

Issued in 2017

ClassNK

Annual Report 2016

[English]





The ClassNK Mission

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

To achieve this mission ClassNK will:

•Independence•

Deliver the highest quality classification services, by the highest quality personnel, while maintaining our totally independent third party, non-profit status.

•Standard•

Develop relevant rules, guidances, and procedures, and conduct technical research and development to positively contribute to the maritime industry.

•Global•

Maintain and develop our global operations in line with the needs of our clients.

Contents

| | | | |
|-----------|--|-----------|---|
| 03 | Message from Chairman and President | 13 | ClassNK in Action |
| 05 | 2016 at a Glance | 21 | ClassNK in Research |
| 09 | Organization Profile | 27 | ClassNK in International Affairs |
| 11 | Worldwide Service Network | 29 | Organization List |

Profile

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 protecting the marine environment. ClassNK provides broad spectrum of services as an independent third party, non-profit organization, including survey & certification services, technical consulting services, and research & development activities. The principal work of the Society's expert technical staff is to conduct surveys of new and existing ships and other floating 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. ClassNK also conducts a wide range of statutory surveys on behalf of more than 100 flag States around the world, as well as audits and registers ship safety & security management systems, quality, environmental and occupational health management systems, and seafarer training institutions.

Code of Ethics

In accordance with its mission to ensure the safety of life and property at sea and prevent the pollution of the marine environment, ClassNK has a duty to conduct its activities not only with respect for life and in observation of the law, but in accordance with social norms and commonly held principles. Bearing this in mind, ClassNK hereby established the following Code of Ethics.

1. The Mission of the Society

In order to fulfill its mission of ensuring the safety of life and property at sea and the security of ships, and preventing the pollution of the marine environment, as well as to provide clients with the best possible service, ClassNK shall operate in accordance with its Rules, as well as relevant international conventions, statutory regulations, flag administration requirements and other applicable standards. The Society shall also make every effort to establish an organized system for conducting business, and shall strive not only to maintain that system, but to make continual improvements to that system in order to earn and maintain the trust of its customers and the society at large.

2. Independence, Impartiality and Integrity

ClassNK shall maintain its status as an independent organization and provide its services as an impartial third party. All personnel of the Society shall work so as to bring neither disgrace to the Society's honor nor detriment to the Society's interests. Further, personnel of the Society shall not take action in the name of the Society, nor make use of their official title, except in the pursuit of their official duties. All personnel of the Society shall remain free from any commercial, financial and other pressures which may affect their judgement on surveys and audits.

3. Confidentiality of Information

ClassNK shall recognize all certificates and survey records issued by the Society, as well as all relevant survey documents submitted by customers and all such information obtained by the Society as confidential information, and the contents and copies of such documents shall not be made available to other parties except as defined in the Rules of the Society, required by applicable legislation, court order, legal proceedings, adherence to Flag State requests, or by the Owner's authorization.

4. Implementation of Classification and Statutory Surveys

ClassNK shall conduct all surveys fairly and impartially and in strict accordance with the Rules of the Society and the requirements of the flag administration. ClassNK shall not issue classification and statutory certificates and or other certificates or survey records, and shall not endorse such certificates, without performing the required surveys and/or fulfilling other stipulated requirements, accordingly.

5. Observance of Laws

ClassNK recognizes that it has a duty to society at large and shall execute all of its activities with respect to justice and impartiality, and shall strictly observe the law and social standards.

The management of ClassNK therefore recognize adherence to this Code of Ethics as part of the Society's mission, and shall not only ensure that all members of the Society's staff are made familiar with this Code, but shall also establish a system to ensure its effective application.

Further, in the event of a serious violation of this Code or the law, the management of ClassNK recognizes that it has the responsibility to investigate the cause of the violation and to take timely and appropriate corrective action in order to prevent the reoccurrence of such violations in the future.



A handwritten signature in black ink, appearing to read 'Koichi Fujiwara' in a cursive style.

Koichi Fujiwara

Chairman and President
ClassNK

Message from Chairman and President

Welcome to the ClassNK Annual Report. First I would like to extend my deepest appreciation to all of our clients and stakeholders who supported our activities throughout 2016.

2016 ushered in some major changes worldwide, from the referendum on leaving the European Union in the United Kingdom to the surprising election results in the United States.

Amongst uncertainties surrounding the global state of affairs and the world economy, it is even more important that we define our policies and steer the organization in the right direction.

While we are seeing some recovery in the maritime industry, it is yet to be seen whether these are the early manifestations of full recovery. An income of regulatory changes over the past year such as the triggering of entry into force of the Ballast Water Management Convention and the Panama's accession to ratification of the Hong Kong Convention on ship recycling, are all expected to have a significant impact on the maritime industry as well as the shipbuilding and shipping industries and of course, classification societies.

The decision at the IMO's Marine Environment Protection Committee (MEPC70) to further lower the cap on SOx emissions will be another big turning point for the industry.

In light of the current situation, this has placed our organization under more financial pressure. However, our priority remains to offer the best technical services to each of our clients under our mission of ensuring the safety of life and property at sea and protecting the marine environment. Taking these financial circumstances and the latest regulatory trends into consideration, we intend to work even harder in order to further develop our core classification services and make valued contributions to the industry.

Following my appointment as Chairman and President of ClassNK last in March 2016, I reassessed our corporate governance structure and made some organizational changes in order to better secure the Society and ensure the continuance and development of our services under these more challenging market conditions.

For our core surveying and auditing services, a more efficient service network has been put in place and new expertise hired to ensure the quality of our services and best service our customers' needs.

Furthermore we have also reformed our research institute and have are continuing with activities related to research in ship classification that involve both research development and members of the maritime industry.

We also continue to make available our information services such as publishing rule amendments or abolitions and guidelines based on the latest R&D results, damage investigations, industry demands and revisions to international regulation made at IMO or IACS, in addition to our comprehensive range of software services.

We have also made big commitments in the fields of Big Data and the Internet of Things, where we are working on providing the necessary platforms and mechanisms for data exchange in addition to ensuring cybersecurity so that the maritime industry can reap the biggest rewards from this exciting new opportunity. Last year our wholly owned subsidiary Ship Data Center, an information hub for ship data, began operations. Our machinery maintenance management software suite ClassNK CMAXS was also awarded for its contributions to Big Data when it was awarded the Big Data Award at the Lloyd's List Award last year. The fully IMO GBS compliant ClassNK Archive Center began operations in 2016 and ClassNK e-Certificate, the world's first comprehensive system to provide ship class certificates and statutory certificates issued on behalf of flag states in electronic format began operational trials.

As the demand for third-party certification services has also grown, ClassNK is also working to expand its certification services for quality, environmental and occupational health and safety systems as well as for maritime education and training, greenhouse gas emissions and renewable energy generation technologies. The Society has been particularly proactive in renewable energy, issuing certification for various onshore large wind turbines in 2016.

The Society will earnestly continue to deliver the very best technical services to its clients and continue to maintain and strengthen relations of trust with the industry. We look forward to receiving your valued support for our activities in 2017.

2016 at a Glance

ClassNK register reaches
more than **245.8 Million GT**
and
9,231 Vessels

- ▶ At the end of December 2016, the ClassNK register reached a total of 245,808,903 gross tons.
- ▶ The size of ClassNK's register has grown every year since 1988, reaching 100 million gross tons registered in 1997 and a record breaking 200 million gross tons registered in mid-2012. Topping the 200 million mark was an important milestone in ClassNK's history, and marked the first time a classification society had achieved such a figure.

17.2 Million GT

ClassNK registers more than 17.2 million GT

Over the course of 2016, 654 vessels totaling 17,215,564 gross tons were newly added to the register.

45 Projects

ClassNK completes 45 Joint Research Projects

Since establishing its Joint R&D for Industry Program in 2009, ClassNK carries out a wide variety of joint R&D with industry partners each year. In 2016, ClassNK and its research partners completed 45 joint research projects as part of this program.

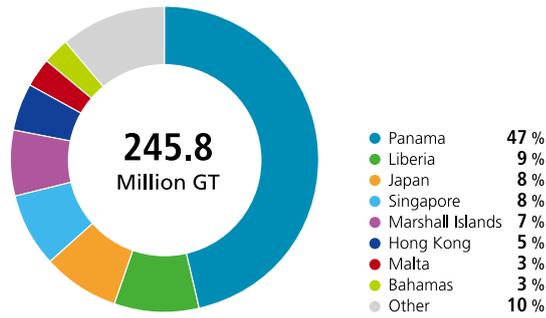
9 Guidelines

Publication of 9 New Guidelines

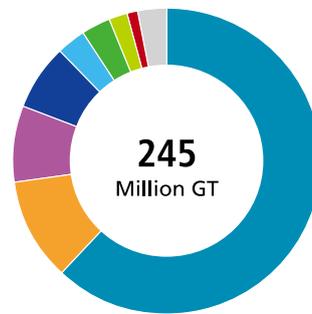
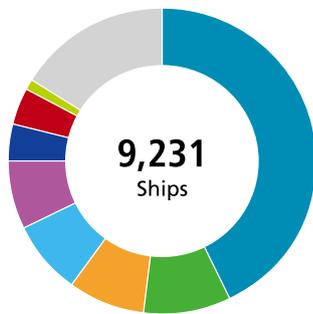
In 2016 ClassNK published the following guidelines. These guidelines are available to download via the Society's homepage after logging into "My Page".

- Environmental Guideline V.3.1
- Guidelines for Gas Fuelled Ships V.4
- Guideline for the Mandatory Code on Noise Levels on Board Ships V.2
- Guidelines for Liquefied Gas Carrier Hull Structures – Independent Spherical Tanks of Type B
- Guidelines on Laser-Arc Hybrid Welding V.3
- Guidelines for Floating Offshore Facilities for LNG/LPG Production, Storage, Offloading and Regasification V.4
- Guidelines for Racking Strength Assessment of Vehicles Carriers – Guidelines for Evaluation of Yielding Strength
- Guidelines on the Installation of Ballast Water Treatment Systems
- Guidelines for Ship Recycling Facilities

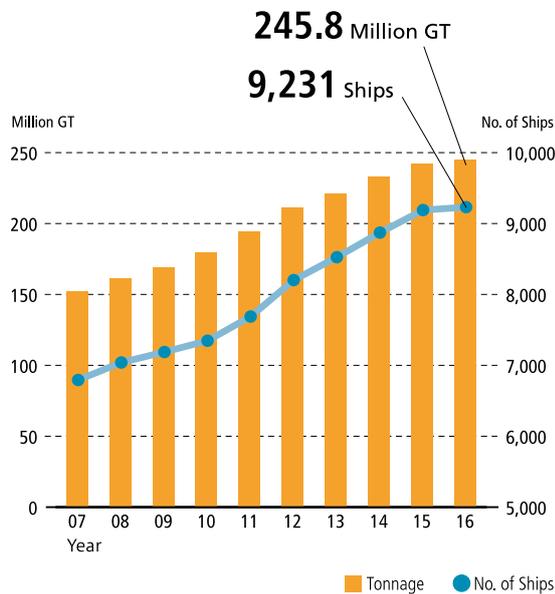
Breakdown of ClassNK Fleet by Flag



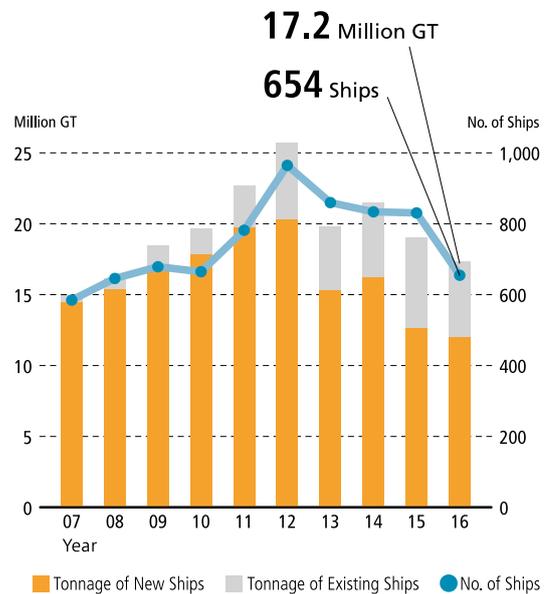
Breakdown of ClassNK Fleet by Ship Type



Total ClassNK Fleet



New Vessels Registered



2016 at a Glance

6 Mar.

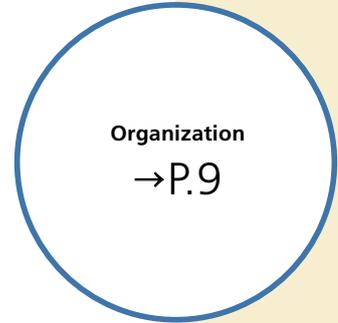
Appointment of new executive team

Following the ClassNK Council and the Board of Directors meeting held on 7 Mar. Koichi Fujiwara was appointed to Representative Director/Chairman and President and other executive directors were also appointed.

1 Apr.

Organization reforms

In order to streamline the decision-making process and criteria as well as vitalizing the Society, organization reforms such as the establishment of divisions were carried out including the reorganization of related departments .



Mar.

ClassNK gains USCG authorization under ACP

The ACP was developed as an alternative method for US-flagged vessels to fulfill the regulatory requirements for construction and operation. In accordance with USCG requirements, US-flagged vessels are required to undergo onboard inspections by the USCG before a Certificate of Inspection (COI) can be issued. Under the

ACP however, the USCG can issue a COI to a ClassNK-registered, US-flagged vessel based on reports from ClassNK without the need for duplicate inspections. This eases the financial and regulatory burden on shipowners whilst maintaining existing levels of safety.



Apr.

ShipDC operation commences operations

The wholly owned subsidiary set up by ClassNK, Ship Data Center Co., Ltd. (ShipDC), officially commenced operations of its data center as the platform for maritime Big Data. After successful data transfer trials from ship to shore, ShipDC

began operations. Voyage data from vessels of multiple shipping companies have been continuously gathered and the data has already been practically applied for voyage data monitoring by cargo owners and hull structure stress monitoring.

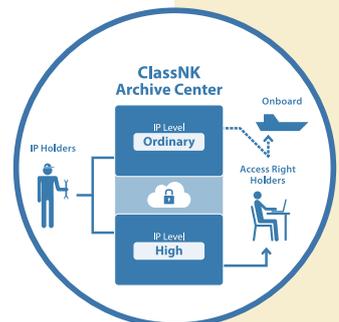


1 Jul.

NKAC marked industry's first system complying with IMO GBS

IMO GBS requires a Ship Construction File (SCF) to be kept onboard during operation for applicable ships. As the SCF includes the documents recognized as being highly sensitive intellectual property, the requirement permits that this information can be kept onshore as well as on board is

permitted. ClassNK Archives Center (NKAC) is the industry's first system complying with IMO GBS requirements and Industry Standards developed by cross-industry groups. NKAC offers safe and secure storage of SCF documents.



27 Jul.

Breakthrough finding for ultra-large container ships

ClassNK carried out a joint R&D project in collaboration with Japan Welding Engineering Society relating to brittle crack arrest design to enhance the structural reliability of large container vessels. Verification tests were carried out using ultra-large-scale test specimens simulating the actual construction of the hatch side

coaming and upper deck of ultra-large container ships as part of the joint R&D project. The results revealed for the first time that brittle crack arrest steel plates with a thickness of 100mm must have a brittle crack arrest toughness value (Kca) of 8,000 N/mm^{3/2} or more at -10°C.

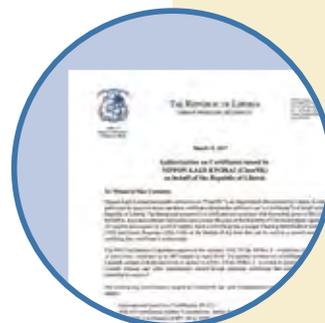


7 Oct.

ClassNK begins trials for electronic certificate system

“ClassNK e-Certificate” is the world’s first comprehensive system to provide ships’ class certificates and statutory certificates issued on behalf of flag states in electronic format. In cooperation with shipping companies, under the authorization

and in mutual cooperation with the Liberian Flag Administration (LISCR), ClassNK has been testing system functions such as the offshore transmission and receiving of data and website access for the verification of electronic certificates.



20 Oct.

ClassNK CMAXS won The Lloyd's List Intelligence Big Data Award at Lloyd's List Asia Awards 2016

“ClassNK CMAXS” suite is comprised of functions to assist in machinery/equipment maintenance, and to realize the preventive maintenance by analyzing Big Data collected from sensors in the engine

room and detect changes in the condition of machinery more accurately. The award was given in recognition of effectiveness and popularity of the system.



22 Nov.

ClassNK wins Environmental Protection Award at IBJ Awards 2016 for its ship recycling activities

ClassNK has worked for ship recycling regulations including its provision of widely used software for development and maintenance of Inventory of Hazardous Materials “PrimeShip-GREEN/SRM”,

and issuance of statements of compliance (SOC) in line with Hong Kong Convention for ship recycling facilities in China, India, and Japan. These activities lead to ClassNK picking up the award.



Message

2016 at a Glance

Organization Profile

Service Network

Action

Research

International Affairs

Organization List

ClassNK Annual Report

Organization Profile



Chairman and President,
Representative Director
Koichi Fujiwara



Senior Executive Vice President,
Executive Director
Tetsuya Kinoshita



Executive Vice President,
Executive Director
Junichiro Iida



Executive Vice President,
Executive Director
Toshiyuki Shigemi



Executive Auditor
Tetsushi Agata

Reorganization of the Board of Directors

In March 2016 and March 2017 the senior management changes were made at the Board of Directors and Administrative Council Meeting.

(Executive team as of March 2017)

Chairman and President, Representative Director
Koichi Fujiwara

Senior Executive Vice President, Executive Director
Tetsuya Kinoshita

Executive Vice President, Executive Director
Junichiro Iida

Executive Vice President, Executive Director
Toshiyuki Shigemi

Tetsushi Agata was appointed to Executive Auditor of the Society.

Division Structure

Based on each business activity, ClassNK allocated its departments to new divisions in order to streamline the decision-making process and clarify standards for making judgements.

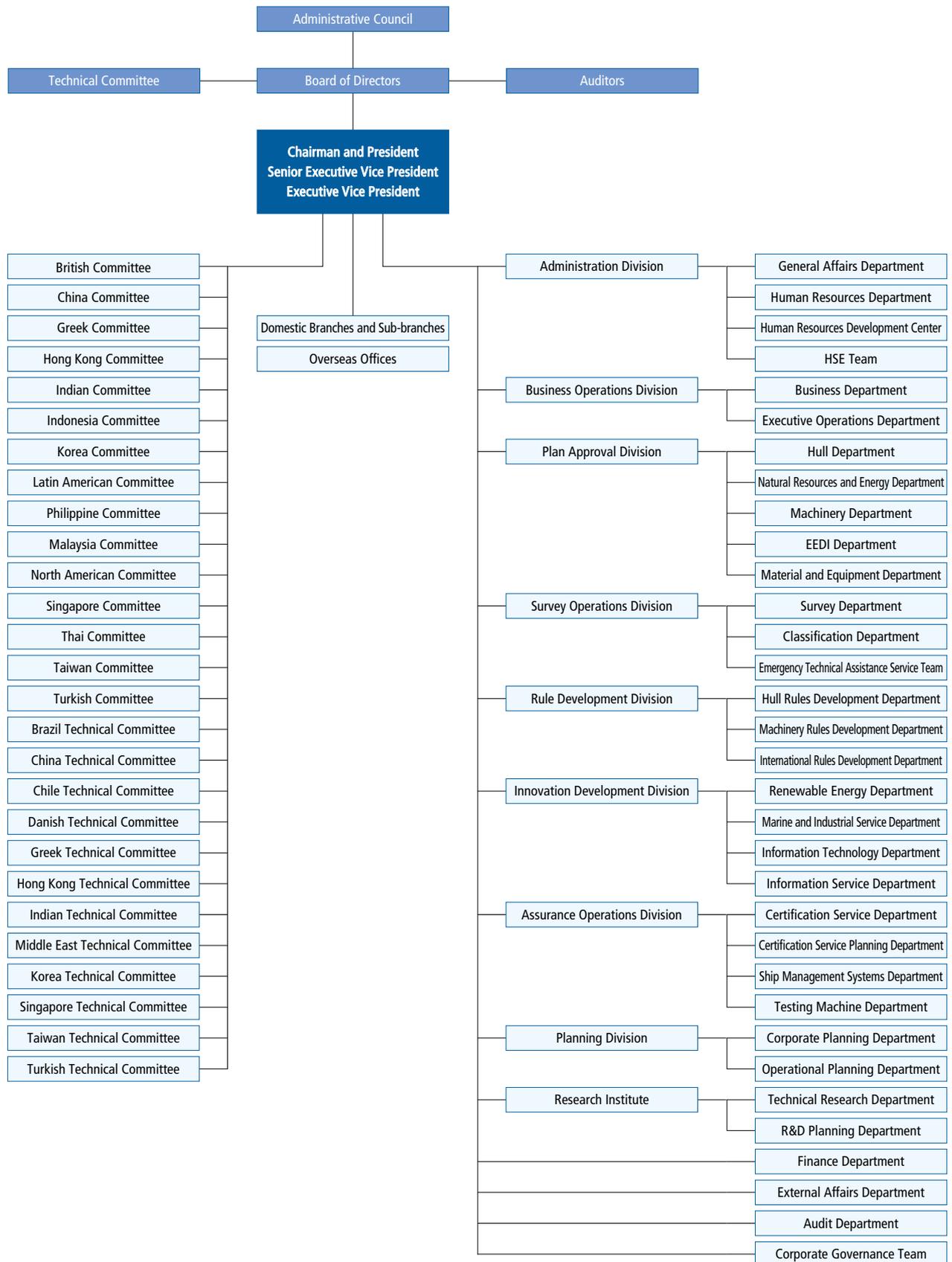
Reorganization of Research and Development Structure

ClassNK merged its Practical R&D Promotion Department with its Research Institute in order to further implement its research and development activities. The newly formed Research Institute will be at the center of the Society's research and development projects relating to ship classification as well as part of its obligations as a member of the maritime industry.

Corporate Governance

ClassNK established a Corporate Governance Team in addition to appointing an Executive Auditor and strengthening its auditing structure as part of its obligations to corporate governance activities as a third-party organization.

Organization



Message

2016 at a Glance

Organization Profile

Service Network

Action

Research

International Affairs

Organization List

ClassNK Annual Report

Worldwide Service Network

133

Exclusive Survey Offices

ClassNK is providing a broad range of services via its extensive worldwide survey network, with the number of exclusive survey offices totaling 133 locations around the world at the end of 2016. In addition to these offices, ClassNK also maintains six Plan Approval Centers located in the major shipbuilding regions of the world.



New offices opened in 2016

- Jan. Novorossiysk, Russia
- Jan. Charleston, USA
- Mar. Bahrain
- Jun. Nantes, France
- Jun. Tehran, Iran

Plan Approval Centers

- Japan ClassNK Head Office, Tokyo, Administration Center Plan Approval Division (Hull Department, Natural Resources and Energy Department, Machinery Department, Material and Equipment Department EEDI Department)
- Korea Plan Approval Center, Busan
- China Plan Approval Center, Shanghai
- Singapore ... Plan Approval Center, Singapore
- Turkey Plan Approval Center, Istanbul
- India Plan Approval Center, Mumbai

- ⊙ ...Offices with Plan Approval Center
- ...Overseas Offices
- ...New Exclusive Survey Offices
- ...Offices in Japan

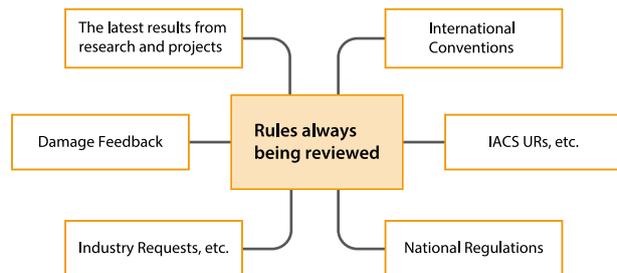


ClassNK in Action

ClassNK is continually expanding its service network, with 133 exclusive survey offices located in major port cities and maritime hubs across the world. The ClassNK register saw the addition of 653 vessels totaling 17,215,564 gross tons during the period of 2016. Going beyond traditional classification services, ClassNK is proactively responding to the needs of the industry through a range of technical services, certification services, renewable energy certification, and training.

Establishment and Amendment of Technical Rules

ClassNK is constantly revising its Rules and Guidance in order to reflect the latest results from relevant research and development projects, feedback from damage investigations, correspond to requests from industry as well as changes made to relevant international conventions, International Association of Classification Societies (IACS) Unified Requirements (URs), national regulations, etc. A total of 88 amendments were approved during 2016. This report will introduce some of the major amendments.



Establishment and Amendments related to Gas Fueled Ships

Responding to the expectation to gas fueled ships as the measures to comply with regulations for ships' emission such as GHG, NOx, SOx, and Particulate Matter, the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code) was adopted during sessions of MSC95 and entered into force. ClassNK established Part GF of the Rules and Guidance and amended the relative rules and guidance in accordance with the

IGF code. The Part GF stipulates requirements for fuel containment system, material and general pipe design, bunkering, fuel supply system, fire safety, ventilation, electrical installations, and so on, of ships using gases or other low-flashpoint fuels. Furthermore, requirements for approving equipment and fittings of ships using low-flashpoint fuels are provided as the annex to Part GF of the Guidance.

Amendments related to Polar Code

Diminishing ice in Arctic and Antarctic areas due to global warming has drawn attention to voyaging waters surrounding the two poles. Aiming the safety and the protection of the environments around the two poles, the International Code for Ships Operating in Polar Waters (Polar Code) and related amendments have been adopted during the sessions of both MSC94 and MEPC68.

ClassNK amended its rules and guidance to stipulate requirements for ship structure, stability, water tightness, machinery, fire safety, communications, structure and installation for environmental protection, and The Polar Water Operational Manual provided for the ships.

A selection of newbuildings that registered with ClassNK in 2016



43,006gt BULK CARRIER built by TSUNEISHI SHIPBUILDING CO., LTD. for CITHAERON MARITIME S.A.



11,918gt OIL/CHEMICAL CARRIER built by SHITANOE SHIPBUILDING CO., LTD. for Lemax Limited



49,718gt CHIP CARRIER built by SANOYAS SHIPBUILDING CORPORATION MIZUSHIMA SHIPYARD for CARIBSTAR SHIPPING, S.A.

Amendments related to the IGC Code revision

Amendments to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) was adopted during the sessions of MSC93 in 2014 as the total revision since its adoption in 1983.

In line with the amended IGC Code, ClassNK amended Part N of its Rules and Guidance. The major amendments were:

Hull-related

The determination of minimum distance of cargo tan for the ship's shell plating in consideration of the influence at the casualty, Design load requirements, Addition of approval criteria for new containment system developed in the future

Outfitting and fire safety related

Installation of water-spray system on the rescue boat etc. facing with cargo area, and requirements for the installation of pressure relief valve
 Insulation to cargo pipes and atmosphere testing Instrument to the hold space.

Major amendments in addition to the above are as follows:

- Torsional Strength of Container Carriers
- Welding Procedure Qualification Tests
- Rudders, Shoe Pieces and Rudder Horns
- Portable Atmosphere Testing Instruments for Enclosed Spaces, etc.
- Air Quality Control System in Closed Vehicle Spaces and Closed Ro-ro Spaces
- Secondary Means of Venting Arrangements for Tankers
- High-strength Materials used for Intermediate Shafts
- Approval of Diesel Engines
- Testing Environment for Chemical Composition Analysis and Testing Machines for Mechanical Testing

More specific details about all of the amendments made during 2016 are available on the "Rule Amendments for Technical Rules" page of the ClassNK website for ClassNK "MyPage" account holders. Please refer to the ClassNK website for more information on how to register for a "MyPage" account.



DIAMOND FAITH
 63,538gt OIL CARRIER built by NAMURA SHIPBUILDING CO., LTD.
 IMARI WORKS for DIAMOND TANKER PTE LTD



DRIVE GREEN HIGHWAY
 76,387gt VEHICLES CARRIER built by JAPAN MARINE UNITED CORPORATION ARIAKE SHIPYARD for JMU5044 SHIPPING S.A.



FALCON TRIUMPH
 36,336gt BULK CARRIER built by CHINA CHANGJIANG NATIONAL SHIPPING GROUP CORPORATION JINLING SHIPYARD for FALCON TRIUMPH SHIPPING LTD.

Class Surveys and Statutory Surveys

Class Surveys

Over the course of the year, ClassNK surveyors carried out a total of 14,981 classification surveys around the world. Of these, 654 were initial surveys, and 15,635 were class maintenance surveys.

Statutory Surveys

As of the end of 2016, ClassNK is authorized to carry out surveys and issue certificates in accordance with international conventions or domestic laws by more than 100 flag administrations around the world. In 2016, ClassNK carried out inspections and issued more than 38,000 statutory certificates based on these authorizations as follows:

- International Tonnage certificates: 981
- International Load Line certificates: 2,761
- SOLAS related certificates: 18,893
- MARPOL related certificates: 11,618
- Anti-fouling system certificates: 1,708
- International Ballast Water Management certificates: 32

ISM/ISPS Audits and MLC Inspections

Over the course of the year, ClassNK newly registered 54 companies and 787 ships in accordance with ISM requirements, bringing the total number of companies and vessels registered with ClassNK to 751 companies and 5,848 ships respectively. As of the end of 2016, ClassNK is authorized to conduct ISM audits on behalf of more than 80 Administrations. ClassNK registered 734 ships to ISPS Code requirements during the year, bringing the total number of ships registered with ClassNK to 5,184. ClassNK currently conducts ISPS audits on behalf of more than 60 Administrations. ClassNK registered 859 ships to MLC requirements during the year, bringing the total number of ships registered with ClassNK to 5,135. ClassNK currently conducts MLC inspections on behalf of more than 60 Administrations.

New services for incoming regulations

Over the past few years, the IMO has adopted a number of new conventions to address environmental issues facing the maritime industry, including the Ballast Water Management Convention and the Ship Recycling Convention. ClassNK offers a wide variety of certification services to support owners' efforts to achieve compliance with new regulations. In 2016, ClassNK issued numerous certificates or statements of compliance in accordance with new Conventions, including the following:

- Ballast Water Management Systems: 442
- Ship Recycling Facility Plans: 3
- Inventory of Hazardous Materials: 232



36,421gt BULK CARRIER built by CHENGXI SHIPYARD CO., LTD. for FLORENTIA SHIPPING INC.



11,413gt RO-RO CARGO/VEHICLES built by NAIKAI ZOKEN CORPORATION INNOSHIMA SHIPYARD for KAWASAKI KINKAI KISEN, LTD.



47,995gt LPG (LOW TEMP) built by MITSUBISHI HEAVY INDUSTRIES SHIPBUILDING CO., LTD. for GREEN SPANKER SHIPPING / KYOWA KISEN CO., LTD.

Approval of manufacturers and service suppliers

In addition to classification and convention related surveys, ClassNK also carries out audits and certifications for companies who provide testing and measurement services related class and equipment maintenance surveys.

As part of these activities, ClassNK certified the following number of firms in 2016:

- Thickness measurements on ships: 21 (239)
- In-water survey of ships: 41 (263)
- Radio inspection services: 26 (368)
- Voyage Data Recorders (VDR): 21 (280)
- Maintenance of firefighting systems and equipment: 45 (292)
- Maintenance of life saving equipment and appliances: 23 (139)
- Tightness testing of hatches with ultrasonic equipment: 1 (16)
- Testing of coating systems: 0 (9)
- Services of lifeboats, launching appliances and on-load release gear: 47 (201)
- Sound pressure level measurements of general alarm and public address systems: 1 (1)
- Measurements of noise level: 1 (1)

※ () Indicates total number of certifications at year end.

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. ClassNK published its Annual Report on Port State Control 2016, a compilation and analysis of PSC related statistics for the previous year, and distributed it to ship owners, ship managers and other stakeholders. ClassNK also released the ARRIVAL CHECKLIST for PSC, the preparatory checklist mobile app for PSC inspections.

In addition, senior ClassNK staff visited key maritime authorities around the world, including Australian Maritime Safety Authority (AMSA), Maritime New Zealand, Ningbo and Zhoushan Maritime Safety Administrations in China, Hong Kong Marine Department, and Maritime and Port Authority of Singapore (MPA) during the course of the year. ClassNK also sent representatives to bilateral China-Japan and Korea-Japan meetings to discuss inspection related matters and present on ClassNK efforts being taken to reduce the detention ratio of ClassNK classed ships.



PORT STATE CONTROL ANNUAL REPORT 2016



23,306gt BULK CARRIER built by SHIMANAMI SHIPYARD CO., LTD. for LEFKADA SHIPPING AND TRADING CORPORATION



127,242gt LNG CARRIER built by KAWASAKI HEAVY INDUSTRIES, LTD. SHIP & OFFSHORE STRUCTURE COMPANY SAKAIDE SHIPYARD for LNG FUKUROKUJU SHIPPING CORPORATION



321gt MULTI WORK BOAT built by JAPAN MARINE UNITED CORPORATION YOKOHAMA SHIPYARD, ISOGO WORKS for REPUBLIC OF THE PHILIPPINES

ClassNK in Action

Technical Services

Condition Assessment Program (CAP)

During 2016, ClassNK issued Statements of Compliance to 28 vessels under its Condition Assessment Program (CAP). As of the end of 2016, the total number of Statements of Compliance issued by the Society for CAP stood at 423.

Emergency Technical Assistance Service (ETAS)

ClassNK's Emergency Technical Assistance Service (ETAS) is on call 24/7 to support the owners and operators of ships registered for this service in ensuring the safety of their vessels and minimizing the environmental impact if disaster should strike. In 2016, this team was called into action for five incidents related to maritime casualties to provide technical support. In 2016, 23 vessels newly registered for the ETAS service, bringing the total number of vessels registered for the service to 1,331.

Certification Services

ClassNK provides a broad range of certification services for quality, environmental, occupational health & safety and energy management systems in addition to verification for greenhouse gas (GHG) emissions inventories.

Quality Management Systems – ISO 9001

In 2016, ClassNK certified a total of 4 organizations in line with ISO 14001, bringing the total number of organizations registered with the Society to 139.

Environmental Management Systems – ISO 14001

In 2016, ClassNK certified a total of 4 organizations in line with ISO 14001, bringing the total number of organizations registered with the Society to 139.

Occupational Health & Safety Management Systems – OHSAS 18001

In 2016, ClassNK certified a total of 3 organizations in line with OHSAS 18001, bringing the total number of organizations registered with the Society to 36.

Energy Management Systems – ISO 50001

In 2016, ClassNK certified a total of 1 organization in line with ISO 50001, bringing the total number of organizations registered with the Society to 6.

Other Certification Services

ClassNK also provides certification services for the following fields:

- Maritime Education and Training
- Seafarer Recruitment and Placement Services
- Clean Shipping Index
- HSE (Health, Safety & Environment systems)
- Road Traffic Safety Management Systems (ISO 39001)
- Verification of Greenhouse Gas Assertions



NSU TRUST

107,512gt BULK CARRIER built by IMABARI SHIPBUILDING CO., LTD., SAJOU SHIPYARD for EMMA LINE S.A.



OCEAN HARVEST

31,883gt BULK CARRIER built by MITSUI ENGINEERING & SHIPBUILDING CO., LTD. CHIBA SHIPYARD for CONFIDENCE SHIPPING INC.



SEA PLOEG

11,933 GRT OIL/CHEMICAL CARRIER built by FUKUOKA SHIPBUILDING CO. LTD. for INVENTOR CHEMICAL TANKERS AS.

Services for Renewable Energy Technologies

Certification for Wind Energy Technologies

ClassNK provides certification and classification for wind power generation systems such as large and small wind turbines, floating offshore wind turbines and their supporting structures. In 2016, ClassNK provided one prototype certification for a large wind turbine and type certification for a small wind turbine bringing the total number of wind turbines certified by the Society to 14.

In regard to certifications for windfarms by large wind turbines (certification required to obtain license and approval as specified in Electricity Business Act of Japan), ClassNK issued statements of conformity for 11 onshore wind power plants in 2016.

Certification for Marine Renewable Energy Technologies

ClassNK provides a variety of certification services for marine renewable energy technologies that utilize wave, tidal, ocean current and ocean thermal energy.

Marine Warranty Surveys

A Marine Warranty Survey (MWS) is the third party surveillance of marine operations which is often requested by insurance underwriters in order to ensure that offshore marine operations such as the installation and transportation of wind turbines and offshore sea structures, and the laying of cables etc. are being carried out safely and reliably.

Whilst ClassNK was approved as an MWS performing body by two reinsurance companies in Europe, ClassNK performed MWS for the transportation and installation of a floating foundation for a wind turbine in 2016.



66,082gt OIL CARRIER built by JAPAN MARINE UNITED CORPORATION, KURE SHIPYARD for JX OCEAN CO., LTD.



7,488gt OIL/CHEMICAL CARRIER built by USUKI SHIPYARD CO., LTD. for NYK STOLT SHIPHOLDING INC.

Educational and Training Services

ClassNK Academy

ClassNK Academy was established in 2009 to provide the necessary basic knowledge to those involved in the shipbuilding, maintenance and transport industries. ClassNK Academy has been held actively since then and more than 3,000 participants around the world took part in courses in 2016. Courses offered during 2016 included:

Courses Related to Newbuildings

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

Courses Related to Existing Ships

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

Courses Related to Ship Management

- Incident Investigation & Analysis Course
- Risk Management Course
- ISM Internal Audits Course

ClassNK Technical Seminars

ClassNK holds technical seminars around the world to provide maritime experts with a wide-range of information about recent technology and technical findings in addition to the latest trends for Class rules. The technical seminars have a high degree of usability for the global maritime industry.

The following are just some of the presentations held by ClassNK at Technical Seminars in 2016:

ClassNK Technical Seminars (July)

- Design and construction for practical application of duplex stainless steel to a chemical tanker
- Advancement of curved shell plates working process using laser scanner
- Highly ductile steel (HDS) application on hull structures to mitigate damages at collision
- Development of carbon fiber reinforced plastic (CFRP) propeller
- Measures for container carriers upsizing - crack arrest steel plate and structural brittle crack arrest design
- ClassNK's activities on large container carriers structural strength
- Latest trends on international conventions

ClassNK Technical Seminars (November)

- Amendments to Rules and Guidance
 - Outline of establishment, revision and abolition of rules
 - Amendments to Class Rules and Guidance for the Survey and Construction of Steel Ships
 - Hull and Materials
 - Engine and Electrical Installations
 - Equipment
- Latest trends on international conventions
- Supporting the safe operation and reducing lifecycle costs through ship preventative maintenance system "ClassNK CMAXS"
- Certification for marine energy generation systems and ClassNK's activities



THORCO LOGIC

13,110gt GENERAL CARGO built by HONDA HEAVY INDUSTRIES CO.,LTD. for FRANBO LOGIC S.A.



TIGER HARMONY

12,148gt OIL/CHEMICAL CARRIER built by KITANIHON SHIPBUILDING CO., LTD. for TIGER SHIP NO. 12 LIMITED

Overseas Technical Seminars

ClassNK holds regular technical seminars around the world to provide in-depth information on incoming regulations, and introduce the latest technologies and technical findings to its clients and maritime stakeholders. The seminars aim to deliver practical information on a wide range of topics in line with the needs of each country.

The following are just some of the presentations that were carried out in 2016:

- Recent Topics at IMO and IACS
- Latest PSC Trends and ClassNK Activity
- Enforcement for the Ballast Water Management Convention

PrimeManagement Seminars

ClassNK has been providing its integrated PrimeManagement System for management system certifications (ISO etc.), training course certification and certification for ISM Code among others since 2011. Over the course of 2016, PrimeManagement seminars were held in the Philippines.

The following are just some of the presentations that were carried out:

- Monitoring of Maritime Education and Training Institutions in the Philippines by The Maritime Industry Authority (MARINA) of the Philippines
- New Training Requirements and ClassNK Maritime Education and Training Audit Project KAIBIGAN;
- Recent Trends of Port State Control Inspections; Implementation and Update of MLC, 2006 (Including PSC Deficiencies on MLC Matters);
- Instruction for Transition Audit to ISO 9001

Training upon requests of external organizations

In 2016, ClassNK conducted the following training upon the request of external organizations.

- "Case Studies of Ship Damage and Lessons Learned" at Innoshima Technical Center
- Part of "SOLAS / MARPOL / Ballast Water Management conventions and newbuilding surveys" for government officials gathered to JICA group training course for "Ship Safety" held by the Shipbuilding Research Centre of Japan
- "The activities of classification societies, and the management and inspection of welding" at the Eastern Japan Training Center for Shipbuilding Skills
- Providing internal ISM auditor training to a Vanuatu maritime procedures agent upon the request of the Maritime Bureau of Vanuatu
- "Security surveys by classification societies" upon the request of Ministry of Land, Infrastructure, Transport and Tourism as part of its ISPS Code training
- "Outline of HCSR Rules" upon the request of the Cooperative Association of Japan Shipbuilders as part of its training for ship designers engaging in basic design
- "Outline of ClassNK's activities and its certification services for Maritime Labour Convention" upon the request of the Ministry of Health, Labor and Welfare, Yokohama Quarantine Station as part of its training ship hygiene inspections
- "Necessary knowledge and skills to check plans and drawings for ships' construction" upon the request of the Japan Coast Guard

Internships

In response to requests from universities ClassNK offered 29 internships to students.

Internal Auditor and Surveyor Training

ClassNK conducts regular training in order to ensure that its surveyors and auditors can provide services to meet the diversifying needs of its customers. ClassNK conducted the following training for surveyors and auditors in 2016.

- Surveyor Training
- Marine Management Systems Auditor Training
- Maritime Labor Inspector Training
- ISO Auditor Training

ClassNK in Research

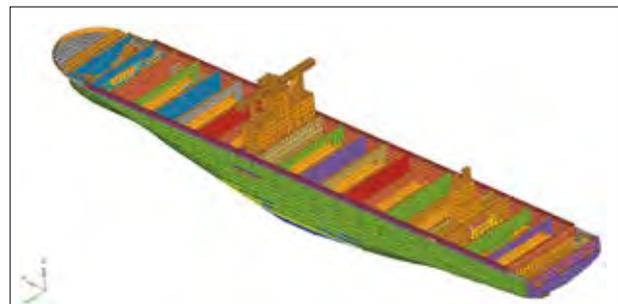
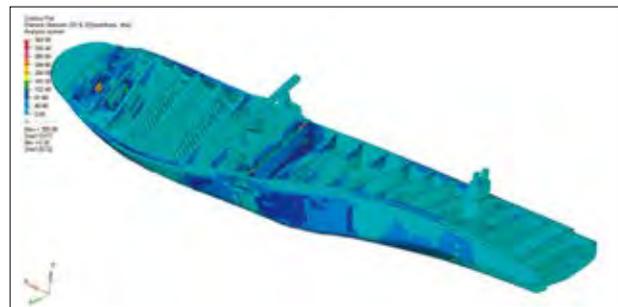
In order to fulfill its mission of protecting life, property at sea and the maritime environment, and contribute to the maritime industry, ClassNK carries out R&D related to classification as well as activities based on our role as a member of the maritime community.

Research and Development related to Classification

ClassNK has carried out R&D related to the classification societies with the aim of improving rules and guidelines and expanding technical services. The outlines of the main R&D carried out in 2016 are as follows:

Development of Rules for Structural Strength of Large Container Ships

Following the development of the rules on the hull girder ultimate strength of large container ships considering the effects of the lateral loads and the whipping response (a type of vibratory responses caused by wave impact load) in 2015, research on hull girder torsional strength were carried out in 2016 and the relevant rules were amended. The new amendments have made it possible to evaluate the correlation of hull girder vertical bending, horizontal bending and torsional bending more exactly on large container ships with various structural arrangements.



Full ship model of container carrier

Guidelines for Liquefied Gas Carriers Hull Structures – Independent Spherical Tanks of Type B

“Guidelines for Liquefied Gas Carriers Hull Structures – Independent Spherical Tanks of Type B” were developed based on the knowledge gained through the researches for the development of rules and guidelines related to the structural strength. The guidelines consist of “Guidelines for Direct Strength Analysis” and “Guidelines for Fatigue Strength Assessment”, which are useful to make adequate hull structural strength assessment of liquefied gas carriers with independent spherical tanks of type B.



GUIDELINES FOR LIQUEFIED GAS CARRIERS HULL STRUCTURES – INDEPENDENT SPHERICAL TANKS OF TYPE B

Guidelines for Racking Strength Assessment of Vehicles Carriers (Guidelines for Evaluation of Yielding Strength)

Vehicles carriers are designed with minimum numbers of transverse and partial bulkheads in order to efficiently load/unload cargo vehicles and to maximize the cargo loading capacity. Due to such a structural feature, structural strength assessment against racking deformations is one of the most important issues for vehicles carriers.

Recently, new designed vehicles carriers, e.g. post panamax type and bulkheadless type, which have different structural designs from conventional vehicles carriers have appeared.

Considering such a situation, researches were carried out aiming to develop unified evaluation procedures on racking strength for vehicles carriers with various structural design types, and the guidelines for racking strength assessment of vehicles carriers (for evaluation of yielding strength) were developed and published.



GUIDELINES FOR RACKING STRENGTH ASSESSMENT OF VEHICLES CARRIERS (GUIDELINES FOR EVALUATION OF YIELDING STRENGTH)

Sponsorship and Support for R&D Institutes and Organizations

ClassNK provides financial and technical support for academic institutes and organizations conducting R&D in addition to collaborating with such organizations in various R&D projects.

| University | Sponsored course |
|---|---|
| Graduate School of Frontier Sciences The University of Tokyo | Realization of Integrated Ocean Development and Utilization systems |
| Graduate School of Engineering The University of Tokyo | Next Generation of Offshore Wind Turbine System |
| University | Joint-established department |
| Faculty of Engineering The University of Kyushu | Department of Ocean Energy Resources |

Message

2016 at a Glance

Organization Profile

Service Network

Action

Research

International Affairs

Organization List

ClassNK in Research

Joint R&D for Industry

ClassNK contributes to the development of the maritime industry by providing technical and financial support to innovative R&D based on proposals from maritime stakeholders. At the end of 2016, 302 projects had been completed as part of ClassNK's joint R&D for Industry Program". In 2016 alone, 47 projects in various fields were completed, some of which are introduced below.

- Promotion of utilization of advanced information technology (Big Data, IoT, AI, etc.)
- Countermeasures to new regulations
- Rule infrastructure development
- Cooperation with maritime clusters and Development support for domestic technology

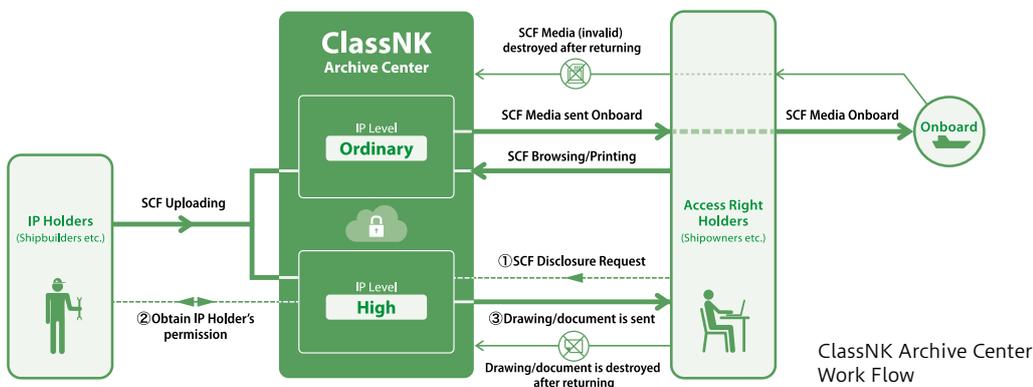
Promotion of utilization of advanced information technology (Big Data, IoT, AI, etc.)

Study on compatibility between ClassNK Archive Center and industry standard

■ Participant
IBM Japan

■ Objectives
Following the finalization of the industry standard for GBS-SCF coming into force, this project aimed to identify the high priority items from differences between the ClassNK Archive Center system and industry standards, and attempted to conform to industry standard specifications.

■ Outcome
The world-first onshore archive center conforming to GBS-SCF has been operated since 1 July 2016. It obtained certification of information security management system (ISMS, ISO / IEC 27001: 2013) in line with the industry standards.



Research on collaboration between CMAXS PMS (maintenance / spare parts management system) and CMAXS LC-A (condition monitoring / automatic diagnosis system)

■ Participants
IMC Co., Ltd.
Diesel United, Ltd.
ClassNK Consulting Service Co., Ltd.

■ Objectives
For the purpose of improving the reliability of the maintenance work on the ship, this project aimed to create a database of maintenance items recommended by the manufacturer. In addition, by bridging CMAXS PMS and CMAXS LC-A, realization for planning of the maintenance work plan based on the state of the engine is aimed.

■ Outcome
As initially planned, the development of functions related to the collaboration between CMAXS PMS and CMAXS LC-A had been completed, and reliability of maintenance work had been improved by availability of planning maintenance work based on the maintenance work recommendation period indicated by the LC-A participation maker.

National project on utilization of IoT for maritime industry

Japan's Ministry of Land, Infrastructure, Transport and Tourism is encouraging productivity revolution in the marine industry, called i-Shipping. As part of its actions, it has defined seven projects for the research and development of IoT-based technologies to help improve marine safety, to be subsidized under the Support Program for Research and Development of Advanced Safety Ship Technology. ClassNK participates as a joint researcher in all seven projects and provides appropriate support from the standpoint of a third party ship classification society.

- Operation support with shaking and steering simulators
 - A Study on the Determination of Ship Collision Risk and Autonomous Shipping
 - Development of a system for the automated observation and transmission of marine weather data
 - Improvement in analytical accuracy with the automatic correction of the ship characteristics model and application to safe operations
 - Research and development of a technology supporting safety in LNG transport with the use of communication between ships and land
- Safety design through hull monitoring
 - Research and development concerning hull structure health monitoring for large container ships
- Preventive maintenance of marine equipment and systems
 - Development of a method of preventing accidents at ship engine plants with the use of Big Data for improving safety and economic efficiency
 - Research and development for the introduction of IoT to deck machinery on cargo carriers and bulk carriers

Countermeasures to new regulations

Research and development on the development of domestic marine SOx scrubber and installation of actual ships

- Participants

Kawasaki Kisen Kaisha, Ltd.
Mitsubishi Heavy Industries, Ltd.
Mitsubishi Kakoki Kaisha, Ltd.
Japan Marine United Corporation
JMU5044 SHIPPING S.A.
- Objectives

Toward the practical application of domestic marine scrubbers, this project aimed to develop scrubber and on-board ship installations as well as establishment of certification procedures through operational tests on actual ships and acquisition of knowledge about the scrubber driving procedure in actual operation.
- Outcome

The first domestic hybrid SOx scrubber in Japan has been developed and installed on 7500 car carriers (Panama registered). Confirmed that it had performance to satisfy exhaust emission standards and emission standards of washing water specified in the EGCS guidelines at sea trial operation and actual navigation. A scheme B certification procedure for the Panama flag was also confirmed.

Rule infrastructure development

Research and development on actual stress of large crankshaft and prediction of bending-torsional fatigue strength

- Participants

Kobe Steel, Ltd.
Mitsui Engineering & Shipbuilding Co., Ltd.
Kawasaki Heavy Industries, Ltd.
Mitsubishi Heavy Industries Marine Machinery & Engine Co., Ltd.
DAIHATSU DIESEL MFG. CO., LTD.
YANMAR CO., LTD.
Niigata Power Systems Co., Ltd.
Hiroshima University
Hitachi Zosen Corporation
- Objectives

The design fatigue strength prescribed by the current international classification rule (IACS UR M53) does not take into consideration the effect of material cleanliness (nonmetallic inclusions). For the prevention of breakage of the crankshaft and pursuit of possibility for further limit design, this project aimed to establish actual stress prediction technology by MBS (abbreviation of Multi Body Simulation) which greatly affects the fatigue strength evaluation accuracy of the crankshaft and the multi-axial fatigue strength evaluation technology including the influence of non-metallic inclusions.
- Outcome

Based on the results of this research, we proposed "Guidance on Utilization of High Fatigue Strength Considering Nonmetallic Inclusive Dimensions" to WG in CIMAC (The International Council on Combustion Engines) which considers updating IACS rule. As a result, a subgroup that examines for rule making has been created.

A Study on the Method of Determining the Lowest Main Machine Output of a Ship Sailing under heavy weather

■ Participants

Hiroshima University
Osaka University
Hokkaido University

■ Objectives

With the EEDI regulation, it is required to ensure the minimum output of a shipping agency to maintain marine vessel maneuvering performance under heavy weather while satisfying the fuel efficiency regulation value. This project aimed to develop a method to rationally determine the lowest main engine output of vessels sailing under heavy weather, which is necessary for verifying the technical validity of the evaluation method.

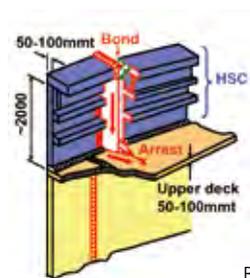
■ Outcome

A method to rationally determine the lowest main engine output of a vessel under heavy weather condition has been developed. This method contributes to the realization of rational EEDI regulation and contributes to the development of maritime industry through optimization of ship design and design and construction of competitive vessels.

Research and development on required arrest toughness of extremely thick steel plate for ultra large container carrier

■ Participants

The Japan Welding Engineering Society



Brittle crack arrest

■ Objectives

There is no specific provision for the required Kca value of the extremely thick arrest steel plate exceeding the plate thickness of 80 mm, and it is based on the judgment of each classification society. In this study, a demonstration test (large structural model arrest test) using specimens simulating hatch side coaming and strength deck structure of a large container carrier were conducted, and we aimed to clarify the required Kca value of extremely thick arrest steel plate with a thickness of 100 mm.

■ Outcome

On the basis of the findings obtained in this study, we proposed IACS(EG/MW) to prescribe the required Kca value of ultra-thick arrest steel plate with a plate thickness of 80 mm or more and 100 mm or less in the IACS unified rule.

Cooperation with maritime clusters and Development support for domestic technology

Research and development for trial design of small and medium type ships such as engine room, etc., on the basis of NOx Tier III regulation

■ Participants

The Cooperative Association of Japan Shipbuilders
USUKI SHIPYARD CO., LTD.
KITANIHON SHIPBUILDING CO., LTD.

■ Objectives

This project conducted trial design on representative types of ships built by CAJS members including EGR for the hull form, engine room arrangement when placing the SCR, piping, etc., to extract issues and discuss solutions.

■ Outcome

We conducted a trial design when SCR or EGR was installed on chemical tankers of 16,000 DWT and 25,000 DWT type, and gained insight on the problems at designing and their solution strategies.

Verification of the effect of countermeasures against onboard noise

■ Participants

The Hakodate Dock Co., Ltd.
Shin Kurushima Dockyard Co., Ltd.
Tokai University
Imabari Shipbuilding Co., Ltd.
Naikai Zosen Corporation
Sasebo Heavy Industries Co., Ltd.
Onomichi Dockyard Co., Ltd.
Oshima Shipbuilding Co., Ltd.
Namura Shipbuilding Co., Ltd.
TSUNEISHI SHIPBUILDING Co., Ltd.
Sanoyas Shipbuilding Corporation

■ Objectives

We conducted comparative tests on soundproofing / sound insulation performance and noise propagation performance on experimental laboratories on various noise countermeasures (damping materials, modification of soundproofing materials, floating floor, etc.). For representative countermeasures, by conducting a test and grasping its effect, it contributes to the optimum design of the residential district.

■ Outcome

Vibration and acoustic characteristics (acoustic radiation efficiency, sound transmission loss, vibration insertion loss and vibration transmission loss) of representative countermeasures of vibration suppression type and floating floor type could be confirmed. In addition, we could obtain similar information on the deck structure for post-harvest measures prepared for unforeseen circumstances after sea trial operation.

Research and development on LNG fuel tugboat

■ Participants

Nippon Yusen Kabushiki Kaisha

■ Objectives

This project aimed to build the first domestic LNG fuel tugboat and demonstrate that it is possible to reduce the environmental burden.

■ Outcome

We succeeded in optimizing IGF Code for small ships and development of compact LNG fuel system as well as ensuring design specifications and safety equivalent to those of conventional fuel oil ships.



LNG-fueled Vessel: Sakigake

Research and Development for Practical Use of Main Engine Main Bearing Condition Monitoring Technology (STEP 1)

■ Participants

Asahi Kasei Engineering Corporation
Mitsui O.S.K. Lines, Ltd.

■ Objectives

For the early detection technology of rubbing of the main slide bearing by frequency modulation analysis, this study aimed to carry out the bearing damage test and prove the technology. This is not a spectral analysis method which was mainstream in the state diagnosis of slide bearings, but a high precision state diagnosis method by cepstrum analysis method. Even when installing the sensor, special jigs and drilling work are unnecessary and versatility is high, so it can be expected not only for main bearing but also for other slide bearings (supercharger, propeller bearing etc.).

■ Outcome

By conducting a slide bearing seizure test in the laboratory and obtaining vibration signal data of cepstrum, the correlation between the extent of damage and the signal was confirmed. We verify the usefulness of the present technology in the real machine in STEP 2.

Research on Hull Structures with Newly Developed Highly Ductile Steel to Mitigate Impact Damage and Cargo Loss in Ship to Ship Collision

■ Participants

Imabari Shipbuilding Co., Ltd.
National Maritime Research Institute
Nippon Steel & Sumitomo Metal Corporation

■ Objectives

In order to evaluate the impact of high ductility steel (HDS: Highly Ductile Steel) on the improvement of crashworthiness of collided ships, collision analysis considering applicable range, draft, collision angle, ship speed, etc. was carried out, and steel material performance Evaluation test was also conducted.

■ Outcome

In the case of high ductility steel, it was revealed that the energy absorbed before cracks occurred in the inner plate of VLCC was significantly improved by the elongation itself and the expansion effect of the plasticized area. NK has set a classification code (Hull Protection by Highly Ductile Steel (HP-HDS)) to adopt high ductility steel.

ClassNK in International Affairs

ClassNK maintains active engagement with various organizations in the international maritime industry. ClassNK is an active member of the International Association of Classification Societies (IACS) and played a key role in the development of the Unified Requirements.

ClassNK has authorization from numerous flag states to carry out statutory surveys on their behalf which is a testament of the depth of trust that the Society has been able to build over its 117 year history.



International Maritime Organization

International Maritime Organization (IMO)

As one of its many important international activities, ClassNK contributes to the International Maritime Organization (IMO) on a wide range of technical issues. In 2016, the Society attended the IMO meetings listed to the right as part of the Japanese Government delegation or as a representative of the International Association of Classification Societies.

Information regarding decisions on amendments to Conventions at the major IMO meetings such as Maritime Safety Committee (MSC) and the Marine Environment Protection Committee (MEPC) are regularly provided to ClassNK clients via email and are also uploaded to the IMO International Convention Calendar on the ClassNK website.

- 3rd Session of the Sub-Committee on Human Element, Training and Watchkeeping
- 3rd Session of the Sub-Committee on Pollution Prevention and Response
- 3rd Session of the Sub-Committee on Navigation, Communications and Search and Rescue
- 3rd Session of the Sub-Committee on Ship Systems and Equipment
- 69th Session of the Marine Environment Protection Committee
- 96th Session of the Maritime Safety Committee
- 3rd Session of the Sub-Committee on Implementation of IMO Rules
- 3rd Session of the Sub-Committee on Carriage of Cargoes and Containers
- 70th Session of the Marine Environment Safety Committee
- 97th Session of the Maritime Safety Committee



International Association Of Classification Societies



Association Of Asian Classification Societies

International Association of Classification Societies (IACS)

Technical matters associated with the development and revision of Unified Requirements (UR) and Unified Interpretations (UI) are conducted by five Panels (Hull, Machinery, Safety, Environment and Survey) and the Project Teams under their control. In 2016, ClassNK staff served as the Chair of the Expert Group on IMO Goal Based Standards (GBS) and the Project Manager of the Project Team on Container Ship Safety.

ClassNK, as the Chair of the Expert Group on IMO Goal Based Standards (GBS), led the activities on finalizing IACS Corrective Action Plans for IMO GBS Audit findings or communicating with IMO Secretariat and IMO GBS Audit Team for the smooth conduct of the audit. In addition, ClassNK, as the Project Manager of the Project Team on Container Ship Safety, led the technical activities on the development of unified requirements of structural strength for container ships.

ClassNK participated in the following IACS meetings in 2015 listed below:

| | |
|---|----------|
| Council Meetings | Twice |
| General Policy Group Meetings | Twice |
| Steering Committee Meeting (Strategy of IACS) | Once |
| Quality Committee Meetings | Twice |
| Small Group Meetings (Quality Policy) | Twice |
| Expert Group Meetings (EU, Law, Material and Weldings, etc.) | 7 times |
| Panel Meetings (Hull, Machinery, Safety, Environment, Survey, Cyber) | 11 times |
| Project Team Meetings (CSR Maintenance, etc.) | 9 times |
| Industry Meetings on Emergency Revisions of CSR | Once |

Association of Asian Classification Societies (ACS)

The Association of Asian Classification Societies (ACS) was formed in 2010, following nearly two decades of informal meetings between its members. In 2016, ClassNK led ACS technical activities by actively participating in WGs which were established as a result of the reformation of ACS organization structure. Furthermore, ClassNK also contributed to ACS independent Technical Seminar, and endeavored to strengthen the relations with Asian maritime organizations. ClassNK participated in the following meetings in 2016:

| |
|---|
| 1st Safety Working Group |
| 13th Technical Management Group Meeting |
| 5th Technical Seminar |
| 14th Technical Management Group Meeting |
| 24th Executive Committee Meeting |

Message

2016 at a Glance

Organization Profile

Service Network

Action

Research

International Affairs

Organization List

Organization List

As of 31 December 2016

| OFFICERS | | | |
|---|--|--|--|
| Councillors | Zenshichi Akasaka Katsuyuki Sugimoto Masakazu Nakanishi Makoto Satani Jiro Asakura Kazuo Tsukuda Yasuhiko Katoh Akimitsu Ashida Akihiro Miyasaka Yasumi Kudo Sho Minami Shinji Hayama Koichiro Yoshida Masafumi Yasutomi Takashi Uyeno | Chairman Executive Adviser Former Chairman Former Executive Consultant Director, Chairman Senior Executive Adviser Chairman and Representative Director Counselor Executive Advisor Chairman, Chairman Corporate Officer Company CEO Professor Emeritus Professor Emeritus Chairman Chairman and President | Akasaka Diesels Limited Iino Kaiun Kaisha, Ltd. Japanese Hull Insurers' Union JX Nippon Oil & Energy Corporation Kawasaki Kisen Kaisha, Ltd. Mitsubishi Heavy Industries, Ltd. Mitsui Engineering & Shipbuilding Co., Ltd. Mitsui O.S.K. Lines, Ltd. Nippon Steel & Sumitomo Metal Corporation Nippon Yusen Kabushiki Kaisha Oshima Shipbuilding Co., Ltd. The University of Tokyo The University of Tokyo Tokyo Metro Co., Ltd. Uyeno Transtech Ltd. |
| Members of Councillor Appointment Committee | Tsutomu Aihara Shiro Okuda Shinji Hayama Seiichi Ochiai Hiroshi Itagaki | Former Commandant General Manager of General Affairs Department Professor Emeritus Attorney-at-Law, Professor Emeritus Professor Emeritus | Japan Coast Guard Nippon Kaiji Kyokai The University of Tokyo The University of Tokyo Yokohama National University |
| Directors | Yoshio Otagaki Hideaki Naoi Toyohisa Nakano Yoshikazu Kawagoe Koichi Fujiwara Tetsuya Kinoshita Junichiro Iida Hideomi Otsubo | Representative Director Vice President General Manager, Engineering Division Executive Officer Managing Executive Officer Chairman and President Senior Executive Vice President Executive Vice President Professor Emeritus | Japan Marine United Corporation Kawasaki Heavy Industries, Ltd. Kawasaki Kisen Kaisha, Ltd. Mitsui O.S.K. Lines, Ltd. Nippon Kaiji Kyokai Nippon Kaiji Kyokai Nippon Kaiji Kyokai The University of Tokyo |
| Auditor | Tsutomu Aihara Tetsushi Agata Yasuo Tanaka Yuzuru Fujita | Former Commandant Executive Auditor Senior Managing Corporate Officer Professor Emeritus | Japan Coast Guard Nippon Kaiji Kyokai Nippon Yusen Kabushiki Kaisha The University of Tokyo |
| TECHNICAL COMMITTEE | | | |
| Chairman | Hideomi Otsubo | Professor Emeritus | The University of Tokyo |
| Vice Chairman | Toshiharu Nomoto | Professor Emeritus | The University of Tokyo |
| Members | Hisahiro Oshima Kazuo Kasai Hisayuki Yamada Teruo Yamaura Kaneo Kuboyama Atsushi Komura Toyohisa Nakano Osamu Matsumoto Naoki Ueda Taketsune Matsumura Yoshikazu Kawagoe Tadashi Yoneda Koichi Fujiwara Tetsuya Kinoshita Junichiro Iida Yuji Nomiyama Yasuo Tanaka Atsushi Majima Akihiro Shimizu Shinji Hayama Koichiro Yoshida Hiroshi Itagaki | Director, Managing Executive Officer Director, Managing Executive Officer Technical Executive General Manager, Strategy Planning Dept., Ship & Offshore Division Executive Assistant, General Manager of Plate Business Planning Department Director, Senior Vice President Senior Manager of Initial Design Department, Engineering Division, Ship & Offshore Structure Company Managing Executive Officer Division General Manager, Steel Casting & Forging Division, Iron & Steel Business Senior Chief Engineer, Shipbuilding & Ocean Development, Commercial Aviation & Transportation Systems Director and Managing Executive Officer, General Manager, Ship & Ocean Project Hq. Executive Officer Executive Officer, General Manager Ship Design Sub-division Chairman and President Senior Executive Vice President Executive Vice President General Manager, Head of Div. Place Technology Div. Plate Unit Senior Managing Corporate Officer Director, Acting Chief General Manager, Business & Technical Development Division Forging, Casting & Pressure Vessel Dept. / General Manager Professor Emeritus Professor Emeritus Professor Emeritus | Iino Kaiun Kaisha, Ltd. Imabari Shipbuilding Co., Ltd. Japan Marine United Corporation JFE Steel Corporation JX Ocean Co., Ltd. Kawasaki Heavy Industries, Ltd. Kawasaki Kisen Kaisha, Ltd. Kobe Steel, Ltd. Mitsubishi Heavy Industries, Ltd. Mitsui Engineering & Shipbuilding Co., Ltd. Mitsui O.S.K. Lines, Ltd. Namura Shipbuilding Co., Ltd. Nippon Kaiji Kyokai Nippon Kaiji Kyokai Nippon Kaiji Kyokai NIPPON STEEL & SUMITOMO METAL CORPORATION Nippon Yusen Kabushiki Kaisha Sumitomo Heavy Industries Marine & Engineering Co., Ltd. The Japan Steel Works, Ltd. The University of Tokyo The University of Tokyo Yokohama National University |

BRAZIL TECHNICAL COMMITTEE

| | | | |
|----------|---|---|--|
| Chairman | Mr. Paulo Roberto Neves Bezerra | Shipping | Vale S.A. |
| Members | Mr. Rosalvo S. Sales Jr. Mr. Alexandre Canhetti Captain Carlos José Dias Mr. Frederico Mithio Horigome Mr. Michel P. Andrade Mr. Hiroshi Nishioka Mr. Takuya Fujita Mr. Soichiro Inoue Mr. Renato Albuquerque Vinhas Capt. Paulo Afonso da Cruz Silva Mr. Ricardo B. Portella Mr. Bertoldo Gancz Mr. Toshihiko Tsutsumi Mr. Nilton Gonçalves Mr. Atul Sethi | Director, Business Development & Strategic Planning Director Marine Affairs, Vetting Manager Industrial Design Manager Engineering Manager Executive Director Engineering Senior Staff Officer, Project Division Vice-President LNG Shipping Operational Coordinator, Gas & Energy Vetting Manager Deputy Director, Basic Design Division Director President General Technical Manager - PROMEF Country Manager | Amec KROMAV ECOVIX Empresa de Navegação Elcano S.A. Enseada Industria Naval S/A Estaleiro Atlântico Sul IHI do Brasil Representações Ltda. Kawasaki Heavy Industries, Ltd. Mitsubishi Indústrias Pesadas do Brasil Ltda. PETROBRAS PETROBRAS Projemar Rio Nave Serviços Navais Ltda. SIGMAX TRANSPETRO UP OFFSHORE |

BRITISH COMMITTEE

| | | | |
|----------|--|---|--|
| Chairman | Mr. Michael G. Parker | Chairman | CMA CGM (UK) Holdings Limited |
| Members | Mr. Douglas W. Lang Mr. Christopher Bailey Mr. Sunil Malhotra Mr. John Anagnostopoulos Mr. Epaminondas G.E. Embiricos Mr. Philip D Atkinson Mr. Lars T Ugland Mr. Danny Ungar Mr. John Kerr Mr. Michael K. Drayton Mr. Roine Ahlquist Mr. Alexander Herriot Mr. George Cowan | Managing Director Vice President Operations Chief Operating Officer Managing Director Chairman Technical Director CEO Managing Director Technical Director Former Chairman Managing Director Operations Director Director Technical | Anglo-Eastern (UK) Ltd. BP Shipping Limited British Marine Plc Eastern Pacific Shipping (UK) Ltd. Embricos Shipbrokers Ltd. Graig Shipping Plc LT Ugland Management Ltd. Ray Shipping Ltd. Songa Shipmanagement Ltd. The Baltic Exchange Tufton Oceanic Shipping Management V. Ships UK Limited Zodiac Maritime Ltd. |

CHILE TECHNICAL COMMITTEE

| | | | |
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| Chairman | Mr. Angel Canessa T. | Head of Planning, Controlling and Engineering | Southern Shipmanagement (Chile) Ltda. |
| Members | Mr. Rosauro Segovia Montenegro Mr. Gonzalo Araya Gajardo Mr. Santiago Tapia Carvajal Mr. Francisco Lopez Mr. Luis Bauerle Mr. Hugo Barra Mr. Carlos Contreras Muñoz Mr. Ramon Gatica O. Mr. Pablo E. Caceres Mr. Mogens Mellerup Mr. Carlos Bastías Nercelles | Technical Manager Chief of Maritime Inspections Services Fleet Technical Manager Fleet Senior General Manager, Head Of LPG & Dry Cargo Fleet Fleet Manager General Manager Fleet Head Manager Deputy Fleet Manager Towage Division Senior General Manager, Head of Handysize Operations Operations Manager | Chile National Shipowners' Association DIRECTEMAR Empremar S.A. Humboldt Shipmanagement Naviera Chilena del Pacifico S.A. SOCIBER Sociedad Nacional Maritima S.A. Southern Shipmanagement (Chile) Ltda. Sudamericana Agencias Aereas y Maritimas S.A. Ultrabulk Ultratug Ltda. |

CHINA COMMITTEE

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| Members | Mr. Li Tian Bao Mr. Wang Yongliang Mr. Liu Yifan Mr. Tao Jian Mr. Zhao Zhanjun Mr. Li Zhong Mr. Xu Ziqiu Mr. Lv Yibin Mr. Dong Qiang Mr. Xu Xing Mr. Li Rong Mr. Hou Liping Mr. Gao Yongjun Mr. Li Cheng Mr. Jian Cao Mr. Sun Xing Tao Mr. Henry Chiang Mr. Yang Jian Ming Mr. Han Cheng Min Mr. Wang Hong Mr. Liu Gang | Board Chairman Chairman General Manager, Technology & Information Management Division Vice President, Secretary to the Board Chairman President, Party Secretary, Secretary of Discipline Inspection Commission Assistant President Assistant General Manager Chairman, Secretary of Party Members' Group Deputy Director, Ship & Ocean Engineering Dept. Managing Director Deputy Managing Director Deputy General Manager Vice President Senior VP President President President Chairman General Manager | Bohai Shipbuilding Heavy Industry Co., Ltd Chengxi Shipyard Co., Ltd. China COSCO Shipping Corporation Limited China CSSC Holdings Limited China Ship Design & Research Center Co., Ltd. China Ship News China Shipbuilding Industry Corporation China Shipping Industry Co., Ltd. (CIC) China State Shipbuilding Corporation China State Shipbuilding Corporation COSCO (Nantong) Shipyard Co., Ltd., COSCO (Qidong) Offshore Co., Ltd. COSCO Container Lines Co., Ltd. COSCO International Ship Trading Co., Ltd. Dalian Shipbuilding Industry Co., Ltd Far East Horizon Limited Fortune Ocean Shipping Limited Greathorse Group Jiangsu Ocean Shipping Company Ltd. Nantong COSCO KHI Ship Engineering Co., Ltd. Penglai Zhongbai Jinglu Ship Industry Co., Ltd. Safargo Shipping Pte. Ltd. |

Mr. Zhao Xianfu
Mr. Franco Tian
Prof. Liu Nan
Dr. Liu Jianfeng
Mr. Xu Junfeng
Mr. Li Zhen
Mr. Ren Le Tian

General Manager
General Consultant
Managing Director
Chief Technics Engineer
Deputy General Manager
Assistant President
Deputy General Manager

Shandong Shipping Corporation
Shanghai Anrita Shipping Co., Ltd.
Shanghai Bestway Marine Engineering Design Co., Ltd
Shanghai Waigaoqiao Shipbuilding Co., Ltd.
Sinochem International Logistics Co., Ltd.
Sinotrans & CSC Holdings Co., Ltd.
Yangzijiang Shipbuilding Group Ltd.

CHINA TECHNICAL COMMITTEE

Chairman Mr. Zhao Zhanjun

President

China Ship Design & Research Center Co., Ltd.

Members Mr. Chen Jianping
Mr. Tian Zhengjun

Technical Director
Technical Director

Asia Maritime Pacific (Shanghai) Limited
Avic International Holding Corporation,
Avic-Dingheng Shipbuilding Co., Ltd.
AVIC International Ship Development (China) Ltd.
Bohai Shipbuilding Heavy Industry Co., Ltd.
China COSCO Bulk Shipping (Group) Co, Ltd.
China COSCO Shipping Corporation Limited

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Mr. Bi Jianyi
Mr. Wang Xinquan
Mr. Zhang Yelong

Vice President
Chief Engineer, Senior Research Engineer
General Manager Assistant
Manager, Strategy & Corporate Management Division,
Investment Management Department

China Ship Design & Research Center Co., Ltd.

Mr. Bai Yu Gang

Vice Chief Engineer, Director of Project Development,
Senior Naval Architect

Mr. Yan Jun

Director

Chinese Institute of Marine &
Offshore Engineering HB.Co., Ltd
COSCO Bulk Carrier Co., Ltd.
COSCO Container Lines Co., Ltd.

Mr. Wang Guorong
Mr. Shi Yongxin

Managing Director, Senior Chief Engineer
General Manager / Senior Engineer,
Safety & Technology Management Division

COSCO Shipyard Group Co., Ltd.
CSC Jinling Shipyard
Dalian Chun An Ship Management Co., Ltd.
Dalian Ocean Shipping Company

Mr. Zhan Shuming
Mr. Jiang Jiazhong
Capt. Wang Liang
Mr. Zhao Jin Wen

Chief Engineer
Vice Director
General Manager
General Manager, Senior Chief Engineer,
Safety & Technical Division

Dalian Shipbuilding Industry Co., Ltd.
Dalian Tiger Shipping Ltd.
Guangzhou Ocean Shipping Co., Ltd.
Guangzhou Shipyard International Co., Ltd.

Mr. Yang Wei Zan
Mr. Chen Yu
Mr. Wang Wei Bin
Mr. Mai Rong Zhi

Deputy Technical Director, Senior Engineer
General Manager
Deputy General Manager, Ship Management Division
Assistant President, Vice Chief Engineer,
Technical Center Manager Director

Hudong-Zhonghua Shipbuilding (Group) Co., Ltd.
International Far Eastern Leasing Co., Ltd.
Jiangnan Shipyard (Group) Co., Ltd.
Jiangsu Hantong Ship Heavy Industry Co., Ltd.
Jiangsu Ocean Shipping Co., Ltd.
Marine Design & Research Institute of China (MARIC)
Millennium Maritime Service Co., Ltd
Nanjing Dongze Shipyard Co., Ltd
Nanjing Ocean Shipping Co., Ltd.
Nantong COSCO KHI Ship Engineering Co., Ltd.

Mr. Lou Dan Ping
Mr. Zheng Shijun
Mr. Hu Keyi
Dr. Zhang Leshan
Capt. Peter Chen
Mr. Jin Qiang
Mr. Sun Zhenglin
Mr. Xiong Cheng Gen
Mr. Chen Xiangwang
Mr. Masanobu Harada

Deputy Chief Technical Officer
Vice General Manager, Transportation Business Unit
Technical Director, Technology & Market Development
Technical Director
Deputy General Manager
Deputy Director, Merchant Ship Department
Managing Director
General Manager
General Manager
Vice President,
Senior General Manager of Central Technical Div.

Nantong COSCO KHI Ship Engineering Co., Ltd.
Noble Great Shipping Co., Ltd
Qingdao Beihai Shipbuilding Heavy Industry Co., Ltd
Qingdao Winning International Ships Management
Co., Ltd.

Mr. Mo Zhong Hua
Capt. Wang Rongliang
Mr. Li Yanjie
Mr. Deng Wenpeng

Vice President, Vice Senior General Manager of Technical Div.
General Manager
General Engineer
Vice General Manager, Chief Engineer,
Certified Safety Engineer
Vice Director, Senior Engineer (Professor)
General Manager

Qingshan Shipyard of SINOTRANS & CSC SBICO
Sea Carrier Shipping Co., Ltd.,
Dalian Sea Carrier Co., Ltd.

Mr. Ren Jian
Mr. Yu Hong Bin

Vice General Manager
General Manager
Deputy General Manager, Chief Engineer
Deputy Chief Engineer, Director, Naval Architect,
R&D Department

Shandong Shipping Corporation
Shanghai Costamare Ship Management Co., Ltd.
Shanghai Hai Hua Shipping Co., Ltd.
Shanghai Merchant Ship Design & Research Insti-
tute, CSSC

Capt. Fu Jian
Mr. Shen Xiaodong
Mr. Zhao Peicong
Mr. Wang Gang - yi

Deputy Managing Director, Senior Chief Engineer
Chief Engineer, Senior Engineer
Managing Director, Senior Engineer
Deputy Managing Director
General Manager, Shipping Asset Management Division

Shanghai Ocean Shipping Co., Ltd.
Shanghai Waigaoqiao Shipbuilding Co., Ltd.
Shanhaiguan New Shipbuilding Industry Co., Ltd
Shenzhen Ocean Shipping Co., Ltd.
Sinochem Shipping Co., Ltd. (Shanghai)
SITC Shipping Group
SUMEC Marine Company Limited
Taizhou Kouan Shipbuilding Co., Ltd.
Taizhou Sanfu Ship Engineering Co., Ltd.
Tianjin Xingang Shipbuilding Heavy Industry Co., Ltd.
Yangzijiang Shipbuilding Group Ltd.

Mr. Chang Hua Ming
Mr. Tao Ying
Mr. Gao Fu Quan
Capt. Guan Qing Hui
Mr. Liu Renjie
Mr. Xiao Sen Yuan
Mr. Xu Gang
Mr. Yang Chun
Mr. Yang Yifeng
Mr. Gao Yunqiang
Mr. Du Cheng Zhong

Vice President
General Manager
Director, Vice General Manager
President
Deputy General Manager
Deputy General Manager

DANISH TECHNICAL COMMITTEE

Chairman Prof. Jørgen Juncher Jensen

Professor, Maritime Engineering Fluid Mechanics,
Coastal and Maritime Engineering,
Department of Mechanical Engineering

Technical University of Denmark

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| Members | Mr. P. E. Antonelos Mr. Dimitris Andreadakis Mr. Christos C. Hadjigeorgiou Mr. Dimitrios Athanasoglou Mr. Haris G. Giantzikis Mr. Amir Geva Mr. Nikolaos A. Ioannou Mr. George Laou | General Manager Deputy Technical Manager Managing Director Technical Manager Technical Manager Managing Director Managing Director Managing Director Technical Director | A. M. Nomikos Transworld Maritime Agencies S.A. Allseas Marine SA Almi Marine Management S.A. Anbros Maritime S.A. Arcadia Shipmanagement Co. Ltd ASM Maritime Benelux Overseas Inc. Cardiff Marine |

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| Mr. Demetrios Koukoulas Mr. George Kourelis | General Manager Technical Management Services Dry Division General Manager Technical Management Services Tanker Division | Cardiff Marine Inc. Cardiff Marine Inc. |
| Mr. Eleftherios A. Belessis Mr. Dionisios Kourouklis Mr. Vassilis A. Sarris Mr. George H. Paschalis Mr. Antonios Giantsis Mr. George Kotsyfis Mr. George Alexandridis Mr. Dimitrios A. Alifragis Mr. Pantelis Chondros Mr. Leontios Pitaoulis Mr. Leonidas S. Zogopoulos Mr. Stefanos Georgiou Mr. Dimitrios J. Fafalios Mr. Dimitrios Theodoropoulos Mr. Christoforos E. Andreadis Mr. Manolis Koutlakis Mr. Constantinos Tourlos Mr. Anastasios Kalogiannis Mr. Demitris Vlassopoulos Mr. Dion Theodorou Mr. Takis Koutris Mr. Nick Argyros Mr. Theodosios Varelzidis Mr. Yannis Voulgaris Mr. Kostas Symeonidis Mr. Michael D. Kapsorrachis Mr. Theodoros Pavlidis Mr. Stavros Daniolos Mr. Nikolaos Balalis Mr. Costas Mitropoulos Mr. Evangelos D. Laliotis Mr. Paraskevas Koutsoukos Mr. John N. Ioannidis Mr. Miltos Synefiyas Mr. Frantzeskos D. Kontos Mr. George Hatzivasiliiou Mr. Elias A. Galanopoulos Mr. Michael Anagnostou Mr. Victor Frangoulis Dr. Konstantinos Galanis Mr. Dimitris C. Makris Mr. Ioannis P. Mitsakis Mr. Apostolos P. Gavalas Mr. Diamantis Andriotis Mr. Vassilis I. Peponis Mr. Dimitrios A. Heliotis Mr. Theo G. Baltatzis Mr. Efstathios M. Vazaios Dr. Vasileios Lampropoulos Mr. Nicholas G. Tattos Mr. Nikolaos Arvanitakis Mr. C. Dean Tseretopoulos Mr. Savvas D. Papadatos Mr. Constantinos M. Metaxas Mr. Costas Petsas Mr. Sofoklis Silyvridis Mr. Takis Koutouras | Technical Operations Manager Director Marine Operations Fleet Manager Technical Manager Technical Manager Technical Manager Naval Architect & Marine Engineer, Technical Manager General Manager Technical Manager Technical Manager Technical Manager Technical Manager, Tankers Division Director Chief Executive Officer Technical Manager Director (New Buildings) Fleet Director Technical Manager Technical Manager Technical Manager Managing Director Technical Director Technical Manager Technical Manager Technical Manager Technical Manager Technical Director Senior Vice President – Technical Director Technical Director Naval Architect & Marine Engineer Managing Director & Technical Manager Chief Operating Officer Technical Director Technical Manager - DPA Technical Manager Managing Director Managing Director Director Technical Manager Technical Manager Technical Director Technical Manager Technical Manager Naval Architect & Marine Engineer, NTUA, Technical Director Technical Director, Chief Operating Officer General Manager Technical Manager Chief Operating Officer Director Technical Manager Naval Architect-Marine Engineer, MBA Mechanical Engineer, Special Projects & Claims Manager Technical Manager Fleet Manager (Technical) Technical Manager Technical Manager | Carras (Hellas) S.A. Chandris (Hellas) Inc. Chartworld Shipping Corp. Chian Spirit Maritime Enterprises Inc. Cyprus Sea Lines Co. Ltd. Diana Shipping Services S.A. Dynacom Tankers Management Ltd E. Nomikos Corp. Efnav Company Ltd. Equinox Maritime Ltd Eurobulk Ltd. European Navigation Inc. Fafalios Shipping S.A. Franco Compania Naviera S.A. Golden Union Shipping Co. S.A. Grecomar Shipping Agency Ltd Grecomar Shipping Agency Ltd Iolcos Hellenic Maritime Enterprises Co. Ltd. Ionic Shipping (Mgt) Inc. Konkar Shipping Kristen Marine S.A. Laskaridis Shipping Co. Ltd. Leon Shipping & Trading SA Load Line Marine S.A. Lydia Mar Shipping Co. S.A. Marine Trust Ltd. Metrostar Management Corp Minerva Marine Inc. Navios Tankers Management Inc. NEDA MARITIME AGENCY Co Ltd Niovis Shipping Co. S.A. Paradise Navigation S.A. Pavimar S.A. Pleiades Shipping Agents S.A. Prime Tanker Management Quintana Ship Management Ltd. Regal Mare Inc Roswell Tankers Corp. S. Frangoulis (Ship Management) Ltd Seanergy Maritime Holdings Corp. Springfield Shipping Co. Panama S.A. Stalwart Management Ltd. Starmarine Management Inc. Stealth Maritime Corporation S.A. Sun Enterprises Ltd. Target Marine S.A. Technomar Shipping Inc TEO Shipping Corporation Thenamaris (Ships Management) Inc. Trade Fortune Inc. Transmed Shipping Ltd. Triple Tee International Ltd. Tsakos Shipping and Trading S.A. Union Commercial Incorporated V.Ships Greece Ltd. Vantage Shipping Lines S.A. Z & G HALCOUSSIS Co. Ltd. |

HONG KONG COMMITTEE

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| Members | Capt. Surendra Dutt Mr. Y. Q. Huang Mr. Chen Xin Chuan Mr. Robert Alexander Ho Mr. Andrew Y. Chen Ms. Sandy Chan Mr. Frank W. K. Tsao Mr. C. H. Lee Mr. Jack Hsu Mr. Kwai Sze Hoi Mr. Chanakya Kocherla Capt. Lothair M. F. Lam | Group Managing Director - Tankers Vice President Managing Director President Chairman & Managing Director Managing Director Group Chairman Deputy General Manager, Fleet Management Managing Director Chairman & President Chief Technical Officer Director, Vice President | Anglo-Eastern Ship Management Ltd, Anglo-Eastern Univan Group China Merchants Energy Shipping Co., Ltd. COSCO (H.K.) SHIPPING CO., LTD Fairmont Shipping (HK) Ltd. & Affiliates Grand Seatrade Shipping Company Ltd. Hong Kong Shipowners Association IMC Group of Companies Island Navigation Corporation International Ltd. Oak Maritime (Hong Kong) Inc. Limited Ocean Longevity Shipping and Management Co., Ltd. Pacific Basin Shipping (HK) Ltd. Parakou Shipping Ltd. |

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| | Mr. M. T. Yung Dr. Peter Cheng Mr. Li Hua Mr. Kenneth K.W. Lo Mr. Edward S. C. Cheng Mr. Wellington Koo Mr. David Price | Director, General Manager, Shipping Division Managing Director Executive Director, General Manager Chairman Chairman Executive Director Managing Director | Patt Manfield & Co., Ltd. Peter Cheng Naval Architect & Marine Consultant Ltd. Sinotrans Shipping Limited Teh-Hu Cargocean Management Co., Ltd. Unique Shipping (H.K.) Ltd. Valles Steamship Co., Ltd. Wallem Shipmanagement Ltd. |
| HONG KONG TECHNICAL COMMITTEE | | | |
| Chairman | Dr. Peter Cheng | Managing Director | Peter Cheng Naval Architect & Marine Consultant Ltd. |
| Members | Mr. Marcel Liedts Mr. Alok Roy | Chief Operating Officer Fleet Director | Anglo-Eastern Univan Group Bernhard Schulte Shipmanagement (Hong Kong) Limited Partnership Chellaram Shipping (Hong Kong) Ltd. China Shipping (H. K.) Marine Co., Ltd. COSCO (H.K.) SHIPPING CO., LTD Fleet Management Limited Gold Bridge Shipping Ltd. Goldbeam International Ltd. Hong Kong Ming Wah Shipping Co., Ltd. IMC Shipping and Offshore Tech Services Pte. Ltd. KC Maritime Hong Kong Ltd. Lihai International Shipping Limited Northstar Ship Management Ltd. Orient Overseas Container Line Ltd. |
| | Mr. Aluri Rama Krishna Mr. Liu Yi Fan Mr. Chen Xin Chuan Mr. Kishore S. Rajvanshy Capt. Lau Pong Sze Mr. Y. H. Shum Mr. Zhang Shiwei Mr. Li Kwok Hung Mr. Vipin Sachdeva Capt. Pan Zhong Shan Mr. Haruki Aono Mr. James S. C. Tai | Fleet Manager Deputy General Manager, Senior Engineer Managing Director Managing Director Director Director Deputy General Manager Managing Director Vice President, Fleet Director & General Manager Chairman General Manager -cum- Technical Director, Fleet Management Department Technical Manager Group Chairman & Chief Executive Officer Director, Ship Management Managing Director | Pacific Basin Shipping (HK) Limited Tai Chong Cheang Steamship Co. (H.K.) Ltd. Unique Shipping (H.K.) Limited Univan Ship Management Limited, Anglo-Eastern Univan Group Wah Kwong Ship Management (Hong Kong) Limited |
| | Mr. Harshavardhan Bhawe Mr. Kenneth Koo Mr. Anil Arora Mr. Vikas Trivedi | General Manager | |
| | Capt. W. L. Hung | General Manager | |
| INDIAN COMMITTEE | | | |
| Chairman | Mr. K. M. Sheth | Chairman | The Great Eastern Shipping Co. Ltd. |
| Vice Chairman | Mr. R. L. Pai | Consultant | -Energy, Infrastructure, Logistics, Maritime |
| Members | Mr. H. Ansari Mr. Umesh C. Grover Mr. Ashok K. Srivastava Capt. A. K. Bahl Mr. Ashok V. Chowgule Mr. Madhu S Nair Mr. Ajithkumar Sukumaran Mr. Satish Kumar Capt. Anoop Kumar Sharma Mr. M. P. Dhanuka Mr. Anil Devli Mr. Dilip Mehrotra Mr. Atul J. Agarwal Mr. S. Govindraj | Visiting Professor (Insurance) Advisor Chief Executive Officer President (Shipping) Executive Director Chairman & Managing Director Dy. Chief Surveyor cum Senior Dy. Director General(Tech) Managing Director Managing Director Executive Director, Technical & Marketing Chief Executive Officer Secretary Managing Director Managing Director | Allcargo Logistics Limited Arcadia Shipping Ltd. British Marine Plc Chowgule and Company Private Limited Cochin Shipyard Limited Directorate General of Shipping Dockendale Ship Management (India) Pvt. Ltd. Essar Shipping Limited GEE Limited Indian National Shipowners' Association IOMOU Secretariat GOA Mercator Limited Progressive Shipping Consultancy Services (PVT) Ltd. Smart Engineering and Design Solutions Ltd. The Shipping Corporation of India Ltd. Tolani Shipping Company Limited |
| | Mr. Antony Prince Mr. Arun Kumar Gupta Dr. Sujata Naik Tolani | President Ex. Chairman & Managing Director Chairperson | |
| INDIAN TECHNICAL COMMITTEE | | | |
| Chairman | Mr. R. L. Pai | Consultant | -Energy, Infrastructure, Logistics, Maritime |
| Members | Mr. Ashok Kumar Sharma Mr. Pradeep Bajpai | Senior Superintendent - Training Fleet Director | Anglo-Eastern Maritime Training Centre Bernhard Schulte Shipmanagement (India) Private Limited Cochin Shipyard Limited Cochin University of Science and Technology (CUSAT) |
| | Mr. Sunny Thomas Dr. Dileep Krishnan | Director Technical & Operations Associate Professor & Consultant, Department of Ship Technology | Colombo Dockyard PLC Dockendale Ship Management (India) Pvt. Ltd. Essar Oilfields Limited Essar Shipping Limited Fleet Management India Pvt. Ltd. Indian Maritime University(IMU) |
| | Mr. D. V. Abeyasinghe Capt. B. N. Singh Mr. Rajeev Nayyer Mr. Ranjit Singh Mr. Brahma Mall Dr. S. C. Misra Mr. R. B. Urikouth Mr. Maneesh Jha Mr. Hariraj P. Capt. H. S. Swaminathan | Managing Director / Chief Executive Officer General Manager Chief Executive Officer Chief Technical Officer, Sea Transportation Business Vice President Professor, Ex-Director Vice President (Commercial Ship Building) Principal General Manager Director | Larsen & Toubro Limited Samundra Institute of Maritime Studies Smart Engineering and Design Solutions Ltd. Synergy Maritime Private Limited |

| | | | |
|----------------------------------|---|--|---|
| | Mr. Ajoy Chatterjee Mr. David Birwadkar Mr. Indra Nath Bose Mr. Virendra Gharat | Principal & Head Vice President - Training & Assessment Head – Vessel Performance Management Director (Technical) | The Great Eastern Institute of Maritime Studies The Great Eastern Shipping Co. Ltd.(GESCO) The Great Eastern Shipping Co. Ltd.(GESCO) Tolani Shipping Company Limited |
| INDONESIA COMMITTEE | | | |
| Chairman | Mr. Widihardja Tanudjaja | President Director | PT Brotojoyo Maritime |
| Members | Mr. Antonius W. Sumarlin Ms. Carmelita Hartoto Mr. Praditya Nirtara Mr. Kevin Wong Mr. Ir. Tjahjono Roesdianto Mr. Riry Syeried Jetta Mr. Theo Lekatompessy Mr. Krisman Bahar Mr. Stephen Layarda Mr. Kasim Arifin Mr. Amir Gunawan Mr. Yance Gunawan Mr. Hendrato Mr. H. Soenarto Mr. Joeswanto Karijodimedjo Mr. Rachmat Koentjoro Mr. Henry Djuhari Mr. Frank Menaro Mr. M. Firmansyah Arifin Mr. Benny Winarto Mr. Ganny Zheng Mr. Handara A. Utomo Mr. Johnson W. Sutjipto Capt. Sahattua P. Simatupang Mr. Asmari Herry | Ex-President Director of PT Humpuss Intermoda Transportasi Tbk President Director Managing Director & CEO President Director Director CEO President President Director Managing Director President Director President Director President Director General Manager, Liner Division President Director President Director President Director President Director Asset Director President Director President Director & CEO Director Chief Operating Officer Commissioner Director of Marine Safety and Seafarers Executive Director & CEO | PT Andhika Lines PT Andhika Lines PT Buana Listya Tama Tbk PT Daya Radar Utama PT Dok Dan Perkapalan Surabaya PT Humpuss Intermoda Transportasi Tbk PT Indobaruna Bulk Transport PT. Alpha Pacific Lines PT. Bumi Perkasa Bahtera PT. Daya Radar Utama PT. Dumas Tanjung Perak Shipyard PT. Gesuri Lloyd PT. Gurita Lintas Samudera PT. Janata Marina Indah PT. Lumoso Pratama Line PT. Meranti Maritime PT. Meratus Line PT. PAL Indonesia PT. Pelayaran Caraka Tirta Perkasa PT. Pelayaran Tirtamas Express PT. Soechi Lines Tbk. PT. Wintermar Offshore Marine Tbk Director of General of Sea Transportation Republic of Indonesia Samudera Shipping Line Ltd |
| KOREA COMMITTEE | | | |
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| KOREA TECHNICAL COMMITTEE | | | |
| Chairman | Dr. Jeom Kee Paik | Professor | Department of Naval Architecture and Ocean Engineering at Pusan National University and Department of Mechanical Engineering at University College London |
| Members | Mr. Myeong Sil, Lee Mr. Sun-Taek Lee Mr. Je-Hyouk Woo Mr. ManSoo Kim Mr. Okhyeon Ryoo Mr. Cha-Soo Lee Mr. Park, Kun-woo Mr. Kim, Hyung Kwan Mr. Ohmin Ahn Mr. Taeg-Gyu Lee Mr. Kim Tae-wook Mr. Jae Deog, Go Dr. Choi, Jae-Sung Mr. Seung-Woo, Lee Mr. Myeong-Su Kim Mr. Sungho Ha Mr. Hangdok (Harry), CHO | General Manager, Hull Design Department Vice President, Integrated Design Team Vice President, Structure Design Division Leader President & CEO Division Executive Ship Management, Business Division 1 Technical Director, Ship Sales Engineering Team 3 Deputy Managing Director, Design Division Senior Vice President, Naval Architect, Initial Design Office, Shipbuilding Division Vice President, Ship Design Office, Shipbuilding Division President Senior Vice President, Head of Design Office Executive Vice President, Marine Division Professor, Division of Marine Engineering College of Maritime Sciences Managing Director, Marine Affairs Division Vice President, SM Division Vice President, Structure Engineering Team 2 Vice President, Head of Fleet Management Division (D.P) | Dae Sun Shipbuilding & Engineering Co., Ltd. Daewoo Shipbuilding & Marine Engineering Co., Ltd. Daewoo Shipbuilding & Marine Engineering Co., Ltd. DSEC Co., Ltd. Eusu ShipManagement Co., Ltd. Hanjin Heavy Industries & Construction Co., Ltd. HHIC-TMS Co., Ltd. Hyundai Heavy Industries Co., Ltd. Hyundai Heavy Industries Co., Ltd. Hyundai Ocean Service Co., Ltd. Hyundai Samho Heavy Industries Co., Ltd. KLC SM Co., Ltd. Korea Maritime and Ocean University KSS Line Ltd. POS SM Co., Ltd. Samsung Heavy Industries Co., Ltd. SK Shipping Co., Ltd. |

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|---------------------------------|---|---|--|
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 Managing Director
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 Managing Director
 Managing Director, Chief Operating Officer
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 General Manager, Technical Division
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 CPC Corporation, Taiwan
 CSBC Corporation, Taiwan
 Deryoung Maritime Co., S.A.
 Eastern Media International Corporation
 Evergreen Marine Corp. (Taiwan) Ltd.
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 Franbo Lines Corp.
 Glory Navigation Co., Ltd.
 Hsin Chien Marine Co., Ltd.
 Kuang Ming Shipping Corp.
 Mingtai Navigation Co., Ltd
 Shih Wei Navigation Co., Ltd.
 Sincere Industrial Corporation
 Sincere Navigation Corporation
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 Taiwan Navigation Co., Ltd.
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 Manager, Ship Building Section,
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 Formosa Plastics Marine Corporation
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 Hsin Chien Marine Co., Ltd.
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 Mingtai Navigation Co., Ltd.
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Message

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Action

Research

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Organization List

CLASSNK Annual Report

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