those listed below. These and other guidelines can be downloaded from the “PDF Publications” page of the ClassNK website:

http://www.classnk.or.jp/hp/download/dl_pdf.aspx

- Guidelines on Corrosion Resistant Steel for COT
- Guidelines on Friction Stir Welding
- Guidelines on the Installation of Ballast Water Treatment Systems
- Guidelines for Performance Standard for Protective Coatings Contained in IMO Resolution MSC.215 (82)



- Guidelines on Laser Beam Arc Hybrid Welding
- Guidelines for the Prevention of Human Error Aboard Ships
- ClassNK Technical Bulletin Vol. 28

International Exhibitions

The Society participated in eighteen major international maritime exhibitions in 2010:

- VIETSHIP 2010
Dates: March 17–19 Location: Hanoi, Vietnam
- CMA Shipping 2010
Dates: March 22–24 Location: Stamford, Connecticut, USA
- Asia Pacific Maritime 2010
Dates: March 24–26 Location: Singapore
- ShipTek 2010
Dates: April 18–19 Location: Dubai, UAE
- LNG 16
Dates: April 18–21 Location: Oran, Algeria
- Sea Japan 2010
Dates: April 21–23 Location: Tokyo, Japan
- China International Marine, Port & Shipbuilding Fair
Dates: May 19–21 Location: Nanjing, China
- Posidonia 2010
Dates: June 7–11 Location: Athens, Greece
- Navalshore 2010
Dates: August 11–13 Location: Rio de Janeiro, Brazil
- SMM Hamburg 2010
Dates: September 7–10 Location: Hamburg, Germany
- Indonesia Maritime Expo 2010
Dates: September 29–October 1 Location: Jakarta, Indonesia
- Asia Maritime & Logistics 2010
Dates: October 11–12 Location: Kuala Lumpur, Malaysia
- Techno-Ocean 2010
Dates: October 14–16 Location: Kobe, Japan
- Seatrade Middle East Maritime
Dates: October 26–28 Location: Dubai, UAE
- Shiptec China 2010
Dates: October 26–28 Location: Dalian, China
- National Congress of Merchant Marine
Dates: November 9–12 Location: Mexico City, Mexico
- China Zhoushan International Maritime Expo 2010
Dates: November 11–13 Location: Zhoushan, China
- EXPONAVAL / TRANSPORT 2010
Dates: November 30–December 3 Location: Valparaiso, Chile

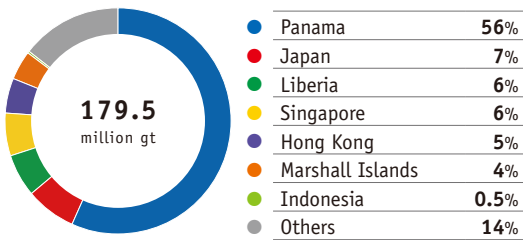


- ① Lloyd's List Asia Awards 2010 ceremony
- ② Naming ceremony
- ③ ClassNK exhibition booth

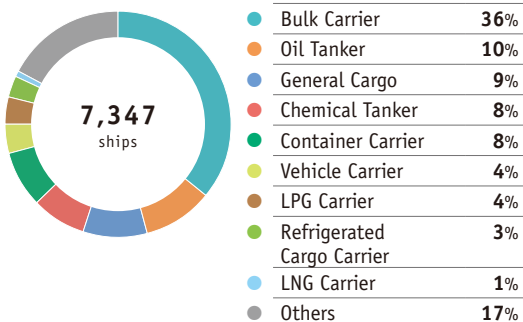
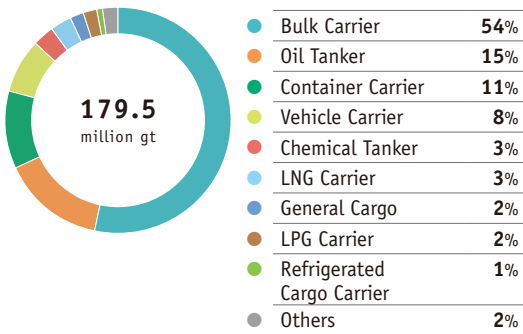
Record Number of Newbuildings Added to Register

The number of newbuildings classed with the Society reached a total of 585 ships amounting to 17,807,446 gt in 2010, surpassing the previous record for the Society set in 2009 for total newbuilding tonnage added to the register during the year. At the end of December 2010, the Society listed a total of 7,347 ships under class with a total tonnage of 179,478,084 gross tons.

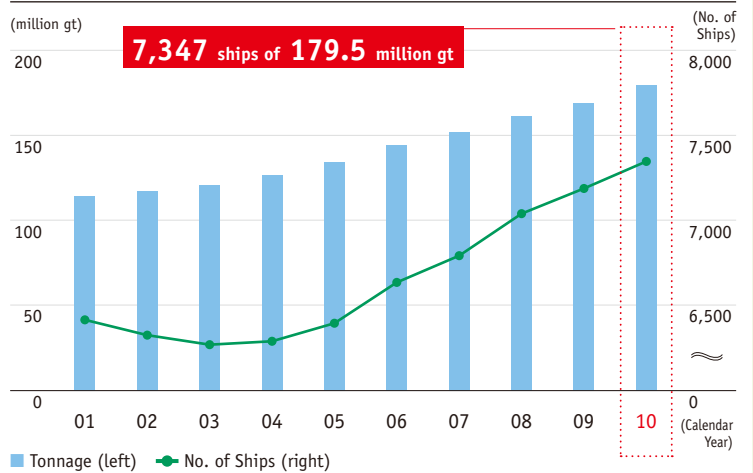
Breakdown of NK Fleet by Flag



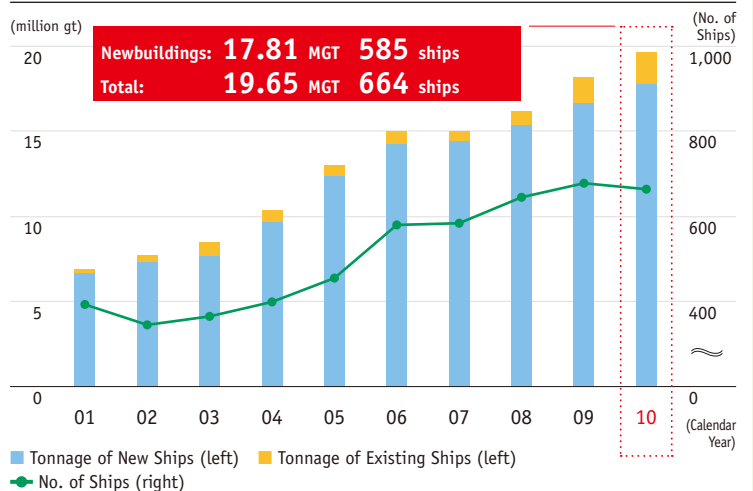
Breakdown of NK Fleet by Ship Type



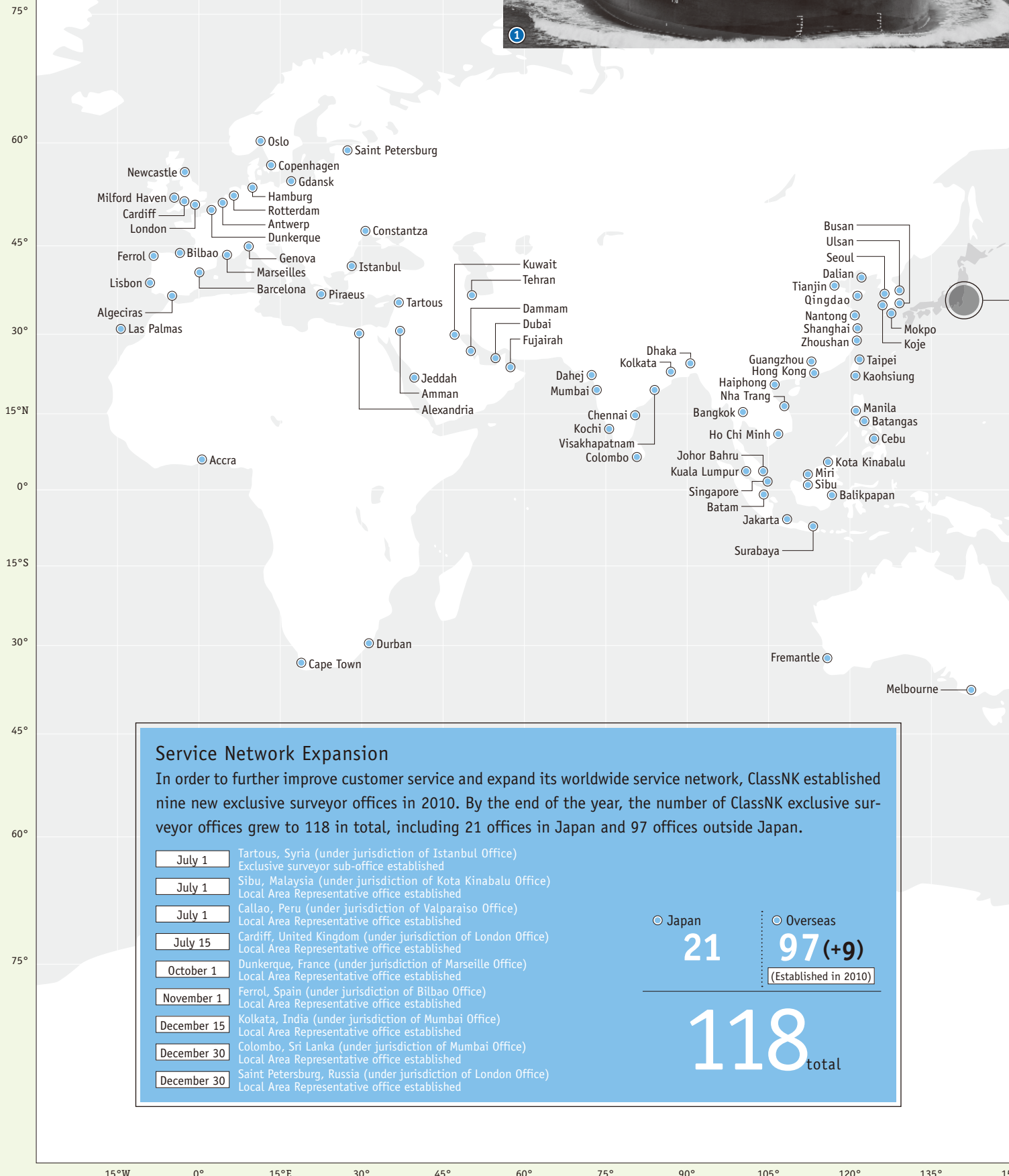
ClassNK Fleet



GT and No. of Ships Newly Classed



Service Network



Service Network Expansion

In order to further improve customer service and expand its worldwide service network, ClassNK established nine new exclusive surveyor offices in 2010. By the end of the year, the number of ClassNK exclusive surveyor offices grew to 118 in total, including 21 offices in Japan and 97 offices outside Japan.

July 1	Tartous, Syria (under jurisdiction of Istanbul Office) Exclusive surveyor sub-office established
July 1	Sibu, Malaysia (under jurisdiction of Kota Kinabalu Office) Local Area Representative office established
July 1	Callao, Peru (under jurisdiction of Valparaiso Office) Local Area Representative office established
July 15	Cardiff, United Kingdom (under jurisdiction of London Office) Local Area Representative office established
October 1	Dunkerque, France (under jurisdiction of Marseille Office) Local Area Representative office established
November 1	Ferrol, Spain (under jurisdiction of Bilbao Office) Local Area Representative office established
December 15	Kolkata, India (under jurisdiction of Mumbai Office) Local Area Representative office established
December 30	Colombo, Sri Lanka (under jurisdiction of Mumbai Office) Local Area Representative office established
December 30	Saint Petersburg, Russia (under jurisdiction of London Office) Local Area Representative office established

○ Japan **21**

○ Overseas **97 (+9)**
(Established in 2010)

118 total



- 1 LIBRA TRADER**
 a 310,339 dwt VLCC built by MITSUI ENGINEERING & SHIPBUILDING CO., LTD., CHIBA SHIPYARD for LEGEND TRANSPORT INC.

- 2 STEEL HUB-19**
 a 6,299 dwt barge built by DALIAN SHIPYARD INDUSTRIAL DEVELOPMENT GENERAL CORPORATION, CHANGXING SHIPYARD for STEEL HUB CO., LTD.

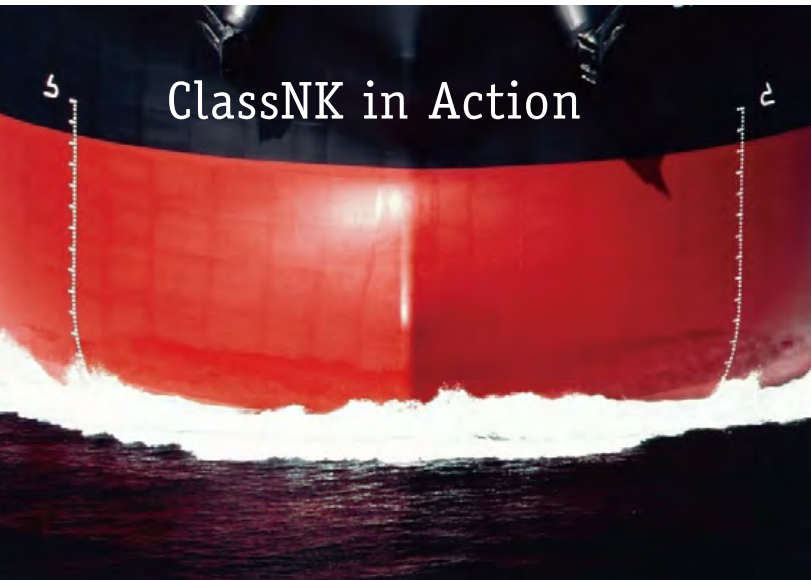
- 3 CHESAPEAKE HIGHWAY**
 a 21,643 dwt vehicle carrier built by NANTONG COSCO KHI SHIP ENGINEERING CO., LTD. for KAW1652 SHIPPING S.A.

- 4 INCE KARADENIZ**
 a 56,956 dwt bulk carrier built by COSCO (ZHOUZHAN) SHIPYARD CO., LTD. for INCE DENIZCILIK VE TICARET A.S.



China

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As of the end of December 2010, ClassNK listed a total of 7,347 ships under class, a net increase of 159 ships over the year-end total for 2009. The total tonnage on the NK class register as of the end of 2010 was 179,478,084 gross tons, a net increase of 10,613,799 gt over the end of 2009.

By the end of 2010, the number of NK classed ships flagged outside of Japan stood at 6,391 vessels, or some 87% of the ships registered with the Society. These ships comprised 166,448,570 gross tons or 93% of the Society's total fleet. Ships registered with the Society continue to bear the flags of many different nations and territories, with NK classed ships registered to 73 different flag administrations. In addition, the average age of the NK fleet lessened slightly to 9.9 years.

A total of 664 ships of 19,650,486 gross tons were added to the register during the year 2010. Of these, a total of 585 ships consisted of newbuildings comprising 17,807,446 gross tons, a significant increase over the 2009 record total of 16,703,104 gross tons. In terms of ship numbers, newbuildings accounted for 88% of all ships added to the register in 2010, while on a gross ton basis, these newbuildings accounted for 91% of the total gross tonnage added to the register.

Domestic Newbuilding Highlights

Given that newbuilding registrations reached record levels again in 2010, it was no surprise that ClassNK's 21 offices in Japan had a very busy year. Though it would not be possible to list all of the newbuildings constructed under the auspices of our Japanese offices in this annual report, a brief overview of the year's highlights is presented below.

Hakodate Branch

During the year, the Hakodate Branch office had a total of 11 ships of 183,495 gross tons in total enter NK class in 2010. Representative of these ships was the 7,981 dwt cement carrier, *Pacific Breeze*, built by Hakodate Dock Co., Ltd. (Muroran Manufactory) for Taiheiyo Kisen Kaisha, Ltd. and Japan Railway Construction, Transport and Technology.

Tokyo Branch

During the year, the Tokyo Branch office saw a total of 19 ships of 778,720 gross tons in total enter NK class. Among the many ships built under the watchful eye of the surveyors of the Tokyo Branch Office was the *LIBRA TRADER*, a 310,339 dwt VLCC built by Mitsui Engineering & Shipbuilding Co., Ltd., Chiba Shipyard for Legend Transport Inc. Two other vessels of particular note included the 217 dwt cargo-passenger ship, *LADY SAMOA III*, built for the Independent State of Samoa, and the 564 dwt cargo-passenger ship, *'OTUANGA' OFA*, built for the Kingdom of Tonga. Both ships were built by the ISB Corporation through Official Development Assistance (ODA) provided by the Japanese government.

**CALLAO BRIDGE**

a 33,008 dwt container carrier built by NAIKAI ZOSEN CORPORATION INNOSHIMA SHIPYARD for KONO SHIPPING INC.

**NORD INSPIRATION**

a 47,987 dwt oil carrier built by IMABARI SHIPBUILDING CO.,LTD. for CHEMICAL WEALTH MARITIME S.A.

Nagoya Branch

In 2010, the Nagoya Branch Office oversaw the construction of 12 newbuildings totaling 1,060,258 gross tons. Notable newbuildings in the region built to NK class include the *OITA MARU*, a 297,736 dwt ore carrier built by Universal Shipbuilding Company's Tsu Shipyard for Fair Wind Navigation S.A., the *BESS*, a 18,013 dwt, 6,300 unit car carrier built by Shin Kurushima Toyohashi Shipbuilding Co., Ltd. for E.A. Car Carriers (Panama) S.A., and the *ATLAS LEADER*, a 21,323 dwt, 6,400 unit pure car carrier also built by Shin Kurushima Toyohashi Shipbuilding Co., Ltd. for FI Kiwi Leasing Ltd. and Kialoa Leasing Co., Ltd.

Kobe Branch

The Kobe Branch Office oversaw the construction of 19 newbuildings totaling 598,844 gross tons in 2010. Representative of these ships was the *MOL MAESTRO*, a 79,423 dwt container carrier built by Mitsubishi Heavy Industries Ltd., Kobe Shipyard, for SNC Hugo. In addition, the Kawasaki Shipbuilding Inspection Co., Ltd., Kobe Works, built the *OCEAN COLOSSUS*, a 58,831 dwt bulk carrier, for K-Noble Pte., Ltd. The vessel was also the first ship to be built by the yard in accordance with *the Common Structural Rules (CSR)* and *the Performance Standard for Protective Coatings (PSPC)*.

Okayama Branch

In 2010, the Okayama Branch Office oversaw the construction of 22 newbuildings totaling 858,719 gross tons built to NK class. A notable example handled by the office was the *MAPLE ISLAND*, a 55,610 dwt bulk carrier built by Mitsui Engineering & Shipbuilding Co., Ltd. (Tamano Works) for Soyo Shipping Inc. Another ship was the *FISKARDO*, a 83,448 dwt bulk carrier built by Sanoyas Hishino Meisho Corporation for Leggero Shipmanagement SA.

Onomichi Branch

The year was another busy year for the NK Onomichi Office. The Office oversaw the construction and entry into NK class of 35 newbuildings totaling 1,654,708 gross tons in 2010. Representative of these was the *MAERSK MUROTSU*, a 50,093 dwt oil carrier built by Onomichi Dockyard for Rich Ocean Shipping, Inc. Another notable ship newly built to NK class through the office included the *SHAGANGFIRST ERA*, a 181,447 dwt bulk carrier built by Koyo Dockyard Co., Ltd. for Osprey Maritime Co., S.A. and Yuying Maritime Co., S.A. Both ships were the first to be built by the respective yards in accordance with the CSR. In addition, the 82,194 dwt bulk carrier, *TORM ISLAND*, was built by Tsuneishi Holdings Corporation, Tsuneishi Shipbuilding Co. Ltd. for Ambitious Line, S.A.



MOL MAESTRO

a 79,423 dwt container carrier built by MITSUBISHI HEAVY INDUSTRIES, LTD., KOBE SHIPYARD & MACHINERY WORKS for SNC HUGO.

Hiroshima Branch

In 2010, the Hiroshima Branch Office oversaw the construction of 29 newbuildings totaling 1,172,234 gross tons. IHI Marine United Inc., Kure Shipyard built the *NYK ALTAIR*, a 89,692 dwt, 9,300 TEU container carrier, for Qimen Shipholding S.A. Elsewhere, the *IVS KNOT*, a 33,143 dwt general cargo ship, was built by Kanda Shipbuilding Co., Ltd. for IVS Bulk 511 Pte., Ltd., while the Shin Kasado Dockyard Co., Ltd. built the *IKAN SENYUR*, a 61,494 dwt bulk carrier, for E.K. Line S.A. and Ehime Kaiun Co., Ltd.

Sakaide Branch

The Sakaide Branch Office oversaw the construction of 46 newbuildings totaling 1,688,015 gross tons during the year. Kawasaki Ship Building Inspection Co., Ltd. built the first of a series of 58K bulk carriers, the 58,713 dwt *KOREAN LILY*. The yard also built the *TAITAR NO. 4*, a 77,053 dwt LNG carrier with a cargo capacity of 147,000m³. In addition, Imabari Shipbuilding Co., Ltd. (Marugame Headquarters) built the 95,790 dwt *DOUBLE FORTUNE*, the first of a new type of bulk carrier, for Catalina Shipping S.A.



TRANS FUTURE 8

a 6,220 dwt vehicle carrier built by MITSUBISHI HEAVY INDUSTRIES, LTD., SHIMONOSEKI SHIPYARD & MACHINERY WORKS for FENG LI MARITIME CORPORATION.

Imabari Branch

The Imabari Branch Office had another busy year in 2010 overseeing the construction and entry into NK class of 82 newbuildings totaling 2,159,626 gross tons. Notable among these ships were the *SPRING ZEPHYR*, a 181,725 dwt bulk carrier built by Imabari Shipbuilding (Saijo Shipyard) for Primavera Montana S.A., and the *MAR CAMINO*, a 53,862 dwt combined ore and sulfuric acid carrier. The *SPRING ZEPHYR* was also the first to be built at the yard in accordance with the CSR. Also in the same region, Shin Kurushima Dockyard Co., Ltd. built the *ALPACA I*, a 33,755 dwt chemical tanker for Isidora Shipping Inc.

Kitakyushu Branch

The Kitakyushu Branch Office oversaw the construction of 12 newbuildings totaling 197,073 gross tons in 2010. Representative ships included the *TRANS FUTURE 8*, a 6,220 dwt car carrier built by Mitsubishi Heavy Industries, Ltd. (Shimonoseki Shipyard & Machinery Works) for Feng Li Maritime Corporation, and the *SIVA CORAL*, a 6,022 dwt LPG carrier built by Kyokuyo Shipyard Corporation for J.B. Ugland Shipping Singapore Pte. Ltd.

**TORM ISLAND**

an 82,194 dwt bulk carrier built by TSUNEISHI SHIPBUILDING CO., LTD. for AMBITIOUS LINE S.A.

**PACIFIC BREEZE**

a 7,981 dwt cement carrier built by THE HAKODATE DOCK CO., LTD., MURORAN MANUFACTORY for TAIHEIYO KISEN KAISHA, LTD.

Nagasaki Branch

In 2010, the Nagasaki Branch Office oversaw the construction of 20 newbuildings totaling 1,416,831 gross tons. One of the notable ships built to NK class was the *YAMATAI*, a 19,818 dwt modular carrier equipped with an air lubrication system. The ship was built for FGL Sunrise Panama S.A. at the Nagasaki Shipyard of Mitsubishi Heavy Industries, Ltd. The air lubrication system is one of the projects being supported by the Society's cooperative project with the Japanese government on the research and development of technologies for reducing CO₂ emissions from ships.

Sasebo Branch

During the year, the Sasebo Branch Office oversaw the construction of 35 newbuildings totaling 1,834,661 gross tons. Representative of these ships was the *DUBAI SUN*, a 61,344 dwt bulk carrier built by Oshima Shipbuilding Co., Ltd. for Sun Maritime Inc., and the *IZUMI MARU No. 10*, a 1,056 dwt electric powered LPG carrier built by Maehata Shipbuilding Co., Ltd. for Nippon Gas Line Co., Ltd. and Japan Railway Construction, Transport and Technology.

International Newbuilding Highlights

As the global network of the Society continues to grow, the number of surveys, including newbuilding surveys, overseas has been steadily on the rise. A brief summary of international newbuilding highlights for some of ClassNK's 97 exclusive surveyor offices overseas during the year 2010 is given below.

China

The Society currently has 8 offices in China. The number of newbuildings classed by the Society in China has continued to grow, increasing by nearly 60% over the previous year.

The Society's Zhoushan Office in particular had the greatest number of newbuildings enter NK class in the China region during the year. Some key examples include the *KEY ACTION*, an 82,168 dwt bulk carrier built by Tsuneishi Group (Zhoushan) Shipbuilding Inc. for Squirtle Maritima S.A., and the *INCE KARADENIZ*, a 56,956 dwt bulk carrier built by COSCO (Zhoushan) Shipyard Co., Ltd. for Ince Denizcilik Ve Ticaret A.S.

The Society's Nantong Office oversaw the construction of the *CHESAPEAKE HIGHWAY*, a 21,643 dwt pure car carrier capable of carrying 6,200 vehicles, the largest ship of this type to be built in China, for KAW1652 Shipping S.A., and the *BAO MIN*, a 297,844 dwt ore carrier for Sea Green Shipping, S.A., both built by Nantong COSCO KHI Ship Engineering Co., Ltd. (NACKS).

**OITA MARU**

a 297,736 dwt ore carrier built by UNIVERSAL SHIPBUILDING CORPORATION, TSU SHIPYARD for FAIR WIND NAVIGATION S.A.

**IZUMI MARU NO. 10**

a 1,056 dwt LPG carrier built by MAEHATA SHIPBUILDING CO., LTD. for NIPPON GAS LINE CO., LTD.

Elsewhere in China, the Society's Shanghai Office oversaw the construction of the 53,360 dwt bulk carrier *THRASHER*, built by Yangzhou Dayang Shipbuilding Co., Ltd. for Thrasher Shipping LLC, while the Dalian Office oversaw the construction of the 6,296 dwt barge *STEEL HUB-20*, built by Chang Xing Shipyard for Steel Hub Co., Ltd. The Society's Guangzhou Office conducted a newbuilding survey for the 56,810 dwt bulk carrier *FLAG ALEXANDROS*, built by COSCO (Guangdong) Shipyard Co., Ltd. for Southport Faith S.A.

Korea

The Society's Pusan Office oversaw the construction of the *FRONTIER BONANZA*, a 179,435 dwt bulk carrier built by Hyundai Heavy Industries Co., Ltd, Gunsan Shipyard for Dumun Navigation S.A. The office also oversaw the construction of the 65,883 dwt container ship *NYK ROMULUS*, built by Hyundai Samho Heavy Industries Co., Ltd. for Rishiri Shipping Pte. Ltd. In addition, STX Offshore & Shipping Co., Ltd. built the *BUNGA ANGELICA*, a 38,001 dwt chemical tanker for MISC Berhad.

Among the many ships handled by the Society's Ulsan Office during the year, the office oversaw the construction of the 52,055 dwt container carrier *BROOKLYN BRIDGE*, capable of carrying 4,500 containers. The ship was built by Hyundai Heavy Industries Co., Ltd. for KLB2124 Shipping S.A.

The Philippines

The Society's Cebu Office oversaw the construction of the 180,630 dwt *TENSHU MARU*, the first capesize bulk carrier to be built in the Philippines. The ship was built by Tsuneishi Heavy Industries (Cebu) Inc. Other ships include the *PEARL HALO*, a 58,096 dwt bulk carrier built for Sun Lanes Shipping S.A., and the 58,091 dwt bulk carrier *DORIC VICTORY*, built for Ocean Harmony Navigation Inc. Both vessels were also built by Tsuneishi Heavy Industries (Cebu) Inc.

Malaysia

ClassNK established a new office in Sibul during the year, adding to the existing offices in Kuala Lumpur, Kota Kinabalu, Johor Bahru, and Miri in the country. During the year, the five offices in Malaysia oversaw the construction of primarily barges and tugboats newly built in the country.

Indonesia

The Society currently has four offices in Indonesia: Jakarta, Batam, Surabaya, and Balikpapan. All told, the offices oversaw the new building of mostly barges and tugboats in the country during the year.

**TAITAR NO. 4**

a 77,053 dwt LNG carrier built by KAWASAKI HEAVY INDUSTRIES, LTD. SHIP & OFFSHORE STRUCTURE COMPANY, SAKAIDE SHIPYARD for NIMIC NO. 4 S.A.

Class Maintenance and Statutory Surveys

2010 was once again a very busy year for ClassNK in terms of surveys of existing ships. Over the course of the year, the Society carried out a total of 13,651 surveys. Of these, 3,063 surveys were conducted in Japan, while 10,588 surveys were carried out overseas.

At present, a total of 106 government Administrations around the world recognize and authorize ClassNK to act on their behalf to conduct surveys and issue certificates in accordance with international conventions and codes, as well as national requirements pertaining to ship safety and the prevention of marine pollution. In 2010, the Society carried out inspections and issued more than 32,000 statutory certificates based on these authorizations as follows:

- International Load Line certificates: 2,821
- SOLAS related certificates: 16,492
- MARPOL related certificates: 11,263
- Anti-fouling system certificates: 2,404

**ALSTROEMERIA**

a 64,500 dwt chip carrier built by SANOYAS HISHINO MEISHO CORPORATION for KINGSHIP LINES S.A.

Inspection and Approval Services

The Society provided a range of company approval related services including testing and measurement services related to class and equipment maintenance surveys as well as for maintaining the registration of approved firms during the year. Firms providing the following types of services were approved by the Society in 2010:

1. In-water survey of ships: 19
2. Thickness measurements of ships: 20
3. Radio inspection services: 33
4. Maintenance of fire fighting systems and equipment: 33
5. Maintenance of life saving equipment and appliances: 16
6. Voyage data recorder performance testing: 35
7. Hatch tightness testing: 3
8. Coating system testing: 2

**MAERSK MUROTSU**

a 50,093 dwt oil carrier built by ONOMICHI SHIPYARD, ONOMICHI DOCKYARD CO., LTD. for RICH OCEAN SHIPPING INC.



BAY BRIDGE
a 52,118 dwt container carrier built by HYUNDAI HEAVY INDUSTRIES CO., LTD.



SPRING ZEPHYR
a 181,725 dwt bulk carrier built by IMABARI SHIPBUILDING CO., LTD., SAIJO SHIPYARD for PRIMAVERA MONTANA S.A.

Port State Control (PSC)

As with previous years, the Society continues to work with the managers and owners of detained vessels to help improve ship conditions and increase safety awareness. To this end, the Society’s Survey Department published the Annual Report on Port State Control 2009, a compilation and analysis of PSC related statistics for the previous year, and distributed it to ship owners, ship managers, and other concerned parties. It also created and released the “Port State Inspections Pocket Checklist,” with the aim of helping to promote the maintenance and strengthen the management of such ships. In addition, high-ranking members of the Society visited key maritime authorities around the world, including the Australian Maritime Safety Authority (AMSA), China MSA, Transport Canada, and the USCG during the course of the year. ClassNK also sent representatives to bilateral China–Japan and Korea–Japan meetings on inspection related matters and gave presentations on the Society’s efforts being made to reduce the detention ratio of NK classed ships.

Audit and Registration of ISM Code and ISPS Code related Systems

In 2010, ClassNK had another busy year conducting ISM Code and ISPS Code related audits as a Recognized Organization on behalf of various flag Administrations. Over the course of the year, the Society registered 47 new companies in accordance with ISM requirements, bringing the total number of companies registered with the Society to 601. Safety Management Certificates (SMC’s) were issued to 828 ships in 2010, bringing the total number of vessels registered with the Society to 4,579. As of the end of 2010, NK conducts ISM authorizations on behalf of 64 Administrations. The Society also registered 768 ships to ISPS Code requirements during the year, bringing the total number of ships registered with the Society under the ISPS Code to 3,880. NK currently conducts ISPS authorizations on behalf of 50 Administrations. A breakdown of the number of vessels by flag state is shown in the following table.

Number of ISPS Code Registered Ships by Flag

Flag	No. of Ships	Flag	No. of Ships
Panama	2,301	Saint Vincent and the Grenadines	14
Singapore	334	Malaysia	8
Hong Kong	226	United Arab Emirates	4
Japan	171	Saudi Arabia	4
Liberia	155	Dominican Republic	4
Marshall Islands	140	Switzerland	3
Malta	123	Bermuda	2
Bahamas	111	United Kingdom	1
Cyprus	59	Kiribati	1
Turkey	55	Tuvalu	1
Vanuatu	46	Barbados	1
Greece	45	The Isle of Man	1
Philippines	38		
Thailand	32	Total (26 Flag States)	3,880



IKAN SENYUR
a 61,494 dwt bulk carrier built by SHIN KASADO DOCKYARD CO., LTD. for E.K. LINE S.A.



NYK ALTAIR
an 89,692 dwt container carrier built by IHI MARINE UNITED INC., KURE SHIPYARD for QIMEN SHIPHOLDING S.A.

ISO AND OHSAS RELATED SERVICES

Assessment and Registration of Quality, Environmental Management, and Occupational Health & Safety Management Systems

ClassNK also conducts registration of quality management systems under the ISO 9001 standard, as well as assessment and registration of environmental management systems under the ISO 14001 standard. In 2010, a total of 11 organizations were newly registered under ISO 9001, bringing the total number registered with the Society to 372. The Society also registered 5 organizations to the ISO 14001 standard during the year, bringing the total number to 105.

The Society also began offering a new service from 15 July 2010 of certifying Occupational, Health & Safety Management Systems (OHSAS) based on the OSHA Health and Safety Manual and OHSAS 18001 Guide, which describe the specifications for certification and related detailed requirements.



TECHNICAL SERVICES

During 2010, ClassNK issued Statements of Compliance to 21 vessels under the Society's Condition Assessment Program (CAP). Statements of Compliance were also issued for the ballast water management plans of 688 ships. As of the end of 2010, the aggregate total number of Statements of Compliance issued by the Society stood at 223 for CAP and 4,320 for ballast water management plans.

In 2010, the Society's Emergency Technical Assistance Service (ETAS) team was called into action for 11 incidents related to maritime casualties to provide technical support. By the end of 2010, 1,080 vessels had registered for the Society's ETAS service, an increase of 114 ships over the 2009 total.

EDUCATIONAL & TRAINING SERVICES

ClassNK Academy

Drawing upon its extensive expertise in the survey of ships and audit of ship management systems, ClassNK unveiled its new ClassNK Academy educational program in 2010 to provide members of the maritime industry active in ship construction, maintenance, or operation with a working knowledge of shipping and shipbuilding. During the year, ClassNK offered the ten ClassNK Academy courses listed on the following page at four locations in Japan, namely: Tokyo, Imabari, Kobe, and Kokura. The courses were attended by a total of 1,680 persons from among ship-owners, shipyards, manufacturers, and others. In addition, courses were offered for the first time overseas in Hong Kong, Kuala Lumpur, New York, and Rio de Janeiro. A combined total of 215 persons attended these ClassNK Academy courses outside



KOREAN LILY
a 58,713 dwt bulk carrier built by KAWASAKI HEAVY INDUSTRIES, LTD. SHIP & OFFSHORE STRUCTURE COMPANY SAKAIDE SHIPYARD.



ELEGANT ACE
an 18,833 dwt vehicle carrier built by MINAMINIPPON SHIPBUILDING CO., LTD. for TRACIE NAVIGATION S.A.

Japan. Moreover, portions of NK Academy courses were also offered as part of technical seminars and other special technical presentations made at eleven locations in nine countries outside Japan during the year.

Courses Related to Newbuildings

- Classification Societies and Statutory Issues Course
- New Shipbuilding Course (Hull)
- New Shipbuilding Course (Machinery and Electrical Installations)
- Material and Welding Course

Courses Related to Existing Ships

- Damage and Maintenance Course (Hull)
- Damage and Maintenance Course (Machinery and Electrical Installations)
- Safety Equipment Course
- Cargo Handling Appliance Course
- Port State Control (PSC) Course

Courses Related to Ship Management

- Ship Management Course (Incident Investigation and Analysis, Risk Management and Internal Audits)



Training

ClassNK actively runs and participates in a number of different training activities both for internal staff development and in cooperation with outside organizations. These training programs cover everything from surveyor training to internships, lectures, and other cooperative training programs designed to meet the needs of government agencies and the maritime industry. Some of the more notable training programs ClassNK conducted in 2010 are briefly introduced below.

Surveyor Training

ClassNK conducted a range of surveyor training programs for its surveyors (including new graduates) around the world during the year. In addition to the training provided by the Society's Head Office, many surveyors also underwent practical training aboard ship, notably the training vessel SEIUN MARU of the National Institute for Sea Training, or took additional survey training at one of the Society's local offices either in Japan or overseas. Practical training was also provided for NK surveyors on marine engines at the Yanmar Co. Ltd. Amagaseki Factory T. T. School. In addition, plan examination training was also provided to surveyors assigned at the Society's various Plan Approval Centers around the world.

Marine Management Systems Auditor Training

ClassNK conducted Maritime Security Auditor training for its surveyors at the Society's Training Center in Japan as well as at its Singapore and London Offices. Surveyors who have successfully completed Marine Management Systems Auditor training are qualified to perform audits of safety management systems and ship security systems.



TENSHU MARU

a 180,630 dwt bulk carrier built by TSUNEISHI HEAVY INDUSTRIES (CEBU), INC.

Maritime Labor Inspector Training

ClassNK conducted Maritime Labor Inspector training for surveyors at its Training Center in Japan as well as at the Society's Singapore, Piraeus, Shanghai, New York, New Orleans, Rio de Janeiro, and Dubai Offices. The training is provided in anticipation of the 2006 Maritime Labour Convention coming into effect in 2011.

Lectures at the Eastern Japan Training Center for Shipbuilding Skills

At the request of the Eastern Japan Training Center for Shipbuilding Skills, the Society presented lectures on the handling of defective welding to technical staff members new to the field of shipbuilding.

Lectures at the Innoshima Technical Center

At the request of the Innoshima Technical Center, the Society presented lectures on "Case Studies of Ship Damage and Lessons Learned" to staff members at the Center.

Lectures for the Japanese Ministry of Land, Infrastructure, Transport and Tourism

In 2010 ClassNK conducted a variety of lectures at the request of the Japanese Ministry of Land, Infrastructure Transport and Tourism (MLIT). These included a lecture on "ISM Audits by Nippon Kaiji Kyokai" at a MLIT ISM Code Seminar as well as on "Principles of Ship Security Risk Assessments at Classification Societies" at its ISPS Code Seminar.

Cooperation with the Tokyo MOU

Following a request from the Tokyo MOU Secretariat, ClassNK provided lectures on MARPOL and SOLAS at the "20th Basic Training Course for Port State Control Officers in the Asia Pacific Region" held by the Shipbuilding Research Centre of Japan (SRC).

Cooperation with JICA

Following a request from Japan International Cooperation Agency (JICA), the Society also presented lectures on the SOLAS and MARPOL conventions as well as on newbuilding surveys at the "Group Training Course in International Maritime Conventions and Ship Safety Inspection" held by the Ship Research Centre of Japan for maritime officials from various countries overseas.

ClassNK Technical Seminars Held in Japan

Providing clients with the latest and most up to date technical information is one of the most important tasks undertaken by the Society. To this end, each year ClassNK conducts a number of technical seminars on a wide variety of timely topics. In 2010, ClassNK Technical Seminars were held twice in five locations across Japan, namely: Tokyo, Kobe, Imabari, Onomichi, and Fukuoka. The seminars drew roughly 1,480 attendees from across the entire spectrum of the maritime industry, including shipowners, shipyard staff, and manufacturers, among others. The Japanese version of the Technical Seminar materials can be downloaded from the Technical Seminar page of Japanese version of the website only. A summary of the material covered in the seminars is listed below.

ClassNK Spring Technical Seminar

- (1) Report on the R&D Activities of the Society during the previous year, 2009
- Research on strength assessment against sloshing in membrane LNG carriers
- Research on application of blast technology using mixed air-water jets
- NK efforts for reducing the emission of GHG from ships



YAMATAI

a 19,818 dwt module carrier built by MITSUBISHI HEAVY INDUSTRIES, LTD., NAGASAKI SHIPYARD & MACHINERY WORKS for FGL SUNRISE PANAMA S.A.

(2) Latest international trends affecting shipbuilding and shipping

- IMO and IACS trends
- Concerns and measures concerning low sulfur fuel controls
- Review of 2006 Maritime Labor Convention and its implementation
- NK activities in preparation for implementation of the Ballast Water Convention (Part 2)

ClassNK Autumn Technical Seminar

(1) Review of amendments to the Rules, etc. enacted since December 2009

- Explanation of Rules related to machinery and electrical systems
- Explanation of Rules related to equipment and materials
- Explanation of Rules related to hull structures
- Latest activities of IACS Hull/Machinery/Survey/Statutory Panel

(2) Latest trends in international conventions and statutory requirements, etc.

(3) Technical topics

- NK activities regarding the Ship Recycling Convention
- NK activities regarding the reduction of GHG emissions from ships

ClassNK Award

The "ClassNK 100 Awards" were originally established in 1999 to commemorate the 100th anniversary of the Society's founding. Since renamed the "ClassNK Award," the award is presented each year in recognition of outstanding research papers prepared by students at participating universities pursuing courses of study in naval architecture, marine engineering, as well as marine technology and ocean engineering. In 2010, awards were presented to select students at universities in Korea, China, and India.



ClassNK Website

The ClassNK website provides access to a wealth of information on the Society's numerous activities and services. It is continually being upgraded to make it more user-friendly and easier to use. This has included the addition of new pages and related menu items on ILO Maritime Labour Convention, Ballast Water Convention, and Occupational Health and Safety Management Systems (OHSAS) related certification services. A function has also been added to allow users to search for Technical Information notices by category. In addition, the pages listing the various free and PDF versions of publications available for download have been improved. Pages on the ClassNK technical seminars have also been improved with shortcuts added for easy access.*

* Applies only to Japanese language version of website.



<http://www.classnk.or.jp/>



Europe and Africa

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ClassNK in Research

Overview of Research and Development

The Society engages in a wide range of R&D activities and always strives to do so ever more effectively and efficiently while responding to customer needs and grasping the latest technological trends more quickly, in order to better contribute to ensuring the safety of ships and protection of the marine environment. The Society also conducts joint research with various industry partners including public and private entities alike based on demands from the relevant sector. This not only includes R&D work concerned with conventional ship classification but also encompasses a wide variety of topics related to the maritime and offshore industry as a whole.

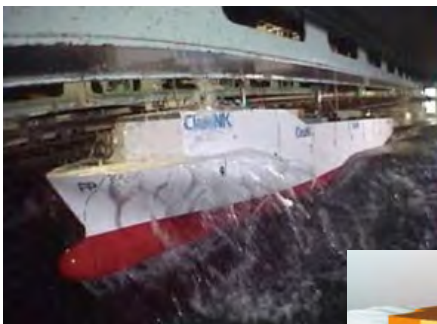
1. Research and Development Work Related to Ship Classification

In 2009, ClassNK launched the second phase of its practical research and development program aimed at finding concrete and practical solutions to the problems faced by the maritime industry. The projects in this program continued in 2010 and have focused mainly on three major areas: ultra-large container ships, LNG carriers, and protecting the marine environment.

Some of the research projects undertaken in 2010 as part of this program are briefly described below.

1) Ultra-large container ships

- An examination was made of the effects of hydroelastic response such as whipping and springing on the longitudinal strength and fatigue strength of container ships; the results of which were compiled and summarized in various technical materials.
- In addition to examining damage resulting from bow flare slamming on container and other large sized ships, numerical simulations were carried out to recreate the damage that occurs as a result of bow flare slamming on a PCC. The results obtained were used to develop a draft set of requirements regarding the strength assessment of horizontal members to withstand bow flare slamming impact loads.
- Research continued on the application of brittle crack arrest design in the prevention of brittle fractures in ultra-large containerships. This included conducting large-scale and full-scale structural component tests to verify required brittle crack arrest toughness that may rely on the damage scenario envisaged. In addition, ultra-wide duplex ESSO tests were conducted to assess and verify the effect of thickness on required brittle crack arrest toughness.

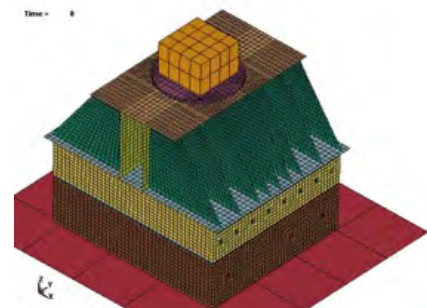


Top: Towing tank test of the response of large container ships to whipping
Bottom: Computer simulation of the response of large container ships to high waves



2) Membrane LNG carriers

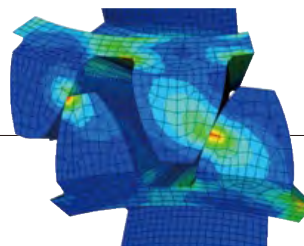
- The Society continued its investigations into a suitable method for evaluating the strength of the insulation structures of membrane LNG carriers against sloshing impact loads caused by ship motions. The examination included verification of a sensitivity study on the structural response of insulation structures against such sloshing impact loads. This was done by performing a series of dynamic FE calculations with a particular focus on the bending failure of the top plate and compressive failure of the side plate being dominant collapse modes. In addition, thorough investigations were made of the appropriate model test specifications to identify the sloshing impact loads with due accuracy. Following these processes, draft guidelines were then developed on the sloshing strength of cargo containment systems of membrane LNG carriers.



Computer simulated test of impact loads on the insulation structures of membrane type LNG carriers

3) Protection of the marine environment

- As regulations on reducing NOx emissions become ever more stringent, the Society continued its research on issues related to the certification of SCR NOx removal systems. This included the development of draft requirements and related provisions on the installation of aqueous ammonia tanks and urea tanks in the engine room.
- As part of its ongoing efforts to reduce the burdens placed on the environment by the maritime industry, the Society also continued its research on the practical application of greenhouse gas (GHG) reduction technologies onboard ships. This included the development of an EEOI (Energy Efficiency Operational Index) calculation and analysis system for use in evaluating the reduction of greenhouse gas emissions from ships.



Stress test of bevel gear teeth in repeated contact

4) Other projects relating to rule development

- Draft strength requirements were developed for bevel gears used in azimuth thrusters and other equipment using such gears. As part of the project, an investigation was made of the mechanism behind the occurrence of what are known as “tooth interior fatigue fractures (TIFF)”, which are a form of fatigue fracture that tend to occur at approximately mid-height in the tooth of such gear teeth as a result of repeated contact of the gear surfaces against each other. Fatigue testing and FEM analysis were also performed as part of the investigation. The results of this examination are to form the basis for new rule requirements.

2. Joint Research Based on the Needs of Industry

The Society also engages in a range of joint research projects to meet the needs of the marine industry. Under this unique joint research scheme, the Society provides both technical as well as financial support based on proposals or requests from various external entities in the maritime industry. The following projects were completed in 2010.

1) R&D of practical application of blast technologies utilizing mixed air-water jets^{*1}

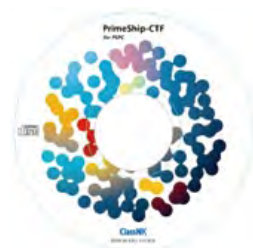
The Society cooperated in the development of equipment capable of being used at a practical level to perform the surface treatment required by the *Performance Standard for Protective Coatings* (PSPC) based on basic technology developed through the Japan Ship Technology Research Association.



Practical application of blast technology utilizing mixed air-water jets

3) R&D on system for supporting preparation of Coating Technical File (CTF)^{*3}

The Society completed development of a software system to make in the creation and maintenance of coating technical files. The system is already being used at a number of shipyards. The aim is to develop the system further and enhance its value with a unified format for use as a de facto standard in Asia.



System for supporting preparation of CTF (coating technical file)

2) R&D on methods for reducing energy consumption at shipyards^{*2}

An examination was made of methods for improving the efficiency of machinery and equipment that consume large amounts of electric power such as welding equipment and NC (numerical control) cutting machines with the aim of reducing emissions from the ship-building process.

4) Investigative research testing of effective utilization of 3-D CAD^{*4}

An examination was made of the feasibility of drawing concrete images for effective use with existing ships. This included a careful review of the format, necessary functions, information management and other factors necessary for the effective development of three-dimensional CAD models that could be practically used for such work.

5) Research into the development of heat-resistant wireless transmission tags (for hot-dip galvanization)^{*5}

Work was completed on the development of highly workable and long lasting radio-frequency identification tags (RFID) that are heat resistant to the point of even being capable of use in hot-dip galvanization and that can be applied at the shipyard.



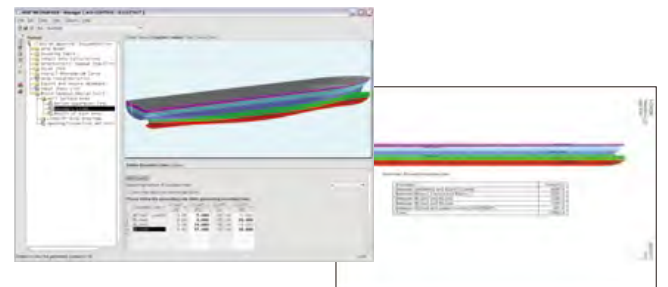
Heat-resistant wireless transmission tags



Functional improvements to existing NK Manager

Left: Development application display screen

Right: Output of calculation results



Function for calculating painting area

Left: Development application display screen

Right: Output of calculation results

6) Investigative research into development of NAPA based application^{*6}

The Society completed development of several program functions that not only facilitate the conduct of stability calculations required by statutory and other requirements but also contribute to the conduct of basic performance calculations and the output of calculation results for use in design work.

7) Development of web-based hazardous substance information^{*7}

The Society completed development of a web-based system that can be used in the creation of the inventory required by the Ship Recycling Convention.

2-1. Joint Research Based on the Needs of Industry (Joint R&D on Reduction of GHG)

The Society also actively participates in a national project overseen by the Japanese government aimed at developing and applying greenhouse gas reduction technologies. In addition to providing technical support, it also includes significant financial support as well as participation in joint research with various industry partners.

The Society is dedicated to achieving the aims of the project of contributing to finding effective solutions to the problem of global warming while enhancing the international competitiveness of Japanese maritime industries, including shipping, shipbuilding, and marine use machinery and equipment in cooperation with the Ministry of Land, Infrastructure, Transport and Tourism for the betterment of the international maritime community as a whole.

Cooperating Organizations (in random order):

*1 IHI AMTEC Co., Ltd., Shibuya Machinery Co. Ltd., Naikai Zosen Corporation, Mikami Shipbuilding Co., Ltd., Chugoku Marine Paints, Ltd., Japan Ship Technology Research Association

*2 The Cooperative Association of Japan Shipbuilders (CAJS), Japan Techno-Mate Co. Ltd., Koike Sanso Kogyo Co., Ltd., Nissan Tanaka Corporation

*3 Japan Ship Technology Research Association, The Shipbuilders' Association of Japan (SAJ), The Cooperative Association of Japan Shipbuilders (CAJS), Japan Paint Manufacturers Association, Japan Shipowners' Association

*4 NYK Line, Monohakobi Technology Institute (MTI), Kawasaki Kisen Kaisha, Ltd., Mitsui O.S.K. Lines, Sanwa Dock Co., Ltd., Kyushu University Faculty of Engineering, SEA (System Engineering Analysis) Soken

*5 Shin Kurushima Dockyard Co., Ltd., Ehime Institute of Industrial Technology, Hiroshima University Graduate School of Engineering

*6 The Shipbuilders' Association of Japan (SAJ) and various member companies of the Association

*7 IBM Japan, Ltd.



South Asia and Oceania

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Special Article

The ClassNK Approach to the Ship Recycling Convention



1. Introduction

Ship recycling consists of dismantling a ship at the end of its operational life and then reusing the steel and other resources extracted from the ship. Most ship recycling occurs at recycling facilities in such countries as Bangladesh, India, China and elsewhere. However, much attention has been drawn in recent years to the abysmal working conditions and pollution of the surrounding environment that have been matters of concern at some of these facilities.

As social concern has deepened regarding this problem, discussions have continued at the International Maritime Organization (IMO) with the aim of encouraging more physically and environmentally sound ship recycling practices to be implemented. This led to the adoption of the *“Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships”* by the International Maritime Organization in May 2009. Once the convention, also commonly referred to as the *“Ship Recycling Convention”*, enters into force, all ships of 500 gross tons or more will be required to develop and maintain an Inventory of

Hazardous Materials, also referred to as just inventory or IHM.

The convention makes a distinction between “new ships” and “existing ships”. A new ship is defined as a ship the construction of which is contracted on or after the entry into force of the convention. All such ships are required to retain onboard an Inventory (IHM) (ships without a contract are defined separately). All other ships are categorized as existing ships. In this case, such existing ships have five years from the

entry into force of the convention to develop an IHM. However, an IHM must still be prepared if the ship is recycled anytime during this five year grace period.

As of the end of 2010, five countries have already indicated their intention to ratify the convention. Other countries are also expected to look ever more favorably on ratifying it as awareness of environmental problems increases. Consequently, it is anticipated that the convention will be ratified sometime between 2013 and 2015.

Framework of Inventory (IHM)

Description of Hazardous Substance/Material		Inventory		
Table	Content	Part 1 Ship structure and equipment	Part 2 Wastes	Part 3 Stores
Table A	Prohibited/Limited Materials (4) [Asbestos, PCBs, Ozone-depleting substances (e.g. Halon), Organotin compounds (e.g. TBT)]	Indicate	—	—
Table B	Harmful Materials (9) [Cadmium (compounds), Hexavalent Chromium (compounds), Lead (compounds), Mercury (compounds), etc.]	Indicate	—	—
Table C	Potentially Hazardous Items [Kerosene, Light oil, Lubricants, etc.]	—	Indicate	Indicate
Table D	Regular Consumable Goods potentially containing Hazardous Materials [Computers, refrigerators, printers, etc.]	—	—	Indicate
Period/timing of development:		Upon Delivery Existing Ship: within 5 years	Before recycling	

2. Inventory (IHM)

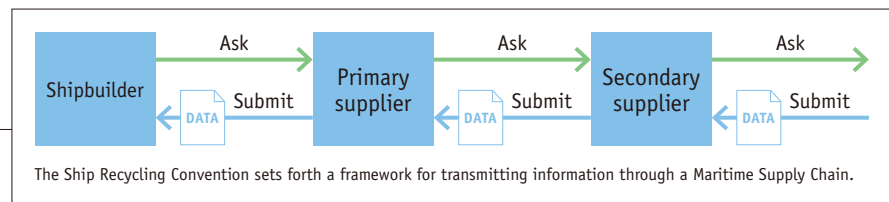
Composition of the IHM

An Inventory (IHM) is a list of hazardous materials, waste, and stores that identifies their locations and approximate quantities onboard the ship. It consists of three parts. Part 1 covers hazardous materials contained in ship structure or equipment, while Part 2 covers operationally generated wastes, and Part 3 covers stores, including those potentially containing hazardous materials. As can be seen from the table on the previous page, Part 1 of the IHM is to be developed by the time of delivery of the ship, while Parts 2 and 3 are to be completed immediately prior to recycling of the ship. Materials and items are to be listed in the IHM as set forth in the Appendix of the convention, referring to the relevant Tables A, B, C, or D included in the Appendix, depending on the properties of the materials and substances involved. Tables A and B are referred to when preparing Part 1 of the IHM, while Tables C and D are referred to in the development of Parts 2 and 3 of the IHM, respectively.

Threshold levels are set in Tables A and B, which list prohibited/restricted materials and other harmful materials, respectively. Equipment, finished products and the like that contain any materials exceeding the threshold levels indicated in the tables are to be listed in the IHM. Information on all hazardous materials onboard the ship that exceed these thresholds is to be clearly indicated in the IHM. Recycling of the ship will then be executed based on the IHM, with due consideration given to the safety and health of the laborers and the prevention of environmental pollution.

Development of an Inventory for New Ships

The Inventory (IHM) is prepared according to the *Guidelines for the Development of the Inventory of Hazardous Materials*. Although the shipyard is to prepare the Inventory in



the case of a new ship, it is not realistic for the yard to gather detailed information on the content of harmful substances in the tremendous numbers of products and materials used in the construction of the ship. The Ship Recycling Convention allows for reliance on a Material Declaration (MD) form prepared by the supplier of any products, including machinery makers, parts manufacturers, material producers and the like. The MD lists the contents of any hazardous materials in the product provided by the supplier. The forms are thus used to convey information through the supply on hazardous materials from the supplier to the shipyard, which gathers the MD forms for all products used in the construction of the new ship.

In principle, a Material Declaration form is prepared for each product. The form confirms that no prohibited or restricted materials listed in Table A are included in the product and also indicates whether or not any hazardous materials listed in Table B are present in the product. In the event that Table B materials exceed threshold levels, the amounts of such materials are also indicated on the form. A Supplier's Declaration of Conformity (SDoC) must also be prepared and submitted with the MD. The SDoC clarifies who has responsibility for preparing the MD and assures that the MD has been prepared in accordance with the provisions of the convention.

With the exception of certain exemptions allowed in the convention, the shipbuilder collects MDs and SDoCs from suppliers for all procured products. The shipbuilder then screens all the products containing hazardous materials by checking submitted MDs, identifies the locations of each product and approximate quantities of the hazardous materials contained therein, and enters the information in the IHM format. The Inventory (IHM) is then examined by either the applicable Administration or the Society, acting as a recognized organization (RO) on behalf of the Administration. Once the IHM has successfully

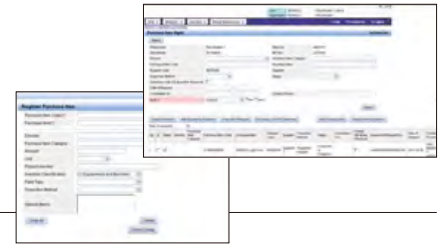
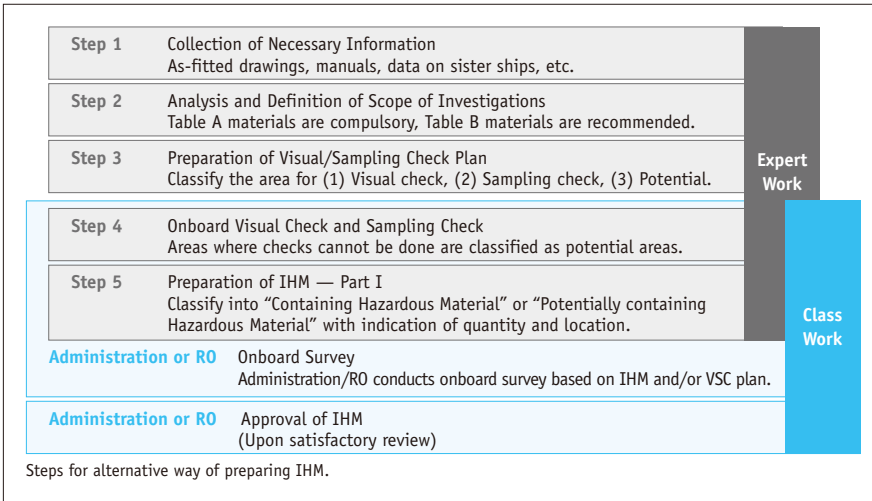
undergone this examination, a Statement of Fact (SOF) for Part 1 of the Inventory will be issued before the convention enters into force. Once the convention enters into force, a conventional certificate will be issued based on the SOF and upon satisfactory completion of a general inspection.

Given the extremely large number of products and materials procured in the construction of any ship, as noted earlier, the development of the Inventory is a massive undertaking. Any number of problems are bound to arise as a result. Large volumes of documents are received, handled and managed as part of the process. In addition, errors are bound to occur in the posting of MD information to the IHM. Moreover, entering the calculated amounts of hazardous materials by location on the IHM by hand is a great burden. It is also necessary to unify the MD and SDoC forms as well as the manner of how they are to be recorded.

Development of an Inventory for Existing Ships

It is difficult to gather the Material Declarations (MD) and Supplier's Declarations of Conformity (SDoC) for existing ships in the same way as can be done for new ships. Thus, the convention sets forth an alternative method for preparing Inventories (IHM) for existing ships based on prescribed document and shipboard inspections. Procedures for the development of an IHM for an existing ship are also described in the *Guidelines for the Development of the Inventory of Hazardous Materials*. Shipowners may also rely on the help of "Experts" to prepare the IHM.

Either the shipowner or the Expert requested by the shipowner first begins the IHM development process by gathering all the necessary information from various documents, purchase lists, cases from ships of similar type or sister ships, and other sources. After conducting a review of all the above information, the Expert will ascertain



what hazardous materials there are, determine their location and calculate their amount, as well as prepare a visual/sampling check plan based on the above collected and analyzed information of the ship. He will then record the current conditions regarding what hazardous materials are present based on document checks of the subject items in the above visual/sampling check plan (either by visual inspection or by obtaining actual samples). The Society will then examine the visual/sampling check plan.

The shipboard inspection is performed in accordance with the visual/sampling check plan. The results of the sampling analysis so conducted will then also be recorded in the visual/sampling check plan. When it is not possible to determine the location and amount of hazardous materials from the document review and shipboard inspection, or if it is not possible to conduct an inspection for other reasons, then the materials will be classified as potentially containing hazardous materials (PCHM). The presence of hazardous materials as well as the location and amount of the substances making up the PCHM are to be posted on a prescribed form, thereby completing the initial preparation of Part 1 of the IHM for the existing ship.

3. The ClassNK Approach

Ever since discussions on the Ship Recycling Convention were taking place, the Society has been actively working to support parties concerned make the transition to meeting the requirements of the convention as smooth as possible. Since 2008, ClassNK has cooperated with various parties concerned prepare actual IHMs for both new ships and

existing ships. This has allowed the Society to examine all aspects of what is involved in the process and thus gain significant expertise as a result. Given the vast numbers of existing ships that will be required to prepare an IHM within the five year period after the convention comes into effect, there is concern that only a limited number of Experts will be available to handle the significant workloads involved to complete all the IHMs on time. As a result, the Society believes that preparing IHMs before the convention comes into force is an effective means of dealing with this situation. Developing IHMs at the time of construction for ships that either are currently being or will be newly built in the future will make it much easier for shipowners to meet the requirements of the convention.

In order to resolve many of the problems associated with the preparation of an IHM for new ships by shipyards, ClassNK has developed an IHM preparation software system known as PrimeShip-INVENTORY to help reduce the workload and costs associated with this process by allowing shipbuilders and suppliers to exchange MD data electronically. The software has already been distributed free of charge to various parties concerned not only in Japan but also to shipyards overseas, where PrimeShip-INVENTORY is already being used to develop IHMs at many locations.

Although recognized organizations (RO) are not permitted to also serve as Experts in the development of Inventories (IHM) for existing ships, ClassNK does provide a one-stop service to introduce shipowners to third party Experts and answer shipowner questions about IHM development for existing ships.

Whether the IHM has been prepared for a new ship based on the gathering and sorting

of MDs and SDOCs as described above, or has been prepared with the help of an Expert for an existing ship, the Society has in place a system for issuing a Statement of Fact (SOF) attesting that the IHM duly satisfies the requirements of the Ship Recycling Convention. ClassNK has already satisfactorily examined numerous IHMs and issued respective SOFs for them at the request of shipowners around the world. Once the convention enters into force, the SOFs will be promptly rewritten as conventional certificates after a general confirmation of their status for each ship.

The preparation of an Inventory (IHM) not only affects ship owners and builders, but must be addressed by the entire marine industry, including material producers as well as parts and equipment makers. The Society has also been focusing much effort on disseminating information on the Ship Recycling Convention both in Japan and around the world through seminars as well as by handling individual inquiries.

In addition, the Society is upgrading its PrimeShip-INVENTORY software system further and is developing a system to further lighten the burdens involved in preparing an IHM as well as manage the maintenance of the IHM during operations. The system is expected to become available in the Spring of 2011. It is being developed in cooperation with IBM as a joint project using cloud computing. The Society aims to develop the system so that it can be used as a global platform for ship recycling management.

ClassNK is proactively moving ahead with addressing the needs of the maritime industry in implementing the provisions of the Ship Recycling Convention and is doing all it can to support all key parties with an interest in putting the convention into actual practice.



The Americas

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ClassNK in International Affairs

Meeting of the IACS (International Association of Classification Societies)

Participation at the International Maritime Organization (IMO)

As part of its many international activities, ClassNK contributes to the International Maritime Organization (IMO) on a wide range of technical issues. In 2010, the Society attended the IMO meetings listed below, either as a member of the Japanese Government delegation or as a representative of IACS. In addition, the Society continues to dispatch a member of its staff to the IMO secretariat on a full-time basis.



Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety (SLF) — 52nd session	(January)
Sub-Committee on Bulk Liquids and Gases (BLG) — 14th session	(February)
Sub-Committee on Ship Design and Equipment (DE) — 53rd session	(February)
Marine Environment Protection Committee (MEPC) — 60th session	(March)
Sub-Committee on Fire Protection (FP) — 54th session	(April)
Maritime Safety Committee (MSC) — 87th session	(May)
Intersessional Meeting of the Working Group on Energy Efficiency Measures for Ships — 1st session	(June)
Sub-Committee on Flag State Implementation (FSI) — 18th session	(July)
Sub-Committee on Safety of Navigation (NAV) — 56th session	(July)
Sub-Committee on the Carriage of Dangerous Goods, Solid Cargoes and Containers (DSC) — 15th session	(September)
Marine Environment Protection Committee (MEPC) — 61st session	(October)
Intersessional Working Group on Lifeboat Release Hooks	(October)
Sub-Committee on Ship Design and Equipment (DE) — 54th session	(October)
Maritime Safety Committee (MSC) — 88th session	(December)



ClassNK conveys the outcomes of major meetings such as those of the Maritime Safety Committee (MSC) and the Marine Environmental Protection Committee (MEPC) to clients of the Society and related organizations through a variety of means, including a special mail service, the timely release of “NK Technical Information” bulletins, and updates to the “IMO International Convention Calendar” section of the ClassNK website.



Participation in the International Association of Classification Societies (IACS)

After serving in the role of vice chairman until the end of June 2010, the Society became the chairing society of IACS from July 2010. As such, ClassNK has played a leadership role in IACS activities by chairing meetings of the IACS Council and General Policy Group, exchanging views with the IMO Secretary General and representatives of related maritime industries on a broad range of topics affecting the marine industry, as well as speaking at international conferences.

The Society also plays an active role in meetings of the IACS Hull, Machinery, Survey, and Statutory Panels, as well as IACS Expert Groups, in addition to the various Project Teams taking into account the views of the maritime industries concerned. Moreover, the Society not only served as the chairman of the IACS Expert Group on IMO Goal Based Standards, but has also actively contributed to the work of Joint Working Groups all with the aim of realizing safer, greener seas.

The following meetings were held during 2010:

Chairman's Office Meeting	2 times
Council Meeting	2 times
Quality Committee Meeting	3 times
General Policy Group Meeting	2 times
Technical Panel Meeting	8 times
Project Team Meeting	15 times
Expert Group Meeting	10 times
Small Group Meeting	4 times
IACS/Industry Joint Working Group Meeting	9 times

Activities regarding ACS (The Association of Asian Classification Societies)

The Association of Asian Classification Societies is a group of six classification societies, including ClassNK, based in different nations in Asia with a keen interest in promoting safer, cleaner seas. ACS has met annually on an informal basis since 1993. During a special meeting held on 1 February 2010, the members unanimously agreed to formalize the ACS association by adopting an ACS Charter. In 2010 ACS established a framework for enhancing technical cooperation among its member societies and for strengthening dialogues with maritime industry organizations, particularly those in Asia, such as the Asian Shipowners' Forum (ASF) and Asian Shipbuilding Experts' Forum (ASEF).



Left: 1st Latin American Committee meeting in Valparaiso at the Sheraton Miramar Hotel

Right: 1st North American Committee meeting on 17 March at the Millennium UN Plaza Hotel in New York

International Committees

As part of its goal of improving customer service and better meeting the needs of the global maritime industry, ClassNK holds many overseas committee meetings around the world. These meetings are an important venue for the two-way exchange of information and advice between the Society and key industry and regional stakeholders in local regions around the world.

Two new overseas committees were established in 2010: the North American Committee and the Latin American Committee. Each committee is comprised of distinguished members of the maritime community in each respective country. A full list of the ClassNK Committee meetings held during 2010 is shown in the following table.

Name of Committee Meeting	Date	Venue
19th Greek Committee	2 February	Piraeus
3rd Middle East Technical Committee	7 February	Dubai
16th Indian Committee	15 February	Mumbai
1st North American Committee	17 March	New York
7th Turkish Committee	6 May	Istanbul
8th Hong Kong Technical Committee	6 May	Hong Kong
21st Korean Committee	7 May	Seoul
10th Taiwan Technical Committee	14 May	Taipei
15th China Technical Committee	27 May	Qingdao
8th British Committee	1 June	London
6th Malaysian Committee	9 July	Kuching
7th Singapore Committee	13 July	Singapore
8th Philippine Committee	15 July	Manila
20th Danish Technical Committee	3 September	Copenhagen
14th Singapore Technical Committee	7 September	Singapore
2nd Turkish Technical Committee	19 October	Istanbul
36th Hong Kong Committee	21 October	Hong Kong
1st Latin American Committee	10 November	Valparaiso
17th Korean Technical Committee	10 November	Pusan
2nd Greek Technical Committee	11 November	Piraeus
11th Taiwan Committee	18 November	Taipei
8th Thai Committee	19 November	Pattaya
17th China Committee	2 December	Sanya
8th Indonesia Committee	3 December	Surabaya

Countries	Conventions		SOLAS					MARPOL 73/78				AFS	
	TM	LL	SC	SE	SR	ISM	ISPS	I	II	IV	VI		
Maldives	●	●	●	●	●	●	●	●					
Malta	★	★	★	★	★	●	★	★	★	●	●	●	●
Marshall Islands	●	●	●	●	●	●	●	●	●	●	●	●	●
Mauritius	●	●	●	●	●	●	●	●	●	●	●	●	●
Mexico	★	★	★	★	★			★					
Morocco	★	●	★	★	★	★		★	★				
Mozambique		●						●	●	●			
Myanmar	●	●	●	●	●	●	●	●	●	●	●	●	●
Namibia	●	●	●	●	●			●	●	●			
Netherlands	●	●	★	★	★	●	●	●	●	●	●	●	●
Netherlands Antilles		★	★	★	★	★	★	★	★	★	★	★	★
New Zealand													★
Oman	●	●	●	●	●								
Pakistan	●	●	●			★		●	●	●			
Panama	●	●	●	●	●	●	★	●	●	●	●	●	●
Papua New Guinea	●	●	●	●	●			●				●	
Paraguay	★	★	★	★	★	★							
Peru													
Philippines	●	●	●	●	●	●	●	●	●			●	
Portugal		★	★					★					
Qatar	●	●	●	●	●	●	●	●	●	●	●	●	●
Saudi Arabia	●	●	●	●	●	●	●	●	●	●	●	●	●
Seychelles	●	●	●	●	●	●	●	●	●	●	●	●	●
Singapore	●	●	●	●	●	●	●	●	●	●	●	●	●
Solomon Islands	●	●	●	●	●								
Somalia		●											
South Africa		●	●					★	●				
Spain													
Sri Lanka	●	●	●	●	●			●					
St. Kitts and Nevis	●	●	●	●	●	●	●	●	●	●	●	●	●
St. Vincent and the Grenadines	●	●	●	●	●	★	★	●	●	●	●	●	●
Switzerland	●	●	●	●	●	●		●	●	●	●	●	●
Syria		●	●	●	●			●		●	●		
Tanzania		●											
Thailand	★	★	★	★	★	★		★					★
Tonga	●	●	●	●	●			●	●				
Tunisia		●	★					●					★
Turkey	★	●	★	★	★	●	●	●	●	●	●	●	●
Tuvalu	●	●	●	●	●	●	●	●	●	●	●	●	●
UAE	●	●	●	●	●	●	●	●	●	●	●	●	●
Uganda		●											
UK	●	●	★		●	★	★	●		●	●	●	●
Uruguay		★	★	★	★								★
Vanuatu	●	●	●	●	●	●	●	●	●	●	●	●	●
Venezuela		★											
Viet Nam	★	★	★	★	★	★		★	★	★			★
Yemen		●											●

Abbreviations:
 ●--Authority has been delegated.
 ★--Authority has been delegated subject to some conditions.

TM: International Tonnage Certificate (1969)
 LL: International Load Line Certificate
 SC: Cargo Ship Safety Construction Certificate
 SE: Cargo Ship Safety Equipment Certificate
 SR: Cargo Ship Safety Radio Certificate
 ISM: International Safety Management Code
 ISPS: International Ship and Port Facility Security Code
 I, II, IV, VI: MARPOL Annex I, II, IV, VI
 AFS: International Convention on the Control of Harmful Anti-fouling Systems on Ships

ClassNK in Committee

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Directorate General of Shipping

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GEE Limited
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Mercator Lines Limited
Mercator Lines Limited
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Director
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Byron M. Sugahara	President	Fairfield-Maxwell Services, Ltd.
Charles Leung	Senior Vice President	Fairmont Shipping (Canada) Limited
Thomas H. Paterson	Vice President	Owned Fleet & Business Development Fednav Limited
Michael M. Lee	President	Foremost Maritime Company LLC
Shunji Sasada	Chief Operating Officer	Navios Corporation
Ronald W. Tursi	President	Roymar Ship Management Inc.

■ PHILIPPINE COMMITTEE

Chairman	Arben E. Santos	President & CEO	Southwest Maritime Group of Companies
Members	Roy R. Alampay	Vice President for Operations & General Manager	Baliwag Navigation, Inc.
	Emerson M. Lorenzo	Administrator	Maritime Industry Authority Department of Transportation & Communications
	Rogelio A. Torres	Vice President	Traffic & Operations Eastern Shipping Lines, Inc.
	Ko-Lin Toh	President	Keppel Philippines Marine, Inc.
	Michael G. Bernardino	Vice President	Loadstar International Shipping, Inc.
	Doris Magsaysay Ho	President & Chief Executive Officer	Magsaysay Maritime Corporation
	Edgardo G. Lacson	President	MIS Maritime Corporation
	Shinji Watadani	President	Tsuneishi Heavy Industries (Cebu), Inc.

■ SINGAPORE COMMITTEE

Chairman	Siong Seng Teo	President	Singapore Shipping Association
Members	Eng Aik Meng	President	APL, NOL Group
	Tong Chong Heong	Chief Executive Officer	Keppel FELS Limited
	Lam Yi Young	Chief Executive	Maritime and Port Authority of Singapore
	Aloysius Seow	Chief Operating Officer	Ocean Tankers (Pte) Ltd.
	Kuok Khoon Kuan	Managing Director	Pacific Carriers Limited
	Teo Cho Keng	Senior Executive Director, Technical Division	Pacific International Lines (Pte) Ltd.
	Wong Weng Sun	President & C.E.O.	Sembcorp Marine Ltd

■ TAIWAN COMMITTEE

Chairman	Loh Yao-fon	Assistant to Group Chairman	Evergreen Group
Members	Huang Chin-san	Chief Executive Director	Chang Yung-Fa Foundation
	Danny Wang	Managing Director	Cheng Lie Navigation Co., Ltd.
	Donald K. L. Chao	President	China Steel Express Corporation
	Jei-Yuan Chen	Executive Manager	CPC Corporation, Taiwan
	Paul T. P. Tang	President	CSBC Corporation, Taiwan
	Shang-Wen Liao	President, Ph. D. Leeds. U.K.	Eastern Media International Corporation
	David Hsu	Chairman	First Steamship Co., Ltd.
	Bill M. H. Huang	Chairman	Glory Navigation Co., Ltd.
	Harvey Chiu	Chairman	Hsin Chien Marine Co., Ltd.
	Michael M. K. Hsiao	Chairman	Mingtai Shipping Corporation
	J. D. Lan	Chairman, C. E. O.	Shih Wei Navigation Co., Ltd.
	Mathias K. Y. Chen	Chairman	Sincere Industrial Corporation
	Fred C. P. Tsai	Chairman	Sincere Navigation Corporation
	Hrong-Nain Lin	President	Ta Tong Marine Co., Ltd.
	Joseph Wu	President	Ta-Ho Maritime Corporation
	I. Y. Chang	Chairman	Taiwan Navigation Co., Ltd.
	Nobu Su	C.E.O.	TMT Co., Ltd.
	C. K. Ong	President	U-Ming Marine Transport Corp.
	Lin Ching Chih	Chairman	Unison Marine Corporation
	Glenn K. L. Chan	President	United Ocean Shipping S. A.
	Chao-Hon Chen	Honorary Chairman	Wan Hai Lines Ltd.
	James Lan	Chairman	Wisdom Marine Lines S.A.
	David C. H. Liu	Top-Corporate Consultant	Yang Ming Marine Transport Corp.

■ THAI COMMITTEE

Chairman	Sutep Tranantasin	Executive Vice President	Regional Container Lines Public Co., Ltd.
Members	Warawan Nganthavee	Managing Director	Asian Marine Services Public Co., Ltd.
	Bhumindr Harinsuit	Managing Director	Bhureemas Navee Co., Ltd.

Wirat Chanasit	Managing Director	ItalThai Marine Ltd.
Chanet Phenjati	President	Jutha Maritime Public Co., Ltd.
Pimook Prayoonprohm	Director of Ship Standard Bureau	Marine Department
Suraphon Meesathien	Vice President	Nathalin Group
Jaipal Mansukhani	Director	Precious Shipping Public Co., Ltd.
Wittawat Svasti-Xuto	Vice President, International Trading Business Unit	PTT Public Co., Ltd.
Voravit Visitkitjakarn	Managing Director	Sang Thai Shipping Co., Ltd.
Nitas Krongvanitchayakul	Managing Director	Thaioil Marine Co., Ltd.
Yodchai Ratanachiwakorn	Operation Director	Thoresen & Co., (Bangkok) Ltd.
Teruo Kondo	Chief Production Manager	Unithai Shipyard & Engineering Ltd.

■ TURKISH COMMITTEE

Chairman	Yalcin Sabanci	Chairman	Yasa Holding S.A.
Members	Necdet Aksoy	Chairman	Akmar Holding S.A.
	Ali Umur	President	Aktif Shipping
	Kenan S. Sumra	Marine Department Manager	Aygaz A.Ş.
	Engin Ozcelik	General Manager	CEBI Maritime & Trading SA
	Esref Cerrahoglu	Chairman	Cerrahgil A. S.
	Mehmet Falay	Managing Director	Cornships Management and Agency Inc.
	H. Bülent Şener	Chairman	DELTAMARINE
	Serdar Akcali	Managing Director	Denak Ship Management & Agency
	Ö. Faruk Miras	Member of Board	Diler Shipping and Trading Inc.
	Bilge Bayburtlugil	General Manager	DITAS Tanker and Marine Operations Corp.
	Cihan Ergenc	Chairman	ER Denizcilik Sanayi Nak. Ve Tic. A. S.
	Orhan Karademir	Technical Manager	Genel Denizcilik Nakliyatı A.S.
	Sadan Kaptanoglu	Owner	H.I. Kaptanoglu Shipping Group
	Bedri Ince	Chairman	Ince Shipping and Trading Co. Inc.
	Murat Edip Karahasan	Chairman	Karahasan Group of Shipping Companies
	Tamer Kiran	Chairman	KIRAN Group of Shipping Companies
	Bayram Yusuf Aslan	President	Mardeniz & Kardeniz & Mardas Group of Companies
	Huseyin Yardimci	General Manager, Member of Board	MOLIVA SHIPPING INC.
	Serif Ozdaglar	Deputy General Manager	Nemtas Shipping
	Murat Dortbudak	Executive Vice President	Odin Shipmanagement
	Emir Sohtorik	Chairman	SEMIH SOHTORIK MANAGEMENT & AGENCY INC.
	Suha Izmiriligil	President	SINOMAR S. A.
	Orkun Kalkavan	Executive Board Member	Turkon Holding
	Emirhan Sabanci	Member of the Board	YA-SA Shipmanagement and Trading S. A.
	Ilhan Sabanci	Member of the Board	YA-SA Tanker and Transportation S. A.

■ CHINA TECHNICAL COMMITTEE

Chairman	Zhao Zhanjun	President	China Ship Design & Research Center Co., Ltd.
Members	Zhu Qingshuang	General Manager, Technical Center	COSCO SHIPYARD GROUP CO., LTD.
	Li Guang Min	Chief Engineer, Vice President	Bohai Shipbuilding Heavy Industry Co., Ltd.
	Ms. Feng Guo Ying	Vice General Manager	China Business Marine Co., Ltd. (SINOMARINE)
	Zhang Yongjian	Secretary of the Board	China COSCO Holdings Company Limited
	Luan Fukai	Senior Manager, Shipbuilding Department, Strategic Planning Division	China Ocean Shipping (Group) Company
	Chen Zhengjie	Director, Safety & Technology Superintendent Div.	China Ocean Shipping (Group) Company
	Li Xue Qiang	Deputy General Manager	China Shipping Container Lines Co., Ltd.
	Chen Jian	Deputy Managing Director	China Shipping Development Co., Ltd. Tanker Company
	Pu Li Fei	General Manager	China Shipping International Trading Co., Ltd.
	Wang Guorong	Deputy Managing Director	COSCO Bulk Carrier Co., Ltd.
	Cai Deqing	General Manager, Safety & Technology Management Division	COSCO Container Lines Co., Ltd.
	Hong Ying	General Manager, Ship Management Dept.	COSCO Shipping Co., Ltd.
	Zhao Jin Wen	Manager, Senior Chief Engineer, Technical Department	Dalian Ocean Shipping Company
	Zhang Zhen De	Vice President	Dalian Shipbuilding Industry Co., Ltd.
	Yang Wei Zan	Deputy Technical Director, Senior Engineer	Dalian Shipbuilding Industry Co., Ltd.
	Li Yi Wen	Vice General Manager	Guangzhou Maritime Transport (Group) Co., Ltd.

Zhou Zhi Hao	Senior Engineer	Guangzhou Shipyard International Co., Ltd.
Lou Dan Ping	Deputy Chief Technical Officer	Hudong-Zhonghua Shipbuilding (Group) Co., Ltd.
Zhang Ming Hua	General Manager, Senior Engineer	IMC SEG (China)
		IMC Shipyard & Engineering Group (China) Ltd.
Hu Keyi	Technical Director, Technology & Market Development	Jiangnan Shipyard (Group) Co., Ltd.
		TDCC Office
Cao Zhi Teng	General Manager	Jiangsu New Yangzi Shipbuilding Co., Ltd.
Luo Jian	Deputy Managing Director	Jiangsu Ocean Shipping Co., Ltd.
Zhu Yue Chen	General Manager, Business Department	Liaoning Bohai Shipyard
Yu Baojun	Professor	Marine Design & Research Institute of China
Hideaki Naoi	Vice President, Senior General Manager of Central Technical Div.	Nantong COSCO KHI Ship Engineering Co., Ltd.
Liu Haijin	Director, Executive Vice President	New Century Shipbuilding Co., Ltd.
Wang RongLiang	General Manager	Qingdao Fushun Ship Management Co., Ltd.
Sun Wen Tian	Vice General Manager	Qingdao Ocean Shipping Company
Lu Zhi-Ping	Honorary President	Shanghai Merchant Ship Design & Research Institute
Qiu Xin Yao	General Manager	Shanghai Ocean Shipping Company LTD.
Jin Yun Long	Technical Chief, Dept. of System Transportation Technology	Shanghai Ship & Shipping Research Institute, Ministry of Communications
Ye Jinwen	Technical Director	Shanghai Shipyard Co., Ltd.
Tao Ying	Chief Engineer, Senior Engineer	Shanghai Waigaoqiao Shipbuilding Co., Ltd.
Yang Shiming	Technical Director	SINOPACIFIC SHIPBUILDING GROUP CO., LTD.
Xiao Sen Yuan	President	SITC Development Group Co., Ltd.

■ DANISH TECHNICAL COMMITTEE

Chairman	Jørgen Juncher Jensen	Professor, Head of Section	Coastal, Maritime and Structural Engineering DTU Mechanical Engineering Department of Mechanical Engineering Technical University of Denmark
Members	Niels Bjørn L Mortensen	Director, Regulatory Affairs	A.P. Moller-Maersk A/S
	Claus Usen Jensen	Executive Vice President, Technical Division	A/S Dampskibsselskabet TORM
	Lars Robert Pedersen	Deputy Secretary General	BIMCO
	Anne Skov Strüver	Head of Division, Ministry of Economic and Business Affairs	Danish Maritime Authority
	Hans Henrik Petersen	Head of Department	Danish Shipowners' Association
	Peter Justesen	Vice President, Head of Fleet Management	Lauritzen Kosan A/S
	Erik Møller	Fleet Manager Tankers	Lauritzen Tankers A/S
	Thomas S. Knudsen	Senior Vice President, Head of Marine Low Speed	MAN Diesel
	Kurt Rye Damkjær	Senior Vice President	Nordic Tankers Marine A/S

■ GREEK TECHNICAL COMMITTEE

Chairman	Marios Stafilopatis	Owner	Byzantine Maritime Corporation
Members	P. E. Antonelos	General Manager	A. M. Nomikos Transworld Maritime Agencies S.A.
	Christos C. Hadjigeorgiou	Technical Manager	Almi Marine Management S. A.
	Haris G. Giantzakis	Technical Manager	Arcadia Shipmanagement Co., Ltd.
	Demetrios Koukoulas	General Manager, Technical Management Services Dry Division	Cardiff Marine Inc.
	George Kourelis	General Manager, Technical Management Services Tanker Division	Cardiff Marine Inc.
	Michael D. Kapsorrachis	Technical Manager	Centrofin Management Inc.
	Dionisios Kourouklis	Director Marine Operations	Chandris (Hellas) Inc.
	George Alexandridis	Technical Coordinator	Dynacom Tankers Management Ltd.
	Costas Petsas	Technical Manager	Empros Lines
	Nikolaos Petromylonakis	Technical Manager	Entrust Maritime Co. Ltd.
	Leontios Pitaoulis	Technical Manager, New Building Projects	Equinox Maritime Ltd.
	Stefanos Georgiou	Technical Manager, Tankers Division	European Navigation Inc.
	George H. Paschalis	Technical Director	Evalend Shipping Co. S.A.
	Dimitrios Theodoropoulos	Chief Operating Officer	Franco Compania Naviera S.A.
	Christoforos E. Andreadis	Technical Manager	Golden Union Shipping Co. S.A.
	Anastasios Kalogiannis	Technical Manager, Technical Department	Iolcos Hellenic Maritime Enterprises Co. Ltd.
	Dion Theodorou	Technical Manager	Konkar Shipping Agencies S.A.

Takis Koutris	Managing Director	Kristen Marine S.A.
John A. Yiannakenas	Technical Department	Kritsas Shipping S.A.
Nick Argyros	Technical Director	Laskaridis Shipping Co. Ltd.
George J. Souravlas	CEO	Load Line Marine S.A.
John N. Ioannidis	Technical Manager	Maryville Maritime Inc.
Theodoros Pavlidis	Technical Director	Metrostar Management Corp.
Nikolaos Balalis	Technical Director	Navios Shipmanagement Inc.
Amir Geva	Manager, Technical Department	Ofer (Ships Holding) LTD.
Paraskevas Koutsoukos	Managing Director & Technical Manager	Paradise Navigation S.A.
Elias A. Galanopoulos	Managing Director	Regal Mare Inc
Michael Anagnostou	Managing Director and Technical Manager	Roswell Navigation Corp.
Achilleas Avlonitis	Technical Manager	S. Frangoulis (Ship Management) Ltd
George Hatzivassiliou	Technical Manager	Samios Shipping Company S.A.
Dimitris C. Makris	Technical Manager	Springfield Shipping Co. Panama S.A.
Frantzeskcs D. Kontos	Technical Director	Sun Enterprises Ltd.
Vasileios Lampropoulos	Technical Department Manager	Thenamaris Ships Management Inc.
Dimitris Andreadakis	Technical Manager	Transman Shipmanagers S.A.
Manolis G.Koutlakis	Technical Manager, Newbuilding Projects	Transmed Shipping Ltd.
C. Dean Tseretopoulos	Naval Architect-Marine Engineer, MBA	Triple Tee International Ltd.
Savvas D. Papadatos	Mechanical Engineer, Special Projects & Claims Manager	Tsakos Shipping and Trading S.A.
Constantinos M. Metaxas	Technical Manager	Union Commercial Incorporated
Takis Koutouras	Technical Manager	Z & G HALCOUSSIS Co. Ltd.

■ HONG KONG TECHNICAL COMMITTEE

Chairman	Peter Cheng	Managing Director	Peter Cheng Naval Architect & Marine Consultant Ltd.
Members	Marcel Liedts	Group Managing Director	Anglo-Eastern Group
	Y. Q. Huang	Deputy General Manager	Associated Maritime Company (Hong Kong) Limited
	B. N. Prasad	General Manager, Fleet Management Group	Bernhard Schulte Shipmanagement (Hong Kong) Limited Partnership
	Vishal Khurana	Director & Chief Executive	Chellaram Shipping (Hong Kong) Ltd.
	Liu Yi Fan	Deputy General Manager, Senior Engineer	China Shipping (H. K.) Marine Co., Ltd.
	Ning Pao Kun	Deputy Managing Director	COSCO (H.K.) Shipping Co., Ltd.
	Kishore S. Rajvanshy	Managing Director	Fleet Management Limited
	Lau Pong Sze	Managing Director	Gold Bridge Shipping Ltd.
	Y. H. Shum	Director	Goldbeam International Limited
	Li Kwok Hung	Managing Director	IMC Shipping Services Co., Pte. Ltd.
	Vipin Sachdeva	Vice President, Fleet	KC Maritime Ltd.
	Pan Zhong Shan	Director & General Manager	Lihai International Shipping Ltd.
	Bibhash Chaudhuri	General Manager, Ship Management Division	New Asian Shipping Company, Limited
	Haruki Aono	Executive Director	Northstar Ship Management Ltd.
	James S. C. Tai	General Manager, Fleet Management Department	Orient Overseas Container Line Ltd.
	Gautam Bandyopadhyay	Technical Manager	Pacific Basin Shipping (HK) Ltd.
	Kenneth Koo	Group Chairman & Chief Executive Officer	Tai Chong Cheang Steamship Co. (H.K.) Ltd.
	W. L. Hung	General Manager	Wah Kwong Ship Management (Hong Kong) Limited

■ KOREA TECHNICAL COMMITTEE

Chairman	Sung-Won Kang	Professor, College of Engineering Department of Naval Architecture & Ocean Engineering	Pusan National University
Members	Jang Min-Seok	Director, Design Department	Dae Sun Shipbuilding & Engineering Co., Ltd.
	ManSoo Kim	Vice President, Head of Hull Design	Daewoo Shipbuilding & Marine Engineering Co., Ltd.
	Sung-Ryool Kim	Deputy Managing Director, Ship Sales Engineering Department	Hanjin Heavy Industries & Construction Co., Ltd.
	Kwang Sang Yoo	Vice President, Fleet Management Director	Hanjin Ship Management Co., Ltd.
	Lee Jong-seung	Senior Vice President, Basic Design Office, Shipbuilding Division	Hyundai Heavy Industries Co., Ltd.
	Taeg-Gyu Lee	Senior Vice President, Head of Maritime Administration Division	Hyundai Merchant Marine Co., Ltd.
	Hyun-Sang Shim	Senior Vice President, Design Division	Hyundai Samho Heavy Industries Co., Ltd.
	Yeong-Se, Jeong	Managing Director, Marine Engineering Team	KLC SM Co., Ltd.

Jae-Sung Choi	Professor, Dept. of Marine System Engineering	Korea Maritime University
Jong-Tae Lee	Managing Director, Director	KSS Line Ltd. Busan Office
Jongyun Kim	Vice President, Technology Planning Team	Samsung Heavy Industries Co., Ltd. Geoje Shipyard
Seog Hwan Kang	Vice President, Head of Ship Management Division	SK Shipping Co., Ltd.
Chul-Ho, Song	Technical Director, Basic & Hull Design, Busan R&D Center	SPP Plant & Shipbuilding Co., Ltd.
Sang-Heon Oh	Department Manager, Hull Technology Department, Shipbuilding Technology Division	STX Offshore & Shipbuilding Co., Ltd.
Nam-Young Kim	Vice President, New Shipbuilding Technical Department	STX Pos Ship Management
Jae-Woo Son	Vice President, Team Manager, Basic Design Team	Sungdong Shipbuilding & Marine Engineering Co.,Ltd.
Nojoon Park	CEO	TMS Co., Ltd.

■ MIDDLE EAST TECHNICAL COMMITTEE

Chairman	Jitendra Misra	Managing Director	Emarat Maritime
Members	Karem Hammad	Tanker Fleet Division Manager	ADNATCO-NGSCO
	Benny K. Alex	General Manager (New Building & Projects)	Emarat Maritime
	Abdul Hayee	Fleet Manager	Gulf Stolt Ship Management
	Anil Cariappa	Technical Director	International Tanker Management Limited
	Jamil Al-Ali	Manager, Fleet Engineering Group	Kuwait Oil Tanker Co. S. A. K.
	Masanori Hayashi	General Manager, Marine & Technical Department	Oman Ship Management Company
	A. Ramamurty	General Manager, Ship Management Dept	Pioneer Ship Management Services LLC
	A. Mansourzadeh	Technical Director	Simatech Shipping L. L. C.
	Mohammed El-Sayed Ahmed	Vice President—Fleet (acting), Fleet Management	United Arab Shipping Company (S. A. G.)
	Shamim A. Syed	Technical & Support Manager	Vela International Marine Ltd.
	N. V. K. Nambiar	Technical Manager	Warm Seas

■ SINGAPORE TECHNICAL COMMITTEE

Chairman	Tey Yoh Huat	Vice President, Technical Services	APL
Members	Toshikazu Saito	Director, General Manager	"K" Line Ship Management (Singapore) Pte Ltd.
	Robert Sumantri	Managing Director	Altus Shipping and Logistics Pte. Ltd.
	Surajit Chanda	Fleet Manager Technical	BW Shipping Managers Pte Ltd.
	Liu De Tian	Managing Director	COSCO (Singapore) Pte Ltd.
	Toh Ho Tay	Director, Rig & Shipbuilding	Drydocks World—SE Asia
	B. S. Teeka	Managing Director	Executive Ship Management Pte Ltd.
	Lim Teck Cheng	Chief Executive	HONG LAM MARINE PTE LTD.
	Ir Wong Sin Futt	Assistant Director, Newbuildings, Ceng FIMarEST	IMC Shipping Services Co., Pte. Ltd.
	Seow Tan Hong	Senior General Manager, Engineering Department	Jurong Shipyard Pte Ltd.
	Nelson Yeo	Managing Director	Keppel Shipyard Limited (A member of the Keppel Group)
	Avinash Kadam	Director, Technical Operations	Maersk Tankers
	Mark Lim Yew Guan	Deputy Director (Shipping)	Maritime & Port Authority of Singapore
	Hiroaki Kubo	Managing Director	MOL Tankship Management (Asia) Pte. Ltd.
	Arun K. Ahluwalia	Fleet Director	MSI Ship Management Pte. Ltd.
	Hemant Pathania	Managing Director & COO	NYK Shipmanagement Pte Ltd.
	Teh Eng Hua	Vice President, Technical Department	Ocean Tankers (Pte) Ltd.
	Lim Tau Kok	Director, Fleet Management Division	PACC Ship Managers Pte Ltd.
	Panneer Selvam	General Manager, Technical Division	Pacific International Lines Pte Ltd.
	Govinder Singh Chopra	Director	SeaTech Solutions International (S) Pte Ltd.
	Francis Chin	Chief Operating Officer	Stellar Shipmanagement Services Pte Ltd.
	Rajdeep Singh	Technical Director	Tanker Pacific Management (Singapore) Pte Ltd.
	Naresh Chand	General Manager—Planning	United Ocean Ship Management Pte Ltd.
	Calum S Hume	Deputy Managing Director and Technical Director	V. Ships (Asia) Pte Ltd.
	Mok Kim Terng	Director, Operations, Ship Power, Ship Design	Wärtsilä Ship Design Singapore Pte Ltd.

■ TAIWAN TECHNICAL COMMITTEE

Chairman	Chiang Shou-hsing	Senior Vice President, Shipbuilding Dept.	Evergreen Marine Corp. (Taiwan) Ltd.
Members	Guo I-Lung	Director/President	Biggin Shipping Corporation
	K. C. Lin	Senior Manager, Marine Dept.	Cheng Lie Navigation Co., Ltd.
	Steve S. J. Ren	Vice President	China Steel Express Corporation
	J. Z. Fang	Chief Engineer, Chief Engineer Office	CPC Corporation, Taiwan
	Chih- Peng Tsai	Director	Deryoung Maritime Co., S.A.
	Michael L. Y. Pan	Executive Vice President	Eastern Media International Corporation
	Luo Chin-ek	Senior Vice President, Maintenance Dept., Project Division.	Evergreen Marine Corp. (Taiwan) Ltd.
	S. H. Wang	Vice President, Engineering & Supply Dept.	First Steamship Co., Ltd.
	Anthony Lin	Adviser	Formosa Plastics Marine Corporation
	C. T. Hsueh, Tony	Manager of Marine Department	Glory Navigation Co., Ltd.
	Thomas S. H. Yeh	DS Vice President SMS Dept.	Harmony Transportation Co., Ltd.
	W. K. Wu	Manager, Technical Dept.	Hsin Chien Marine Co., Ltd.
	C. K. Lin	Vice President, Engineering Department	Mingtai Navigation Co., Ltd.
	You-Yen Ho	Vice President, Marine Department	Shih Wei Navigation Co., Ltd.
	Kenny J. H. Yang	General Manager, Technical Division	Sincere Industrial Corporation
	Young Perng-Terng	Chief Engineer	Ta Tong Marine Co., Ltd.
	Andy D. Ouyang	Chief of Marine Technical Section, Marine Department	Ta-Ho Maritime Corporation
	Chen Teng	Senior Vice President, Marine Dept.	Taiwan Navigation Co., Ltd.
	Robert Y. P. Kao	Assistant Vice President	U-Ming Marine Transport Corporation
	Peter W. D. Ho	Vice President, Planning and Development Dept.	Unison Marine Corp.
	Sanders Jong	Vice President, Engineering Division	Wan Hai Lines Ltd.

■ TURKISH TECHNICAL COMMITTEE

Chairman	M. Erbil Özkaya	General Coordinator	YA-SA Shipping Industry and Trading S.A.
Members	Ş. Şenol Üngör	Technical Manager	Active Shipping & Management Pte Ltd
	Özgür Aksoy	General Manager & Board Member	Akmar Holding S.A.
	Saim Gökçen	Technical Manager	Aksay Denizcilik ve Ticaret A.Ş.
	Selçuk Karakimseli	Board of Member	Atlas Ship Management Ltd.
	Kenan S. Sumra	Marine Department Manager	Aygaz A.Ş.
	Mustafa Bahar	Technical Manager	Cebi Denizcilik AS
	Ergun Köker	Technical Manager & DPA	Cornships Management & Agency Inc.
	S. Dirim Şener	Department Manager, Planning Department	Delta Marine Engineering and Computer Trading Co.
	Şemsettin Özyapar	Technical Manager	Denak Ship Management & Agency
	Baha Erbil	General Manager	Densan Deniz Nakliyat ve Sanayi A.Ş.
	Taşkin Çilli	CEO, Member of Board	Desan Deniz İnşaat San. A.Ş.
	Coşkun Ağca	Fleet Manager	Ditaş Deniz İşletmeciliği ve Tankerciliği A.Ş.
	Metin Solak	Technical Manager	Dünya Denizcilik ve Tic. A.Ş.
	Kemal Ayten	General Manager	E. S. C. Ereğli Denizcilik A.Ş.
	Bülent Subaşı	Operation Manager	IDÇ Denizcilik San. Tic. A.Ş.
	A. Yaşar Canca	Technical Manager	Ince Shipping Group
	Raif Söylerkaya	Ocean Going Master	Kaptanoğlu Holding
	Cengiz Eren	Head of Technical Department	Karahaslan Group of Shipping Companies
	Mehmet Güllakdeniz	Safety Coordinator/DPA, Master Mariner	Kiran Group of Shipping Companies
	Melek Yavan	Member of Board	Körfez Shipping and Trading Inc.
	Galip Kendigelen	General Manager	Mardas & Mardeniz & Kardeniz Group of Companies
	Göksenin Eroğul	Deputy General Manager (Technical & Logistics)	Nemtaş Shipping
	Hüseyin Şener	Fleet Manager	Odin Ship Management
	M. Cumhuri Kuter	General Manager	Sedef Shipbuilding Inc.
	Müjdat Uludağ	General Manager	Sefine Shipyards Inc.
	Mehmet Başoğlu	General Manager, Marine Division	Semih Sohtorik Management & Agency Inc.
	Hayati Cingöz	BSC Engineer & Technical Manager	Ulusoy Sea Lines Management S.A.
	Mehmet Kayhan	General Manager, Bulk Carriers	YA-SA Shipmanagement and Trading S.A.
	Hakan Gürel	General Manager	YA-SA Tanker and Transportation S.A.

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OFFICERS

DIRECTORS	N. Ueda	Chairman and President	Nippon Kaiji Kyokai
	Dr. H. Kitada	Executive Vice President	Nippon Kaiji Kyokai
	T. Matsui	Executive Vice President	Nippon Kaiji Kyokai
	S. Kakubari	Managing Director	Nippon Kaiji Kyokai
	K. Fujiwara	Managing Director	Nippon Kaiji Kyokai
	Dr. T. Yoneya	Managing Director	Nippon Kaiji Kyokai
	Y. Nakamura	Managing Director	Nippon Kaiji Kyokai
	A. Ashida	Chairman	Mitsui O.S.K. Lines, Ltd.
	Dr. H. Itagaki	Professor Emeritus	Yokohama National University
	Dr. H. Ohtsubo	Professor Emeritus	The University of Tokyo
	Y. Katoh	President	Mitsui Engineering & Shipbuilding Co., Ltd.
	K. Kama	President and Chief Executive Officer	IHI Corporation
	S. Kobayashi	Adviser	Nippon Yusen Kabushiki Kaisha
	K. Sugimoto	Counselor	Iino Kaiun Kaisha, Ltd.
	S. Sumi	President	Tokio Marine & Nichido Fire Insurance Co., Ltd.
	K. Tsukuda	Chairman	Mitsubishi Heavy Industries, Ltd.
	Dr. T. Nomoto	Professor Emeritus	The University of Tokyo
	S. Hasegawa	President	Kawasaki Heavy Industries, Ltd.
	Dr. S. Hayama	Professor Emeritus	The University of Tokyo
	M. Furukawa	Chairman and President	Hitachi Zosen Corporation
H. Maekawa	Chairman	Kawasaki Kisen Kaisha, Ltd.	
K. Miyahara	Chairman	The Japanese Shipowners' Association	
T. Motoyama	Chairman	The Shipbuilders' Association of Japan	
Dr. K. Yoshida	Professor Emeritus	The University of Tokyo	
AUDITORS	T. Aihara	Chairman	Japan Civil Aviation Promotion Foundation
	N. Ishii	Former Managing Executive Director	Nippon Yusen Kabushiki Kaisha
	K. Kondo	Vice President Executive Officer	Mitsui Sumitomo Insurance Co., Ltd.
	I. Shintani	Board Counsellor	Kawasaki Kisen Kaisha, Ltd.
COUNCILORS	Z. Akasaka	Chairman	Japan Marine Equipment Association
	H. Ishikawa	President	Japan Railway Construction, Transport & Technology Agency
	S. Inui	President	Inui Steamship Co., Ltd.
	Y. Inubushi	Senior Adviser	Kobe Steel, Ltd.
	Dr. Y. Inoue	Professor for Specific Project	Yokohama National University
	K. Uchida	President	Meiji Shipping Co., Ltd.
	N. Kakizoe	President and CEO	Nippon Suisan Kaisha, Ltd.
	T. Kakei	Chairman	NS United Kaiun Kaisha, Ltd.
	H. Kashimoto	President	Sumitomo Heavy Industries Marine & Engineering Co., Ltd.
	J. Kato	Senior Adviser	Kyoei Tanker Co., Ltd.
	H. Kadota	President	Shin Kurushima Dockyard Co., Ltd.
	T. Kawamoto	Tsuneishi Shipbuilding Company President, Executive Officer Representative Director	Tsuneishi Holdings Corporation
	S. Kinoshita	President	NYK-Hinode Line, Ltd.
	S. Kurahara	President	IHI Marine United Inc.
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	Dr. H. Tanikawa	Professor Emeritus	Seikei University
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	N. Tsuchiya	President & CEO	Yuyo Steamship Co., Ltd.
	H. Tomono	Representative Director & President	Sumitomo Metal Industries, Ltd.
	T. Nakabe	President	Onomichi Dockyard Co., Ltd.
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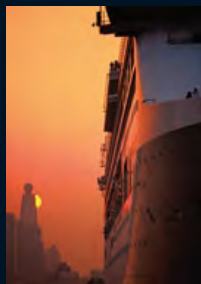
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