

# ClassNK

MAGAZINE 64th Edition

SPECIAL ARTICLE

## *Certification for ECDIS training*

**Technical Essays**

*Research Studies to Install Existing Vessels  
with Ballast Water Management Systems*

*ClassNK's Initiatives for  
the Safe Carriage of Nickel Ore*

*Practical Use of LNG Fuelled Ships and ClassNK Activities*

**Story from the Sea**

*A Greener and Safer Future*

**ClassNK Around the World**

**Focus on Japan**

**Topics and Events**





Chairman and President **Noboru Ueda**

A handwritten signature in black ink, appearing to read 'N. Ueda'.

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## Welcome to the 64th edition of the ClassNK Magazine

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While it is always a great honor for me to welcome you to the ClassNK Magazine each year, this year is a particular highlight as in 2012, ClassNK became the first classification history to have more than 200 million gross tons on its register. Besides this historical achievement, this year we also celebrate the 50th Anniversary of both our London and New York Offices which were the first offices ClassNK opened outside of Japan.

Since our founding 113 years ago, ClassNK has grown to the point that it is today the undisputed largest classification society in the world. Our ongoing success is without a doubt directly related to its increasing internationalization, and it is also thanks to the support and cooperation of all our clients and partners worldwide, as well as the deep trust of the global maritime industry that ClassNK was able to reach this historic milestone.

In addition to classification related services, ClassNK is, as always, dedicated to cutting-edge research and development to contribute to an ever safer and greener maritime sector. In recent years, in order to respond to the various needs of clients working in the maritime industry, ClassNK has expanded our operations to the “soft” side of the maritime industry by offering a wider range of services in various fields including certification of maritime education & training courses.

This year's ClassNK magazine not only highlights the 50th Anniversary of the ClassNK Office in London, but also includes three Technical Essays exploring our latest research, guidelines, and services.

The first article highlights some of ClassNK's latest research on retrofitting Ballast Water Management Systems (BWMS) on existing vessels, which are an area of increasing concern in the maritime industry as new regulations for BWMS are expected to enter force over the next few years.

The second essay discusses our new Guidelines for the Safe Carriage of Nickel Ore. Nickel Ore has been called the deadliest bulk cargo and the liquefaction of Nickel Ore has been linked to numerous casualties over the past few years. These new guidelines provide not only operational best practices, but also lay out new construction standards to ensure that this cargo can be carried safely.

The third and final technical essay details ClassNK's new “Guidelines for Gas Fuelled Ships”. As regulations curbing atmospheric pollution and greenhouse gas emissions grow stricter amid stronger calls for a greener shipping industry, attention is turning to the potential for natural gas as a cleaner alternative to heavy fuel oil. The article goes in depth to describe the new guidelines and how they are contributing to a safer and greener shipping industry.

Following these three Technical Essays, is an article on our new certification service for ECDIS training courses. Electronic Chart Display and Information Systems, or ECDIS, are important nautical instruments which can not only contribute to more efficient operations but also greatly enhance ship safety.

From July 2012, new regulations requiring ECDIS to be installed on all vessels engaged in international operations will be gradually implemented, and shipmasters and navigation officers will need to become proficient in ECDIS operations. As a result, demands for ECDIS training have drastically increased.

As the demand for ECDIS training has increased, so too has the demand for third-parties to certify the contents and quality of those training programs, and in response to this need ClassNK began providing such certification services last year. ClassNK certification confirms that the training is carried out in accordance with the IMO's model course and we hope that it will become a de-facto

standard for the industry and contribute to safer ships seas.

Following the Technical Essays, the Story from the Sea feature discusses the latest developments of the Green Award Foundation.

The main objective of the Green Award Foundation is to promote the safe and environmentally friendly operation of ships by providing incentives for high quality ships. The article looks at how the Foundation is working to encourage greater CSR (Corporate Social Responsibility) activities on a global scale.

The Magazine then turns to our London Office, the focus of our ClassNK around the World feature. Relive the history of the City of London as we celebrate the 50th anniversary of our London Office, the oldest of ClassNK's offices outside of Japan.

ClassNK Magazine concludes with our "Focus on Japan" which introduces the wonderful city of Tokyo "from the ocean to the sky". The article looks at many aspects of Tokyo, including its newest popular attraction, the Tokyo Skytree, as well as a key new development for the future of the Port of Tokyo, the Tokyo Gateway Bridge.

Finally, I would like to once again thank all of our clients around the world for their continued partnership and support of ClassNK and our activities. I hope you enjoy this year's edition of the ClassNK Magazine.

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# Research Studies to Install Existing Vessels with Ballast Water Management Systems

## 1. Outline of Research Studies

There are still various technical points that remain unknown concerning the installation of ballast water management systems on existing ships, and those problematic points need to be cleared before installation starts for numerous vessels. Therefore, the Society is working on collaborative research with the cooperative association of Japan Shipbuilders implementing an inspection of 13 types of ballast water management systems with an assessment of their handling, abilities and features, performing evaluation tests on 11 ships, with two types of equipment installed on each. The type of ship and equipment used are described in Table 1. Furthermore, when tests started in March 2010, the management systems chosen have been approved by G8 or are almost meeting the required conditions.

Table 1 Type of vessel and management system.

Type of vessel	DWT	Ballast Water Quantity (m <sup>3</sup> )	Ballast Water Management System ①	Ballast Water Management System ②
General Cargo Ship	6,700	1,200	Electro-Clean	NK-O3 Blue Ballast
Bulk Carrier	32,000	14,100	NK-O3 Blue Ballast	Electro-Clean
Container Carrier	845TEU	4,400	JFE BallastAce	Hyde GUARDIAN
Container Carrier	2,500TEU	14,000	Electro-Clean	ClearBallast
Refrigeration Ship	380KCF	900	PureBallast	Electro-Clean
LPG Ship	3,800	1,600	SEDINOX	Hyde GUARDIAN
Chemical Tanker	4,000	1,200	UNITOR BWTS	Optimarin
Chemical Tanker	14,200	4,200	GloEn-Patrol	Ocean Saver
Chemical Tanker	25,000	10,400	GloEn-Patrol	JFE BallastAce
Product Tanker	39,800	19,000	NK-O3 Blue Ballast	JFE BallastAce
Product Tanker	50,000	18,900	CleanBallast	VOS System

## 2. Study Items for Design Testing

When installing a ballast water treatment system, the ballast water treatment system has to be chosen first, therefore, the following points have to be mentioned as topics that should be discussed.

1. Is there certified equipment matching the processing power of the vessel?
2. Is there enough space to install the treatment equipment?
3. Is there no problem with the generator capacity for operations related to ship's equipment, and especially the ballast pump?
4. Can such a system be installed regarding costs which includes initial, maintenance, supply, etc.?
5. Are there any items that would affect vessel's shape (vessel's course and water used for equipment)?
6. The degree of impact on vessel's existing equipment.

If these types of designs are not carried out under actual conditions, the answers regarding these questions cannot be completely certain. In the design trials an examination regarding these topics was carried out.

## 3. Methods of Ballast Water Management

During these trial designs 13 types of treatment equipment that differ in their structural method of ballast water management were used. The methods are described below. However, while some equipment is used alone, others are combined mechanisms of different equipment. In cases of combined installation, equipment using filters are numerous.

### ◎ Treatment Methods

Filter, Caption, Electrolysis, Chemicals, Ozone Gas, Inert Gas, Ultraviolet, Photocatalyst, Centrifugal Separator and Coagulation-Magnetic Separation.

### ◎ Combination Examples

- Filter + Electrolysis
- Filter + Ultraviolet
- Electrolysis + Centrifugal Separator



Container ship discharging Ballast Water.

## 4. Features of each Ballast Water Management Methods

In the inspection and trial designs of the Treatment Equipment, greater knowledge was obtained regarding the size of subject ships, the type of ship and treatment system. The details on the results are not given here; however, the different methods of ballast water treatment, the features described in Table 2 are given.

Table 2 Knowledge obtained by inspection and trial designs regarding features of ballast water treatment methods.

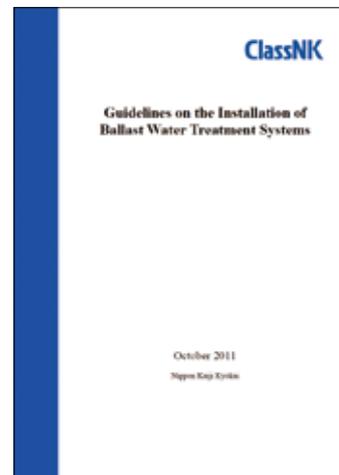
Treatment Method	Features
Filter	<ul style="list-style-type: none"> <li>• Many models can be distributed</li> <li>• Release system</li> <li>• Removal of large marine species possible</li> <li>• Models with additional pump for filter cleaning available</li> <li>• Suppression of waste and sediments in the tank possible</li> <li>• Models that can change to larger size available</li> </ul>
Electrolysis	<ul style="list-style-type: none"> <li>• Many models can be distributed</li> <li>• Release system required for models generating hydrogen</li> <li>• If TRO is under regulations no management needed during water evacuation.</li> <li>• Model available with limit in salinity concentration in treated water</li> </ul>
Ultraviolet	<ul style="list-style-type: none"> <li>• Numerous models with simple structure</li> <li>• Models with high electricity consumption</li> <li>• No chemical used</li> <li>• Periodic change of lamp required</li> </ul>
Chemicals	<ul style="list-style-type: none"> <li>• Low electricity consumption</li> <li>• Periodic supply of chemicals necessary</li> <li>• Variation of chemical concentration degree allowing compliance with strict regulation</li> <li>• Storage location in the ship necessary</li> </ul>
Inert Gas	<ul style="list-style-type: none"> <li>• Low electricity consumption</li> <li>• Separated gas piping system necessary for all WBT</li> <li>• Results of rust prevention due to hypoxia</li> <li>• Recovery of oxygen concentration necessary during water evacuation</li> </ul>
Ozone Gas	<ul style="list-style-type: none"> <li>• No pressure loss</li> <li>• Installation space and electricity consumption high for small capacity type</li> <li>• No need to change existing ballast pipes</li> <li>• Safety Inspection on gas needed</li> </ul>
Coagulation-Magnetic separation	<ul style="list-style-type: none"> <li>• No mud accumulation due to suppression of marine species</li> <li>• Size of equipment is big</li> <li>• No management needed during water evacuation</li> <li>• Magnetic supplies etc, needed</li> </ul>
Centrifugal separator	<ul style="list-style-type: none"> <li>• Low electricity consumption</li> <li>• Loss of pressure is big</li> <li>• No management needed during water evacuation</li> <li>• Limited height due to treatment method</li> </ul>

## 5. Conclusion

ClassNK and its subsidiary ClassNK Consulting Service are implementing the services mentioned below after considering the information and the knowledge obtained during these trial designs.

- Consulting service for the selection of ballast water treatment system.
- Support of inspection for installation of ballast water treatment system.
- Inspection and support for the creation of a management plan of ballast water
- Issuance of a certification for installation of ballast water treatment system.
- Attribution of a classification BWTS code for ships having installed a ballast water treatment system.

For further information on the above content please contact ClassNK Marine and Industrial Service Department or the ClassNK Consulting Service Co.



Ballast Water treatment guidelines.



"SUNNY JOY" obtained a certification based on the IMO's ballast water convention.

# ClassNK's Initiatives for the Safe Carriage of Nickel Ore

## 1. Introduction

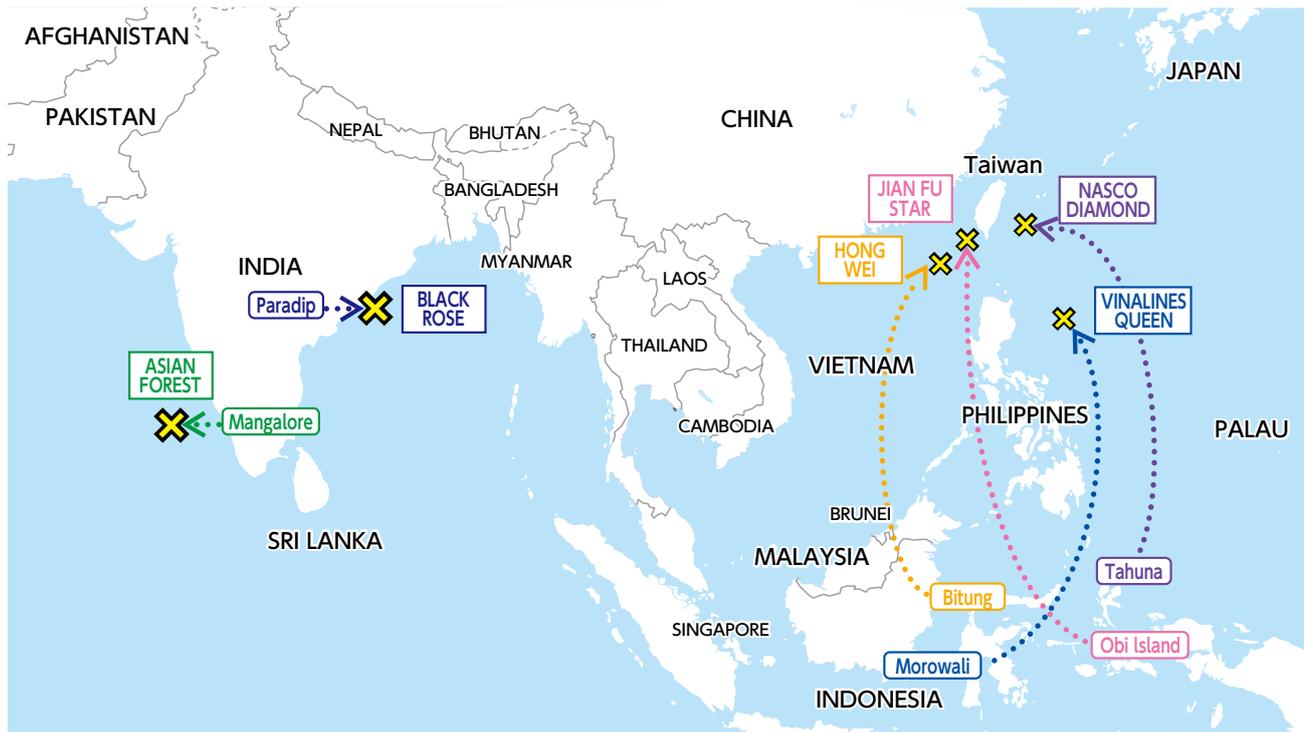
In recent years, the liquefaction of cargo during the transportation of Nickel Ore is reported to be the principal cause of serious marine accidents. As we can see a growing interest for safe carriage of this type of cargo, there is a strong demand for the drawing of more unified safety guidelines. (Table 1 & Map 1)

Table 1 Information related to ships that sank after cargo liquefaction since 2009

18/7/2009	M/V "ASIAN FOREST" loaded with Iron Ore fines sank in the Arabian Sea in Western India just after leaving the Indian port of Mangalore.
9/9/2009	M/V "BLACK ROSE" carrying Iron Ore fines sank in Eastern India coast just after leaving the Indian port of Paradip.
27/10/2010	After leaving port, M/V "JIAN FU STAR" loaded with Nickel Ore in the Indonesian port of Obi Island sank in Southern Taiwan.
4/11/2010	After leaving port, M/V "NASCO DIAMOND" loaded with Nickel Ore in the Indonesian port of Tahuna sank off Okinawa Coast.
3/12/2010	After leaving port, M/V "HONG WEI" loaded with Nickel Ore in the Indonesian port of Bitung sank in Southern Taiwan.
25/12/2011	M/V "VINALINES QUEEN" loaded with Nickel Ore in the Indonesian port of Morowali sank off Okinawa Coast.

From the end of 2010 to the end of 2011, for a period of approximately a year, four ships capsized and sank due to a loss of hull stability attributed to the liquefaction of cargo. Those ships were M/V "JIAN FU STAR", M/V "NASCO DIAMOND", M/V "HONG WEI" and M/V "VINALINES QUEEN", with each of those having departed from the Indonesian ports of Obi Island, Tahuna, Bitung and Morowali. A total of 66 crew members killed in those tragedies are still fresh in our memories.

After learning from such various marine accidents and due to the growing interest of the international community concerning the carrying of Nickel Ore and other so-called "cargoes presenting a risk of liquefaction", as of July 2012, basic precautions have been proposed in the regulations for all types of ships and the documents warning on this subject, among others (see Guidelines attached in appendix E). Proposals include: assuming that the moisture value of the transported cargo is thought to be less than the allowable moisture limit, verify the information on re-handling when the cargo is semi-loaded, verify the information on the cargo before loading, perform a second validation test regarding the moisture value of



Map 1 Sinking sites of ships that capsized and sank caused by cargo liquefaction since 2009

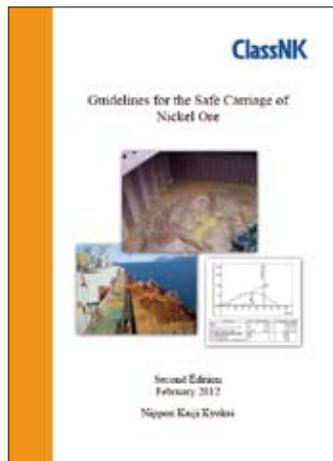


Fig. 1 Guidelines on Nickel Ore Carriage

the cargo that could have changed in case of rain, etc. Based on the conditions mentioned above, the Society has expectations on the application of those safety guidelines during loading and carrying operations of Nickel Ore. The loading requirements defined by the IMSBC code (order of the loading procedures / technical requirements) and the knowledge obtained from past notes and recommendations during these operations have been comprehensively summarized in the first edition of “Guidelines for the Safe Carriage of Nickel Ore” released in May 2011. In those guidelines, a real effort has been made to distinguish trustable and reliable vessels carrying Nickel Ore by providing services such as the “Operation Appraisal” for vessels recognized as properly implementing the various recommendations.

On the other hand, with the IMSBC code, even in the case of “specialized ships, or cargo ships with special equipment or ships having on board a certification document delivered by local administration” (Ref. IMSBC Code 7.3.2.2) liquefied cargo may exceed the permissible moisture level. The cargo vessels referred here as “specialized” or “with special equipment” are vessels having a boundary structure limiting the movement of goods or vessels considered to be satisfying the appropriate criteria on hull strength and stability, however, no international requirements have been specified so far.

Therefore, in the second version of guidelines mentioned above, released in February 2012 (Fig. 1), in addition to the content of the first version, understandable tests regarding the properties of Nickel Ore when moisture value exceeds the allowable limit, and the appropriate criteria for hull strength and stability based on those

results have been newly published, so it can be used as an index for all countries’ administration when they deliver certification for a vessel specialized in Nickel Ore transport. Furthermore, the Society is providing the “issuance of certification of Nickel Ore carrying ship” for vessels satisfying criteria on ship hull strength and stability.

In this publication, along with a presentation on second edition overview, a description is given on ClassNK’s further efforts to the implementation of vessels specialized in Nickel Ore carrying, aiming at its safe transportation in.

## 2. Guidelines second edition outline

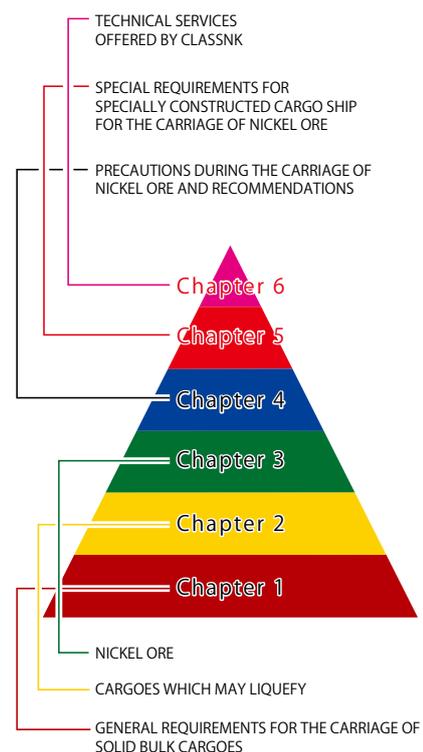


Table 2 Composition of second edition guidelines (chapters indicated in red are section added / rectified from the first edition)

In the first edition, the principal objective was to prevent liquefaction by providing notes, recommendations and technical service during operations, and to further deepen understanding related to this topic. Explanations concerning basic knowledge (general requirements set by IMSBC code, risks related to Nickel Ore carriage /



Fig. 2 Nickel Ore which liquefied incargo space during voyage

actual conditions of carriage, etc.) were hierarchically based and composed of five chapters.

In the second edition, following this configuration, a sixth chapter has been added after additions and rectifications regarding special requirements for vessels specialized in Nickel Ore carriage (5th chapter) or the vessels meeting those requirements provide a technical service (6th chapter) (Table 2). Concerning the details, they will be omitted by referring to the actual guidelines, and for each chapter mentioned below we will give a brief presentation on the overview.

**2.1 Chapter 1 General requirements for the carriage of solid bulk cargoes**

The requirements concerning the “carriage procedures” stipulated in the IMSBC code have been briefly organized after being changed into a flow chart. As a result, this method allows a clear understanding of the information and documents needed for a scheduled cargo loading.

- Chap.1.1 Transportation Procedures According to the IMSBC Code
- Chap.1.2 Cargoes Listed in Appendix 1 of the IMSBC Code (Ref. IMSBC Code 1.2 and 4.2.2)
- Chap.1.3 Cargoes Not Listed in Appendix 1 of the IMSBC Code (Ref. IMSBC Code 1.3)

**2.2 Chapter 2 Cargoes which may liquefy**

In continuation of Chapter 1, regarding the transportation procedures for “cargoes which may liquefy” according to the IMSBC Code, along with definitions and technical terms this chapter introduces the two cases in which the Moisture Content (MC) is inferior or superior to the Transportable Moisture Limit (TML). Furthermore, regarding the typical assessment method of TML established in appendix 2 of IMSBC Code, this method is inserted as appendix A of these guidelines.

- Chap.2.1 Definition of Cargoes which may Liquefy According to the IMSBC Code
- Chap.2.2 Characteristics of Cargoes which may Liquefy
- Chap.2.3 Moisture Content, Transportable Moisture Limit (Guidelines Appendix A attached)
- Chap.2.4 Provisions for Cargoes which may Liquefy

**2.3 Chapter 3 Nickel Ore**

Concerning Nickel Ore which was treated as the cargo subject of the first edition of guidelines (Fig. 2),

focus on special features and the actual situation of transportation not defined by IMSBC Code, with the intention of increasing awareness towards the potential dangers related to this type of cargo has been introduced.

- Chap.3.1 Features of Cargo
- Chap.3.2 Properties of Cargo
- Chap.3.3 Main Cargo Loading Countries
- Chap.3.4 Actual Circumstances Reported during Loading

**2.4 Chapter 4 Precautions during the carriage of Nickel Ore and recommendations**

A precondition for the transport of Nickel Ore is not to load cargo with MC over the TML. On the other hand, this chapter warns on measurement errors, environmental conditions during voyage and other factors that could cause liquefaction even if the MC is less than the TML and after dividing each step into “Assignment of the Ship”, “Before Loading”, “Loading Operation” and “During Voyage”, it introduces measures concerning important points recommended to be followed during operations. Furthermore, in order to be able to use these recommendations during actual voyage, a sample of checklist is attached as appendix B of these guidelines.

- Chap.4.1 General
- Chap.4.2 At Assignment of Ship
- Chap.4.3 Before Loading
- Chap.4.4 At Loading Operation
- Chap.4.5 During Voyage
- Chap.4.6 Check List

**2.5 Chapter 5 Special requirements for specially constructed cargo ship for the carriage of Nickel Ore**

Notwithstanding the provisions of chapter 4, the transportation of Nickel Ore having moisture content over the transportable moisture limit is permitted only for specialized ships or cargo ships with special equipment, and having on board authorization issued by local administration of the ship’s country. Therefore, in this chapter, hull structural strength and stability requirements have been newly published to serve as index when receiving the certification as a cargo specially constructed for Nickel Ore carriage from the local administration of the ship’s country. Furthermore, concerning these new requirements measures, by implementing laboratory tests with Nickel Ore sample and distinct element method simulation (Fig. 3) as the appendix C of these guidelines (Table 3 and Fig. 4) sufficient assurance has been gained concerning the validity and rationality.

**Chap.5.1 General (Ref. Guidelines Appendix C)**

**Chap.5.2 Stability Requirement**

**Chap.5.3 Hull Structural Requirement (Ref. Guidelines Appendix D)**

Table 3 List of laboratory tests using Nickel Ore sample.

Test	Outline of Test
Weight Penetration Test	After added vertical vibration, penetration amount of a weight is measured and changes to properties due to vibration was investigated.
Rolling Test	A container which has the sample inside is rolled with a rolling test machine, and behavior of the sample in the container is observed. Test is carried out with various moisture content samples.
Static Inclining Test	A container which has the sample inside is statically inclined, and behavior of the sample is observed. Test was carried out with the various moisture content sample.
Tri-axial Compression Test	A test for measurement of strength of soil property. Shear resistance and cohesion of the samples is calculated from results of the test.



Static Inclining Test



Tri-axial compression Test



Fig. 3 Distinct element method simulation

Fig. 4 Appearance of testing equipment



Weight Penetration Test



Rolling Test

**2.6 Chapter 6 Technical services offered by ClassNK**

In the first edition, in order to plan the distinction between ships that can carry out the operation as appropriate and those that cannot, the Society provided two technical services as part of its assessment operations which were the “Title of approved Operation Manual” and the “Issuance of an Appraisal Document”. In addition to these services, for ships that met the requirements stipulated in chapter 5, and as part of the assessment operations to certify a vessel specially constructed for Nickel Ore carriage three new services will now be provided: the “Approval of related plans”, the “Issuance of an Appraisal Document” and the “Attribution of a Special Notation”. This chapter introduces all necessary documents, and the order of procedures (including basic approval) for each application related to assessment certifications.

**Chap.6.1 Application**

**Chap.6.2 Application for Approval**

**Chap.6.3 Documents to be submitted**

**Chap.6.4 Procedures for obtaining approval**

### 3. ClassNK's efforts towards the creation of cargo ships specially constructed for the carriage of Nickel Ore

As it has been said so far, having the duty to guarantee safety during the carriage of Nickel Ore, the Society has compiled on its own the “Operation to prevent liquefaction of Nickel Ore” and the “special requirements for loading of Nickel Ore with risk of liquefaction due to a moisture content above the limit approved for transportation” into guidelines related to the carriage of Nickel Ore.

On the other hand, regarding the creation of a cargo ship specially constructed for Nickel Ore carriage, it is necessary for the flag state's administration to recognize the requirements defined by the Society as the Industry Index when they deliver the approval certification (Ref. IMSBC Code 7.3.2.2) for cargo ships specialized in Nickel Ore carriage. For this reason, the Society has actively performed technical explanations to those flag state administration before the release of the second version, and on the 17 October 2011, the Panamanian



Fig. 5 Part of the article on the certification for cargo ships specially constructed for Nickel Ore carriage (Source Tradewinds)

Government approved the first specialized vessel for carriage of Nickel Ore, a 27,200 dwt open-hatch bulk carrier (Fig. 5). Using this case as an example, as of April 2012, voices of support have been given by the Governments of Japan, Panama, Liberia and Marshall Islands for the issuance of approval certificates (Table 4). ClassNK's aim is to reach an even greater normalization of this procedure. As technical explanation for other flag states are planned as required, please contact the Society to get information on the latest conditions.

Table 4 List of laboratory tests using Nickel Ore sample

Country	Outline
 Japan	From 21 March 2012, after rectification on the part of the information for inspections on special cargo ships related to the new requirements for cargo ships specialized in Nickel Ore carriage defined by the Society, certification will be delivered by Regional Transport Bureau of the Ministry of Land, Infrastructure and Transport.
 Panama	On 17 October 2011 issuance of certification for a specialized ship was approved. The new requirements having also been approved, the certifications will be delivered by the Panamanian Government from now on.
 Liberia	Last preparations are underway after the acceptance of the Society's Certificate and the approval of new requirements and the assignment of a delegated authority.
 Marshall Islands	Same as Liberia.

### 4. Conclusion

After more than a year and a half with Nickel Ore as one of its main issues, the Society has completed its “Guidelines for the Safe Carriage of Nickel Ore”, and continues to actively work on the creation of cargo ships specialized in the carriage of Nickel Ore. To respond demands from the industry, those guidelines contain graphic examples of laboratory tests and if their use can help as a tool allowing safer carriage of Nickel Ore, it would be more than appreciated.

Furthermore, the matter not being limited to Nickel Ore but also Iron Ore on which an increasing interest can be witnessed, it is clear that carriage of cargo with a risk of liquefaction is a topic of international level. In the near future, after results of IMO meetings, a global reform of requirements will be conducted. Consequently it would be hard to deny that to load such cargoes will be forbidden for ships that were allowed to do it so far. But even in these kinds of conditions, the Society always considers minimizing the impact on related industries with the intention to find and develop reasonable safety guidelines ahead of other institutions.

# Practical Use of LNG Fuelled Ships and ClassNK Activities

## 1. Introduction

In recent years, industries related to marine activities are actively conducting studies on gas fuelled ships with the objective of reducing the burden on the environment. So far, LNG fuelled ships are equipped with engines or boilers that can use dual fuel (heavy fuel oil and gas) and then boil off gas (natural gas) from the cargo tank is used as fuel. However, studies on gas fuelled ships are not only limited to LNG ships, but also include the proactive use of natural gas as a fuel on all ships.

Records of ships using natural gas as fuel are mostly comprised of coastal ferries used in Norway for various services with few large ocean-going ships recorded. However, the implementation of natural gas as fuel is expected to grow in the years to come.

In order to respond to this fact, the discussion for settling on the “International code of Safety for Ships using Gases or other Low Flash Point Fuel (Code IGF)”, which will be used in IMO as international common regulation ships using gases as fuel, is underway and is planned to receive approval in 2014.

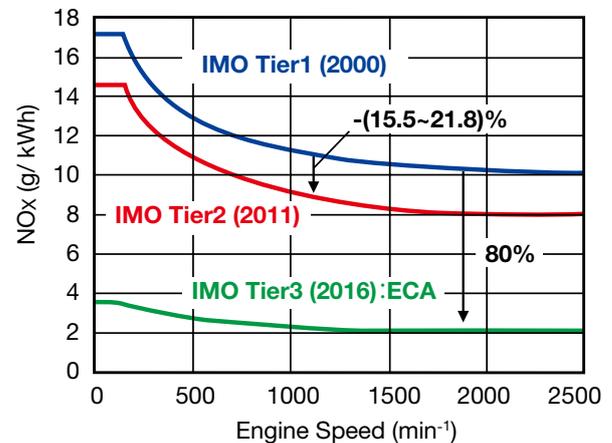
## 2. Properties of Natural Gas and Advantages of the Engine

Natural gas is a gas that includes methane as a principal component, a certain amount of ethane and a very small quantity of propane and butane. It is stored and distributed as both Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG) forms.

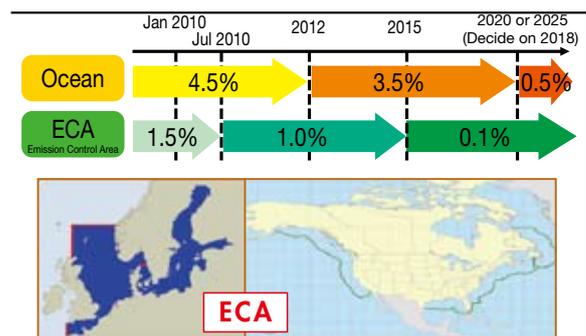
Methane, ethane, propane and butane are flammable gases but methane is lighter than air and is not toxic. Consequently, we can say that is a relatively safe gas because even if, in the worst case, there was a gas leak onboard it would escape into the atmosphere.

Methane, the principal component of natural gas, theoretically makes a reduction of CO<sub>2</sub> emissions by 25% compared to diesel fuel (for a total combustion) possible, in the case of a same calorific value. Furthermore, there is practically zero emission of SO<sub>x</sub> and PM (particulate matter), concerning NO<sub>x</sub> emissions it is said that a reduction of 80 to 90% can be obtained compared to

NO<sub>x</sub> REGULATIONS



SO<sub>x</sub> REGULATIONS



heavy fuel oil. As you can see, the fact that emissions of CO<sub>2</sub>, SO<sub>x</sub>, PM and NO<sub>x</sub> are greatly reduced is the main factor allowing us to call natural gas an environment friendly fuel.

The greatest advantage in the use of a gas engine is that SO<sub>x</sub> and PM emissions are almost reduced to zero.

Especially concerning SO<sub>x</sub>, strict rules already apply for ships staying in EU ports: the sulfur content in the fuel has to be less than 0.1 mass%, and additionally, from 2015, the same rule will be applied to waters designated by IMO. To meet requirements of this new regulation the usual fuel burning engine will have no other solution than to use low sulfur fuel or be equipped with a waste gas cleaner (SO<sub>x</sub> scrubber).

Concerning NO<sub>x</sub>, current gas engines generally use re-burn (lean combustion), provoking combustion by mixing an excessive amount of air in the fuel, and

it is precisely that excessive use of air that causes a reduction of combustion temperature that allows a large suppression of NOx emissions.

Furthermore, compared to the price of marine fuel oil with the price of crude oil price expected to rise in the future, even if there are price differences between regions it can be considered cheaper than heavy fuel oil. Consequently utilization of gas engine has definitely advantages in operations cost terms.

## 3. Issues related to the practical use of gas fuelled ships

### 3.1 Fuel storage onboard ship

The biggest problem facing the realization of gas fuelled ships is the issue of storing the gas on the ship. Even if LNG has the same calorific value as heavy oil, when it is loaded as fuel the required volume is twice the volume needed for heavy oil. Large ocean-going ships are required to have high capacity fuel tanks and this involves sacrificing a certain amount of space for fuel tank installation, therefore, there will be a decrease in cargo space equivalent to the amount of space needed.

As a way to reduce the impact on cargo space, design studies ensuring installation space by locating fuel tanks below cabins are underway, but further safety assessments are considered necessary and discussions on the IGF Code at IMO are still continuing.

### 3.2 Fuel supply

The three following methods are considered possible for supplying LNG.

#### (1) Supply by fixed injector line

A method that uses fixed injector lines to supply fuel from an onshore LNG storage tank. This method is certainly safe, but the reality is that except for a few specific areas where LNG fuelled ships are in service, the required infrastructures maintenance is insufficient.

#### (2) Supply by tanker truck

A method that uses flexible hoses to supply fuel from a tanker truck placed alongside a ship docked at a wharf. Even though it has the advantage of being convenient thanks to its flexibility, questions remain regarding its

safety, and there are still some countries in which this method is not legally recognized.

#### (3) Supply by bunker ship

This fuel supplying method is commonly called STS (Ship To Ship). Recently it has gained attention as a method compensating for the insufficient maintenance of infrastructures. After a risk assessment certifying its safety, this method has a great chance of being adopted. With the STS transfer of cargo having already been put into practice for LNG ships, it is more than conceivable to similarly see common acceptance of STS transfer of fuel from bunker ships to ocean-going vessels.



Example of LNG STS

### 3.3 Possibility of gas engine malfunction.

The possible malfunctions and problems with gas engines are the following:

#### (1) Gas leakage from piping

The discussions underway at IMO for a IGF code and ship classification regulations are naturally considering the measures related to gas leakage as high priority, and in the case of the utilization of a fuel supplying system using high pressure (around 300 bar). From the perspective of preventing gas leakage, attention is

particularly needed on junction devices (flange joints) in high pressure piping.

### (2) Knocking

Knocking is an abnormal combustion that frequently happens in gasoline engines and gas engines. According to the operation records of ships equipped with dual fuel engine operating on liquefied gas, it has been confirmed that there have been a considerable number of cases in which knocking occurred due to a change in calorific value of the supplied gas. It is believed to be caused by the lighter methane components evaporating first after generating boil-off-gas, and then heavier components also evaporate, provoking a change in the calorific value. It is possible to see the same phenomenon happening in the mechanisms of gas fuelled ship engines.

### (3) Methane slip

Methane slip is a phenomenon caused when unburned methane is released directly into the atmosphere. With the greenhouse effect caused by the methane being 21 times greater than the effect CO<sub>2</sub> emissions, even if the use of a gas engine reduce CO<sub>2</sub> emissions, this reduction would be nulled by the methane emissions. There is a possibility of methane slips in 4 stroke gas engines and dual engines but according to an engine makers report, even if a methane slip does occur, the reduction of GHG would still be around 20%.

### **3.4 Construction costs of a gas fuelled ship**

In addition to the high price of the fuel tank, thermal insulation equipment must be installed onboard, increasing the construction costs of a gas fuelled ship. Furthermore, equipment related to heavy oil would be required in the case of a dual fuel engine. According to an estimation by the Norwegian Marine Technology Research Institute (MARINTEK), in the case of a coastal ferry, offshore supply vessels and RORO ships equipped with a 200-450m<sup>3</sup> LNG tank fuel, there is an increase of 8-15% of the total cost compared to a conventional ship. Additionally, a greater increase in cost is expected for large ocean-going ships.

On the other hand, the operation costs after construction are expected to become relatively cheaper than conventional ships with regard to price trends of both crude oil and natural gas.

## 4. ClassNK Activities

In order to respond to demands from the industry, the Society is taking part in joint research projects related to gas fuelled ships, and is working with the industry towards solving the technical problems mentioned above. One of these joint research projects, the “research study on the fuel tank for LNG fuelled ships” took place from October 2010 to January 2012. During this research study, in collaboration with Japanese Shipowners and Shipyards, the Japan Ship Technology Research Association and the National Maritime Institute, precursory research was conducted on the conceptual design testing of LNG fuelled ships, methods and limitations of rearranging LNG bunkering, and the IGF Code. Research results are attached to Japan’s proposal to the IMO in order to reflect opinions from the industry regarding the IGF Code.

Furthermore, in January 2012, the Society released the “Guidelines for Gas Fuelled Ships”. These guidelines, based on the IGF Code currently being discussed at the IMO, are composed of a draft of the present IGF Code and ClassNK’s interpretations, and present a guide for the design of gas fuelled ships before entry into force of the IGF Code. The type of fuel discussed in those guidelines is only natural gas, and in the future, those are guidelines are planned to be periodically revised, including changes related to the situation of IGF Code discussion and considerations on latest technologies.

ClassNK is willing to continue its contribution to the development of related regulations and the solutions to technical challenges well into the future.



Gas fuelled ships guidelines

# Certification for ECDIS training

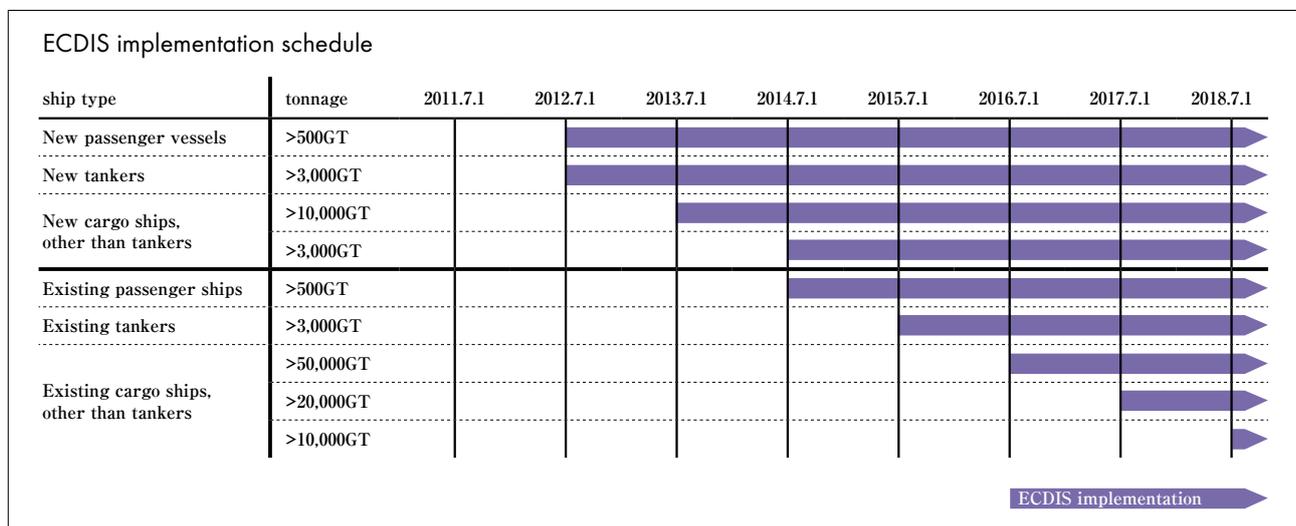


Demand for ECDIS training is expected to be at around 500,000 people in the world.

## 1. Background

**T**he Electronic Chart Display and Information System (ECDIS) is a navigation information system with enough back up measures using the latest nautical charts in compliance with requirements of the SOLAS Convention. It shows combined information selected on ENC system (SENC) and all information obtained from all types of navigation sensors. It can also show various information related to navigation and become an efficient support to navigators when they plan their voyage route (IMO/ MSC.Res.232(82). Regarding the IMO Safety Committee of 2009, the regulation V/19.2 of SOLAS Convention was reformed for vessels engaged in international

maritime activities, newly built ships will gradually have the obligation to install an ECDIS from 1 July 2012. Additionally, the Manila Amendments of the STCW Convention stipulating the required capacities related to the use of ECDIS came into force on 1 January 2012, and according to an estimation from the United Kingdom Hydrographic Office (UKHO), around 160,000 seafarers are subject to training by the 1 January 2017, the date in which the reformed protocol is expected to be fully applied. Concerning the shift from nautical paper charts to paperless navigation, regardless of the fact that crew training is an extremely important matter, shipping companies and PSC mentioned various problems such as “impossibility for the crew to take part in the training” or “deficiency in performance related to ECDIS”,



certainly caused by lack of training and insufficiencies in the ECDIS training institutes. Furthermore, PSC has already made demands for ECDIS operating manuals and practical demonstrations, and shipping companies are also expected to react promptly. Let us now have a closer look at the kind of training and the certification services proposed by ClassNK.

## 2. Generic Training: Manila Amendments 2010 of the STCW Convention

The STCW Convention regulating seafarers' basic training, qualifications and duties was adopted in 1978. It was then completely reformed in 1995, and with the introduction of a Quality Standard System, the crew training institutes needed to have a management structure allowing them to be ISO9001 certified. Following this, in 2010, in order to respond to the growing interest in technologic innovations, marine environment and its preservation, comprehensive amendments were adopted in Manila. Part of those amendments, regarding the utilization of ECDIS, the necessary knowledge / comprehension and technical abilities were stipulated, consequently, ECDIS training became compulsory for shipmasters and navigation officers of ships equipped with ECDIS. Regarding the abilities required by the STCW Convention, training along with IMO model course is effective and efficient, and in 2000, IMO model course 1.27 (2000 edition) was published for the ECDIS training. However, the model course published in 2000 could not be applied to the

Manila Amendments 2010 of the STCW Convention, this is why the IMO/STW43 sub-committee held session in April 2012 and newly adopted the IMO model course 1.27 (2012 edition) as revised edition. In the 2012 edition, five days (40 hours) of training are required. It



There are also vessels already equipped with ECDIS

is now necessary for shipmasters and navigation officers of ships equipped with ECDIS to take part in a training course conform to the IMO model course 1.27.

## 3. Type specific training: ISM code

According to ISM code 6.3 and 6.5, companies are required to make necessary personnel undergo practice duty, and because ECDIS is a nautical instrument directly related to operations safety, it is asked to not only practice this system but also to strictly undergo type specific training for the equipped ECDIS on PSC and Oil Majors' inspected ships. However, the type-



State of the art ECDIS training  
(Japan Marine Science ECDIS Training Center)

specific training is not basic like the IMO model course basic training, and flag states are showing no move toward an institutionalization of the training, a situation in which no consensus could be found was continuing on what training to follow. To respond to demands from clients for on-board learning, e-learning and CBT, ECDIS makers are providing type-specific training, but this has to be training that will allow mastering of the required skills. According to United Kingdom “no acceptance of type-specific training is possible for training in which a superior officer teaches a junior officer”. In Bahamas, the following are recognized as institutions responsible of type-specific training: ECDIS maker, agency certificated by ECDIS maker and instructors who followed specific training from ECDIS maker. After finishing the generic training, shipmasters and navigation officers of ships equipped with ECDIS have to follow the type specific training for the ECDIS maker installed on board.

## 4. ClassNK certification service for ECDIS training

ClassNK has started certification service for generic ECDIS training meeting requirements with STCW Convention and Type-specific training fulfilling conditions of PSC and Oil Majors. This service is composed of document inspection and a site examination, and confirms that the three important elements, which are training material, instructors and programs, are complying with standards defined by IMO model course and ClassNK standard for maritime education and training.

Generic training is certified based on IMO model course 1.27 (2012 edition) as the standard. ClassNK took part in the IMO sub-committee that adopted this model course and consequently has a deep comprehension of the subject. Even if the certification of flag states remains the most important, in addition to the flag states, the double certification of crew training by a third party has become an international trend.

Numerous flag states do not certify type generic training. However, a document proving that it was followed is required on PSC and Oil Majors’ inspected ships. ClassNK certifies type specific training in the “ClassNK standards for maritime education and training”. To respond to the demands of their clients, ECDIS makers are providing DVDs, e-learning, CBT and other forms of training. As flag states don’t determine the basic training for the type specific training, various type specific trainings exists. ClassNK is implementing certification on standards that can hold up to any inspections.

## 5. Merits of ClassNK certification

### ① Acquisition of flag state certification

At the present time, ClassNK’s certification is effectively recognized by the Marshall Islands and Liberia. Practically speaking, regarding the Marshall Islands, if the Society delivers a training completion certification for ECDIS comprehensive course to the Marshall Administration, endorsement for seamen's competency certificate can be obtained. Concerning Liberia, after receiving certification from the Society, the training institute which obtained certification can apply to



ECDIS equipment

Liberian Administration and be registered as training institute for ECDIS comprehensive training course appointed by Liberia.

### ② *Rapid Examination*

Performing rapid examinations for the certification of seamanship education training is one of ClassNK's mottoes. Regarding documents inspection and site examination, ClassNK is attaching utmost importance in communicating with all its clients and implementing a quick issuance of the related certification documents.

### ③ *Measures for PSC and Oil Majors*

From its creation in 1899 to this day, ClassNK has been trusted, and furnished all possible efforts, as an impartial third party not only to ensure safety of life and property at sea but also to stop the degradation of maritime environment. Based on that trust, ClassNK is now thinking to extend the domain of its activities and provide all its clients with certification of seamanship education training that can be used on PSC and Oil Majors' inspected ships.

### ④ *Examination of High Quality*

From the Head Office to the 120 local offices located worldwide, ClassNK's personnel located all around the world are surveyors with a high level of professionalism dispatched to quickly respond to all our client needs. Even if at the Seatrade Asia Award in 2012, the quality level of certification of seamanship education training

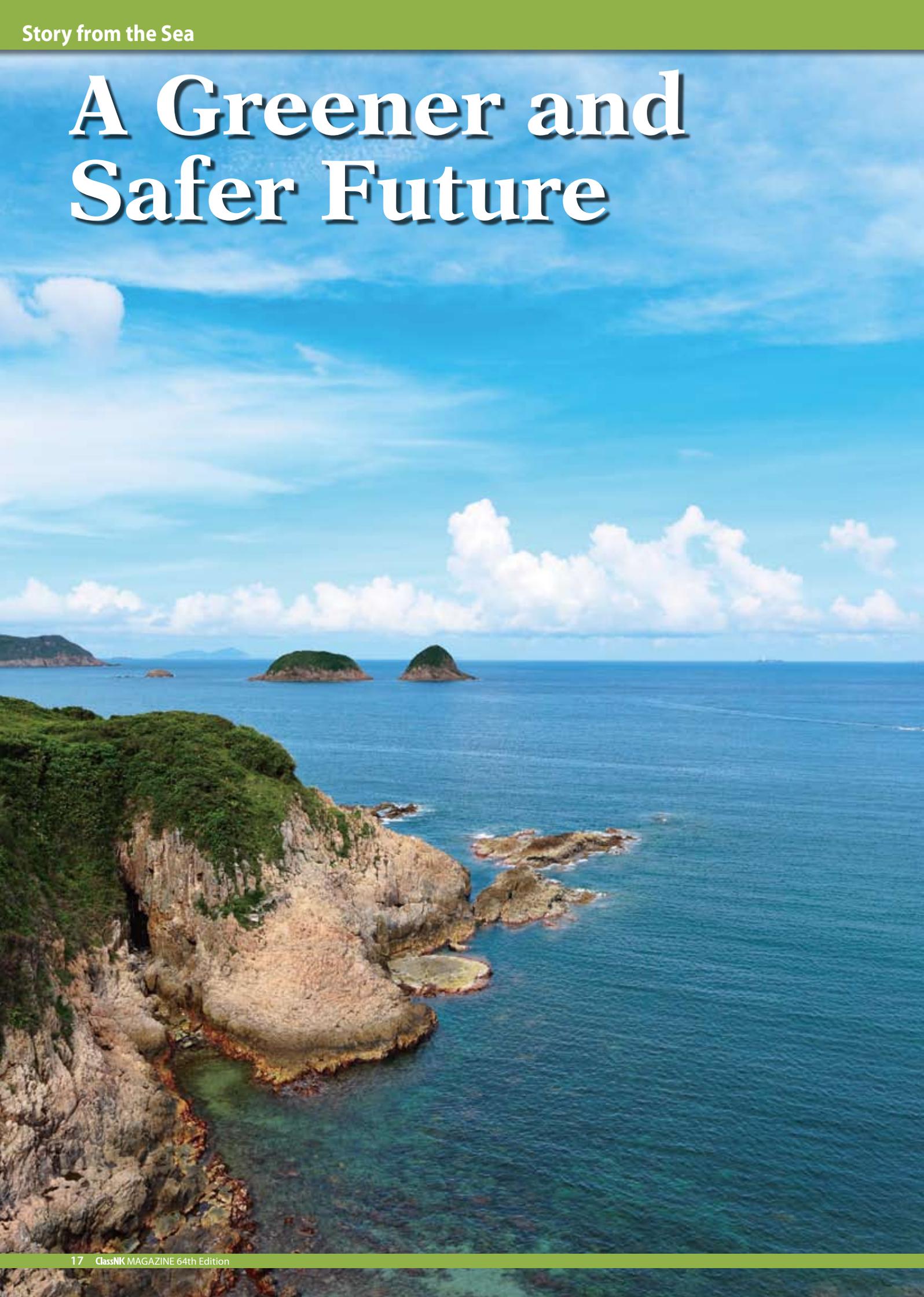


ClassNK's Executive Vice President K. Fujiwara delivers ECDIS Certification to Mr. S. Gotoh, General Manager of Sales Strategy Division and Director of Japan Radio Co., Ltd.

was recognized as high, ClassNK continues to strongly implement personnel education and work on providing a certification service of high quality.

Having started with ECDIS training, in the near future ClassNK will provide certification to various type of crew training, and not only support world marine transportation on the hard side with ship inspections but also on the soft side by supporting crew members.

# A Greener and Safer Future





## ClassNK and the Green Award Foundation

For decades, ClassNK has been dedicated to meet the evolving needs of the maritime industry, and made colossal efforts towards ascertaining that safety and environment preservation should be the top priority for all the people related to this industry. As it is well known, ClassNK's mission is to ensure the safety of life and property at sea and protect the marine environment. However, this task is not an easy one to complete as fast as it should be, for the preservation of our planet wonderful biodiversity is without a doubt one of the main challenges to face humanity in the 21st Century. A race against the clock to save it has already started.

The Green Award Foundation, sharing the same strong will of promoting eco-friendly and safe vessels, is an organization totally independent of governments and international political institutions, having a status of international NGO since the assistance from the Dutch Government took end on 1 January 2000.

Founded in 1994 with a grant from the Port of Rotterdam and its Dutch Ministry of Transport, the Green Award Foundation's main objectives are to promote the safe and environmentally friendly operation of ships, with an incentive system rewarding the good quality of those ships and the development of eco-friendly ships by achieving international acceptance, recognition, regulation and coordination of the Green Award Certification.

The Green Award Foundation is suggesting business operators from port authorities and private sectors to provide incentives to all ship-owners that go beyond international conventions, legislation and developments in the area of ship lay-out, equipment, crew, operations and management.

Thanks in part to the efforts of ClassNK, the concept that safe, clean shipping is in the interest of all involved

with shipping, has become generally accepted now. Green Award bestows international recognition on extra clean, extra safe seagoing vessels, which are more than welcome in any seaport. As a totally independent and neutral, non-profit organisation, Green Award wants to create market preference for quality tonnage resulting in less incidents and accidents that can jeopardize the marine environment.

The main purposes of the Green Award Foundation are to stimulate quality improvement in shipping, avoid incidents with sea vessels, expel sub-standard shipping, improve environmental awareness and assist ports to improve their environment.

To reach its objectives the Green Award Foundation delivers a certification of owner/manager and ship, continues to improve the Green Award organisation, upgrades the Green Award requirements on a regular basis and finally promotes worldwide the Green Award system.

## 11 of the 12 LNG ships awarded Green Award Certification are classified by ClassNK

Last year, for the first time, an LNG carrier received the Green Award Certificate. This LNG carrier, the "Dukhan", is chartered by "Qatar Gas", the biggest



Certificate handover ceremony of DUKHAN

## Dukhan



Capacity: 137,661 m<sup>3</sup>  
 Build: 12 Oct 2004  
 Management: MOL LNG Transport (Europe) Ltd.

## Doha



Capacity: 137,262 m<sup>3</sup>  
 Build: 01 Jun 1999  
 Management: NYK LNG Shipmanagement

## Al Rayyan



Capacity: 137,420 m<sup>3</sup>  
 Build: 26 Mar 1997  
 Management: "K" Line Ship Management

producer of LNG in the world. Mitsui O.S.K. Lines is in possession of that ship and a company from this group "MOL LNG Transport (Europe) Ltd." is in charge of its management. Qatar Gas is promoting the obtainment of Green Award Certificate for its chartered LNG carriers. MOL LNG Transport (Europe) Ltd. has successfully passed the strict Green Award inspection on quality, safety, environmental, management and technical fields. LNG ships from Mitsui O.S.K. Lines, Nippon Yusen Kaisha and Kawasaki Kisen Kaisha received the Green



Certificate handover ceremony of AL ZUBARAH, BROOG and ZEKREET

Award Certification. In total, 11 of the 12 LNG carriers awarded with Green Award Certification are classified by ClassNK.

In recent years, in line with the rising world LNG trade, the LNG shipping market has witnessed an accelerated development. Liquefied natural gas is widely used on vessels designed to transport the commodity and has started to be introduced on other types of ships. Around 30 vessels, including many Norwegian ferries and offshore support ships in the North Sea, are powered by LNG and these types of ships are expected to increase in the near future.

This year, the guidelines that ClassNK released describing the requirements for the design of natural gas fueled ships have been specified based on the current draft of the IGF Code. The guidelines provide comprehensive information on key design features including bunkering, hull structure, fire safety, and explosion prevention measures.

ClassNK's most important mission as a classification society is to help ensure the safety of shipping as the industry looks to ways in which it can reduce its carbon footprint. These new guidelines have been compiled based on the Society's vast array of technical expertise and experience. With these guidelines, ClassNK hopes to provide practical guidance for shipyards, manufacturers, owners, managers, and operators looking to prepare their fleets for a safer and greener future.

## Summary

ClassNK and the Green Award Foundation are sharing the same philosophy towards environmental preservation and protection through the fundamental

concept of “Quality Shipping”. A global effort from the maritime industry including the obligation of respecting strict guidelines, and the implementation of an incentive system encouraging shipowners and management companies to favor green ships will definitely help to prevent natural and human disasters.

### Future initiatives of the Green Award Foundation

The first landfall for the Green Award Foundation in Japan was the Green Award certificate for Iino Marine Service Co., Ltd. in 2004. In recent years, the Green Award’s name has gradually gained a positive reputation in Asia, Middle East, South America etc and has become famous in the oil tanker sector, where it all started in 1994.

As a result, the Green Award Foundation is willing to join hands together with the whole maritime industry and help to implement the measures related to Corporate Social Responsibility on a global scale and obtain worldwide recognition.

The Green Award certification scheme is available for oil and chemical tankers, LNG carriers, bulk carriers and European inland barges, and the foundation intends to incorporate container ships in early 2013.



Port of Rotterdam



Aerial view of Rotterdam

# Celebrating the 50th Anniversary of the ClassNK London Office



Streets of London

## History of London

London's origins go back to Celtics times. It is said that the etymology of "London" is derived from the pre-Celtic Old European "(p)lowonida" meaning 'river too wide to ford', and suggested that this was a name given to the part of the River Thames which flows through London; from this, the settlement gained the Celtic form of its name, Lowonidonjon.

In AD 43, when the Romans invaded Britain, they moved north from the Kentish Coast and traversed the river Thames in the London region, building a permanent wooden bridge just east of the present London Bridge. It was this bridge that attracted settlers and led to London's inevitable growth. The Thames is a deep river, and its location within the tidal zone made it an ideal location for berthing ships. The settlement quickly grew to become a flourishing city known as Londinium and by about AD 200, the city had acquired its famous walls and became a regional capital.

Over the next several centuries, the city would increase in size and importance as it came under the rule of a number of different kings.

Under the Saxons, London was called "Lundunburg" and it became the metropolis of the Kingdom of Essex. Bede, writing in the early part of the eighth century,

refers to London as the "mart of many nations resorting to it by sea and land." The city was constituted the capital of England by Alfred the Great; York and Winchester having previously enjoyed that dignity in succession - the former under the Romans, the latter under the Saxons. In 994, the first bridge across the Thames was built.

The incorporation of the City of London actually predates England's parliament. The first recorded Mayor of London, in this case Henry Fitzailwyn, dates back to 1193. The increasing role the city played was also enshrined in the Magna Carta, which gave shared responsibility to the Mayor of London and for upholding the terms of the charter and thus protecting the liberties of the city.

In the sixteenth and seventeenth centuries, the expansion of London had become so rapid that both Elizabeth and James I issued proclamations against any further extension of the city. London was, and of course still is, Britain's artistic and literary capital. For centuries, with its publishers, newspapers, journals and weeklies, coffee houses, taverns, and literary salons, the city played an important (and frequently crucial) role in the life, development, and work of virtually every



English literary figure of any significance.

To the latter part of the eighteenth century belong some of the finest of the old buildings in London, such as Somerset House, the Mansion House, and the Horse Guards. However, the metropolis as we know it is largely a creation of the Victorian Age. Most of the leading streets having been widened and improved, some newly constructed and many of the chief public edifices remodeled, if not built, during that period.

Since the beginning of the twentieth century, the city has grown to become the modern city we know today.

Though the city was bombed by German zeppelins, causing a great deal of terror and 700 deaths during the First World War, its buildings were not greatly affected. On the other hand, the Second World War brought massive destruction to London and its suburbs. 7 September 1940 marks the beginning of the blitz; bombs rained down night after night on London, devastating the city. Much of the city, Docklands and East End areas were severely damaged. Throughout this period the London Underground became a safe haven to both the homeless and those seeking refuge from the bomb raids. However nearly 35,000 Londoners were killed, around 50,000 seriously injured and tens of thousands made homeless.

After the destruction of the war, however, the rebuilding began with a feeling of optimism and renewal. In 1948 London hosted the first Olympic games to be held after the war, and in the years following it, various groups



Westminster Abbey

of immigrants, mainly from the Commonwealth, have come to London and made it a very cosmopolitan city. There are many cultural links and influences between London and India, China, the Caribbean Islands and many others. Restaurants in London serve traditional food from all over the world. In the 1950's London boomed; car factories were very busy, as were the aircraft factories in north London. The docks were also very busy, employing 30,000 men. But in the beginning of the 1960's the docks began to suffer from the breakup

of the British Empire. The newly independent countries began to trade with countries other than Britain and the London docks suffered as a result.

Then, starting in the mid-1960s, and partly as a result of the success of British musicians such as the Beatles and the Rolling Stones, London became a center for the worldwide youth culture, exemplified by the Swinging London subculture which made Carnaby Street a household name of youth fashion around the world. London's role as a trendsetter for youth fashion was revived strongly in the 1980s during the New Wave and Punk era. In the mid-1990s, this was revived to some extent with the emergence of the Britpop era.

Being today one of the world's leading financial centers, the London metropolitan area is the largest in Europe generating approximately 30 percent of the UK's GDP. It is estimated that every year 200 festivals take place in London with more than 17,000 theatrical performances and more than 50 theatres in London's West End. London is, as always, a mixture of the new and the old.

London has four UNESCO world heritage sites: Tower of London, Maritime Greenwich, Westminster Palace and Kew's Royal Botanic Gardens. It remains for the tourist a fascinating environment - providing a unique historical perspective, mixed with the freshest and most contemporary entertainment.

In 2012 the Summer Games took place in London, and the city became the first to officially host the modern Olympic Games three times, having previously done so in 1908 and in 1948, and once again the eyes of the world were on London. The Games offered a unique chance for people around the world to take a fresh look at modern London. A London that is creative, dynamic, connected and open.

The city welcomed the 2012 Olympic Games with the attributes it has always had; a cosmopolitan viewpoint, a feeling of optimism and excitement, the hum of history as its background, the clatter of commerce and business in the forefront, changing as it has always changed through the ages.

Dr. Samuel Johnson once wrote:

When a man is tired of London, he is tired of life; for there is in London all that life can afford.

## ClassNK London Office

Fifty years ago, in London, ClassNK opened its very first exclusive surveyor office outside of Japan.

In 1962 for ClassNK to choose London as the city to welcome its first foreign office ever established is of course not a coincidence. This choice was made knowing the historical strong link between London and the



Aerial view over the City of London



Tower Bridge

maritime industry.

The City of London also symbolizes Royal Navy Traditions with its maritime knowledge. Beyond merely being a cosmopolitan metropolis with a rich maritime history, London is also the birthplace of ship classification. The Lloyd's insurance market began in Edward Lloyd's coffeehouse on London's Tower Street in 1688, and over time this insurance market would grow in complexity and diversify, serving as the direct forerunner of modern ship classification and a number of related industries.

London remains today as the world's maritime center and is home to many of the world's major maritime institutions - IMO, BIMCO, ICS, IACS, IMIF, INTERTANKO and INTERCARGO, to name a few. The city's importance to the maritime community is not only marked by the presence of these international organizations but also by the huge number of maritime-related businesses that call London home. London's impressive maritime cluster represents every aspect



Houses of Parliament in London

of the maritime industry, from maritime lawyers, to underwriters, brokers and insurers, to ship owners, managers, operators, charterers and registries.

The Society's London Office was first established at the Lloyd's Chambers on Crutched Friars. From 1972 to 1981, the office was located at the Europe House in the World Trade Centre, and from 1981 to 1989 at the P&O Building on Leadenhall Street.

The Office then moved to the prestigious Baltic Exchange Building, which was in many ways the headquarters of the global ship sales and ship information marketplace. Due to two successive IRA bombings – one on the Baltic Exchange and the other at Bishopsgate – when the ClassNK office was damaged, in 1993, it was relocated to Finsbury Circus. In 2010, it moved to its current location in Tower 42 (ex-Natwest tower).

ClassNK London office is the Regional Office responsible for operations in Europe and Africa. The office currently has a staff of nine; the regional manager, two managers, four exclusive surveyor and two office staff. The ClassNK London office also oversees four Local Area Representative (LAR) offices: three in the United Kingdom - at Milford Haven on the south-west corner of Wales established in 1997, at Newcastle on the north-east of England, established in 2006 and at Cardiff, the Capital of Wales, established in 2010 – and one in Russia at St Petersburg. The LAR offices are each managed by exclusive surveyors.

In addition to regular survey activities, ClassNK holds yearly meetings of its British Committee. The British Committee was established in 2003 and consists of members drawn from the wide spectrum of the UK's maritime industry. The Committee is an important forum for the mutual exchange of information and allows the Society to meet face to face with industry leaders and discuss maritime issues and developments.

The NK London office also works with the Maritime and Coastguard Agency (MCA), the UK Flag Administration, which has its main office in Southampton; about 2 hours to the south-west of London. NK has maintained close cooperation with MCA for PSC related and other maritime matters ever since NK has become a recognized organisation of the British Flag in 2004.

Furthermore, ClassNK London Office delegate members participate in both IMO and IACS – the latter having an observer status and acting as a technical adviser to IMO, representing Asia by voicing the global concerns of the Maritime Industry.

After 50 years of continued support from the maritime industry worldwide, ClassNK London Office and all the other 100 Overseas Offices established after that will continue to provide the best services all around the world, for safer and greener activities, enhancing the growing potential of the whole maritime sector in the years to come.

# Tokyo

## From the Ocean to the Sky



Aerial view of Tokyo

**Tokyo is home of the Head Office of Nippon Kaiji Kyokai, also known as ClassNK. Since its founding in Tokyo in 1899, ClassNK has grown to become the world's largest classification society and its Head Office is located in Tokyo. Established in January 1949, the Tokyo Branch Office is one of the oldest branch offices of the Society and it is completely separate from the Head Office. It covers most of eastern and northern Honshu, the main island of Japan, thus it has the greatest jurisdictional responsibility of any branch office in Japan. It also spans 14 prefectures, including Tokyo itself, as well as several islands in the Pacific Ocean.**

A kaleidoscopic metropolis, Tokyo is a city of old shrines and temples surrounded by modern skyscrapers, karaoke bars, Kabuki theaters, electronics stores, traditional street festivals, large shopping complexes, old style public bathhouses and countless bars and restaurants where you will experience the world famous Japanese great sense of hospitality.

Tokyo is like a bridge between the past and the future allowing you to really live in the present moment and we hope that it will be your next destination.

No other city in the world is like Tokyo.

A fascinating mix of the traditional and the modern, Tokyo stuns with its contrasts. Sparkling skyscrapers and multicolored blinking, flashing neon lights, traffic sounds, crowded crossings with giant screens and its sheer scale are just one part of this multi-faceted city.

Enter one of Tokyo's ancient shrines, feel the sounds of water and the trees blown by the wind. Experience the traditional wooden buildings and wonderful temples in Hamarikyu Gardens or Ueno Park where you will forget yourself in quiet contemplation beside a carp pond, take a few steps back and you'll see the Tokyo Skytree colorful shining lights above the cherry blossoms.

Experience the scent of traditional Japanese food while you're taking a stroll in one of the metropolis's old towns (shitamachi) where you can see groups of co-workers heading to the next destination of their multi-staged drinking party. Hear karaoke performances behind the doors of the numerous karaoke bars, and the sound of beer mugs clinking followed by laughter coming from small bistros (izakayas) along your way down lanes marked with floating lanterns.

Tokyo has become one of the biggest and most important cities in the world, not only because it is a major business and financial center, but also because Tokyo is the capital of the world's third largest economy, Japan.



Tokyo Gate Bridge

The population of Tokyo has surpassed 13 million and represents 10% of Japan's total population, yet Tokyo covers an area of about 2,188 square kilometers, which is only 0.6% of the total land area.

Forming one of the most efficient transport systems in the world, Tokyo's extensive systems of highways, trains and subways move millions of people every day.

Finally this year saw the completion of the Tokyo Gate Bridge in Toyosu District, and on 22 May 2012, with the public opening of Tokyo Skytree in Sumida Ward, Tokyo officially became home of the tallest tower in the World.

## Tokyo Gate Bridge

The Port of Tokyo instituted a number of development plans aimed at bolstering the facilities of the port and easing congested urban traffic. The growth of the port was a key aspect of the redevelopment plans of Tokyo itself. This included further active construction of numerous new wharves and berths to handle vigorously rebounding cargo volumes and successive land reclamation.

The latest one of those development plans is the Tokyo Gate Bridge.

Tokyo Gate Bridge, also called the Dinosaur Bridge (derived from its shape), is a 2.6km-long truss bridge over Tokyo Bay.

Construction of the bridge began in 2003 and its main purpose is to offer infrastructural support to the Port of Tokyo by easing congestion on the Wangan Expressway. The Tokyo Gate Bridge forms part of the Rinkai Tokyo Port Seaway. It reduces the travel time from the Shin Kiba district in Koto to 10 minutes from 19 minutes. It also provides an alternative route to truckers transporting cargo to the Aomi and Oi container terminals.

Opened to traffic on 12 February 2012, it spans Tokyo Bay with a height of 87.8 meters and a central span of 440 meters. This 2,618-meter-long truss bridge links Wakasu in Koto Ward with the Jonanjima Seaside Park in Ota Ward. The Tokyo Gate Bridge is a steel hybrid structure designed to withstand an earthquake directly under Tokyo. It can handle 32,000 vehicles a day between eastern Tokyo and a man-made island, where a new container terminal is being built. According to the port office, this new container terminal will be able to handle ships capable of carrying 10,000 boxes. "Dinosaur Bridge" will bring 19 billion yen (\$246 million) in economic benefits a year as it almost halves journey times to container terminals in Tokyo Bay.

Offering views of Mount Fuji and the Tokyo Skytree, the bridge has four lanes and a walkway that is open from 10 a.m. to 5 p.m. The toll-free bridge spans a major sea lane into Tokyo Port, but its height had to be restricted to below 100 meters due to the flight path of planes to and from Haneda Airport, but at the same time it had to be high enough to allow for the ships to pass underneath it. These restrictions were considered in choosing the truss model over a cable-stayed or a suspension bridge design. The truss's shape resembles two dinosaurs facing each other.

The bridge will be followed by a ring road and two larger loop lines which are still under construction. The ring road is expected to be completed by 2014 together with the new fish market that will replace the world famous "Tsukiji Fish Market".

## Tsukiji Fish Market

Tsukiji Market is one of the largest fish markets in the world, handling over 2,000 tons of marine products per day.

The busy atmosphere of sellers and buyers hurrying around, scooters and trucks lining, and the sight of the

many kinds of fresh fish other seafood make Tsukiji Market a major tourist attraction. In recent years, the number of visitors has increased so much, that they have become a problem to the normal course of business, as the aging market's infrastructure was not anticipated to serve as a tourist spot with the tuna auction among others.

The number of visitors permitted to the tuna auction is limited to 120 per day, the maximum number which the market's infrastructure can accommodate. For tourists wishing to see the auction, they have to apply at the Osakana Fukyu Center (Fish Information Center) at the Kachidoki Gate, starting from 5:00am on a first-come, first-serve basis.

Expect that the maximum number of visitors is likely to be exceeded on busy days, and that some later arriving visitors may not be able to see the auction. Only successful applicants will be able to view the auction from a designated visitor area. Viewing the auction from anywhere else, using flash photography or to interfering with the business operations in any other way is strictly forbidden.

Combined with a fresh sushi breakfast or lunch at one of the local restaurants a visit to Tsukiji Market is definitely an experience you have to try. There are restaurants both in the inner and outer market area, which are typically open from 5:00 in the morning to around noon or early afternoon.

Since Tsukiji Market is a site where serious business is conducted, it is important for visitors not to interfere with the action by following the additional rules mentioned below:

- Do not touch anything!
- Do not enter areas restricted to authorized personnel!
- Do not obstruct traffic!
- Do not bring large bags or suitcases into the market!
- Do not enter the market in high heeled shoes or sandals!
- Do not bring small children or pets!
- Do not smoke in the market!

After enjoying the fish market and some fresh sushi, we recommend you visit Tokyo's brand new attraction, the Tokyo Skytree.



Tsukiji Fish Market



Tokyo Skytree

## Tokyo Skytree

Opened on 22 May 2012, Tokyo Skytree is the fusion of futuristic design and the traditional beauty of Japan and will be without a doubt a catalyst for the revitalization of the city.

With its height of 634 meters, Tokyo Skytree is the World's tallest broadcasting tower. The height of 634m was selected to be easily remembered. The figures 6 (mu), 3 (sa), 4 (shi) stand for "Musashi" an old name of the region where the Tokyo Skytree stands.

One of its main purposes is to relay television and radio broadcast signals. Tokyo Tower with a height of 333m no longer gives complete digital terrestrial television broadcasting coverage because it is surrounded by many high-rise buildings.

Tobu Railways Co. the parent company of tower's operator Tobu Skytree Co. announced that during the first week, more than 1 million people visited the newly completed 37,000 square meter commercial complex Tokyo Skytree Town, consisting of "Solamachi", an area with 312 tenant shopping and restaurant, an aquarium, a planetarium and an office building.

There are observation decks at 350m, with a capacity of up to 2,000 people, and 450m, with a capacity of 900 people. The upper observation deck features a spiral, glass-covered skywalk in which visitors ascend the last 5 meters to the highest point at the upper platform. A section of glass flooring gives visitors a direct downward view of the streets below.

Concerning the earthquake resistance, the tower has seismic proofing, including a central shaft made of reinforced concrete. The main internal pillar is attached to the outer tower structure 125 meters above ground. From there until 375 meters the pillar is attached to the



tower frame with oil dampers, which act as cushions during an earthquake. According to the designers, the dampers can absorb 50 percent of the energy from an earthquake.

The area where the most modern tower in the world is built is Sumida Ward, which is also home of the oldest temple in Tokyo, the Senso-ji Temple

## Sumida Ward and Asakusa Shrine

A Japanese legend says that the Senso-ji Temple was founded in Asakusa one thousand three hundred years ago by two brothers who found a goddess statue in their fishing net, and today it is one of the most visited spots in Tokyo.

Kaminarimon, the main entrance gate to the Asakusa Shrine is one the symbols of Tokyo and is visited by millions of people every year.

Once you have passed through the Kaminarimon, no doubt you will enjoy the unique Nakamise Shopping Street which stretches 250 meters from the entrance to the temple with more than 50 shops selling souvenirs and other local specialties.

On the banks of the Sumida River, Asakusa Shrine is definitely a place you need to visit next time you have a chance to come to Tokyo, especially during the Sanja Matsuri, a three-day local festival attracting more than 2 million visitors every year, or during the Sumida River Fireworks Festival in July which is One of the major fireworks displays in Tokyo.

If you don't like crowded spaces you can still enjoy Sumida Park or a typical Japanese meal on a Yakatabune (Japanese old-fashioned houseboats) on the Sumida River.

Needless to say that the recent opening of Tokyo Skytree, a few minutes across the Sumida River, has led to an even greater increase of tourists and revitalized the whole Sumida ward.

Let's hope that the Tokyo Skytree Tower will bring economic success not only to Sumida but also to Tokyo and Japan as much, if not more, than the Tokyo Tower brought after its construction more than 55 years ago.

## Events

### ClassNK Marks Historic World Milestone

Leading classification society ClassNK officially announced that its register had surged past the 200 million gross ton mark on 28 May 2012. This unprecedented achievement makes ClassNK the world's first class society in history to have more than 200 million gross tons on its register.

Founded in 1899, the growth of ClassNK's register has steadily accelerated over the years. ClassNK broke the 100 million gross ton mark in 1997, before becoming



the world's largest classification society in 1999. Just 10 years later, ClassNK became the first class society to exceed 150 million gross tons on its register in 2007. As of 31 May 2012, the ClassNK register accounts for 7,847 ships totaling 200,804,781 gross tons. As ClassNK's register surpassed more than 190 million gross tons at

the end of September 2011, some 10 million gross tons have joined the Tokyo-based class society's register in just the past eight months.

Despite the importance of this achievement, ClassNK President and Chairman Mr. Ueda emphasized that ClassNK would not rest, saying: "Roughly 20% of the world's commercial tonnage relies on ClassNK and our services, and we are committed to exceeding the expectations of the maritime industry."

### ClassNK Takes Two at Seatrade Asia Awards 2012

ClassNK earned top honors for its work as Asia's leading classification society, as well as its role in education and training in the region, as it received both the "Classification Society Award" and the "Education and Training Award" at the Seatrade Asia Awards held at the Shangri-La Hotel in Singapore on 23 April. Organized by London-based maritime media company Seatrade Communications, each year the Seatrade Asia Awards recognize excellence in the Asian maritime industry in such fields as innovation, safety, and education.

This year's distinguished panel of judges selected ClassNK as the best classification society, as well as the most dedicated education and training organization, from among the large number of classification societies and educational organizations nominated. This marks the second consecutive year and the third time that ClassNK has been awarded the "Classification Society Award", as well as the first time the Society has received the "Education and Training Award", since the Seatrade Asia Awards were established in 2008.



## ClassNK joins with NAPA to bring best-in-class SEEMP solution to market

ClassNK and NAPA, the leading software house for ship design and operations, announced on 8 May 2012, a collaboration to provide the most comprehensive solution for Ship Energy Efficiency Management Plan (SEEMP).

The collaborative solution builds upon the in-depth understanding of ship performance in practice delivered by two world-leading companies in their respective fields. By sharing their expertise, this co-operation will provide an unrivalled service for ship owners, operators and shipbuilders across the globe seeking to rationalise energy consumption and emissions, reduce fuel costs and find an effective solution for SEEMP, for which regulation will come into force on 1st January



2013, ultimately mitigating the environmental impact of operations.

In order to ensure that the collaborative SEEMP solution will be both effective and practical for use on actual vessels, ClassNK and NAPA are working closely with Japan's largest shipbuilder, Imabari Shipbuilding Co. Ltd. and a trial version of the new solution is expected to be completed within the year, and upon completion it will undergo extensive real world testing on vessels owned and operated by an Imabari Group shipping company. Feedback from this verification testing will be used to further develop and refine the system prior to final release.

The SEEMP solution from ClassNK and NAPA will combine modules to optimise trim, route and speed optimisation and weather routing with an analytics service to offer operational efficiency and decision support. The system will allow owners and operators to respond quickly and adapt operations in real-time to capitalise on latent efficiencies within operations in order to increase eco-efficiency and reduce fuel consumption as a solution for SEEMP.

## Topics

### ClassNK Issues First Certifications for Ship Energy Efficiency Management Plan (SEEMP)

ClassNK announced on 12 April 2012 that it had issued certifications for Ship Energy Efficiency Management Plans (SEEMP) to Japanese shipowner Nippon Yusen Kaisha (NYK LINE) and Turkish ship management company Semih Sohtorik Management & Agency Inc. (SSMA). These two certifications are the first of their kind to be issued by ClassNK.

New amendments to Annex VI of the Convention for the Prevention of Pollution from Ships (MARPOL) related to reducing the greenhouse gas emissions from ships were adopted at the 62nd session of the Marine Environment Protection Committee (MEPC) in July 2011. The amendments require both new and existing ships with a gross tonnage of 400 tons or greater engaged on international voyages to retain a SEEMP onboard on or after 1 January 2013.

By offering new services to help shipowners and operators improve ship efficiency and reduce CO<sub>2</sub> emissions, such as SEEMP certification, ClassNK is proactively address environmental concerns in the maritime industry.

### ClassNK establishes EEDI Division

Once the amendments to MARPOL Annex IV aiming to reduce CO<sub>2</sub> emissions related to international shipping enter into force on 1 January 2013, an Energy Efficiency Design Index (EEDI) for new built ships will be introduced and all existing ships will have the obligation to possess a "Ship Energy Efficiency Management Plan" (SEEMP).

On the 1 April 2012, ClassNK established the EEDI Division. This division is composed of technical staff doing all the necessary preparations before the entry into force of the new systems mentioned above.

It should be noted that during the evaluation process of EEDI, ClassNK has prepared a very complete security system for clients' confidential information (documents which are relevant for the estimation of ship speed and test results related to the model of ship tank) including intellectual property rights.

Furthermore, ClassNK is providing direct evaluation for Energy Efficiency Operational Indicator (EEOI) and additionally a calculation analysis system for EEOI, the "PrimeShip-GREEN/EEOI".

By creating a clear contact point for all operations related to the improvement of energy efficiency, the Society can rapidly respond to the needs of its clients and provide them with even better service.

### ClassNK Grants Japan's First Certification for Small Wind Turbines

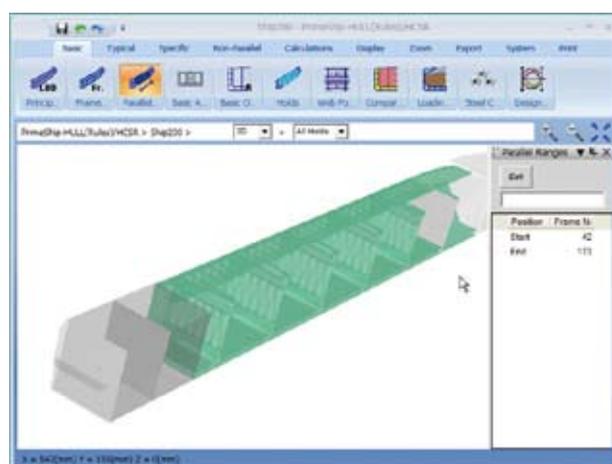
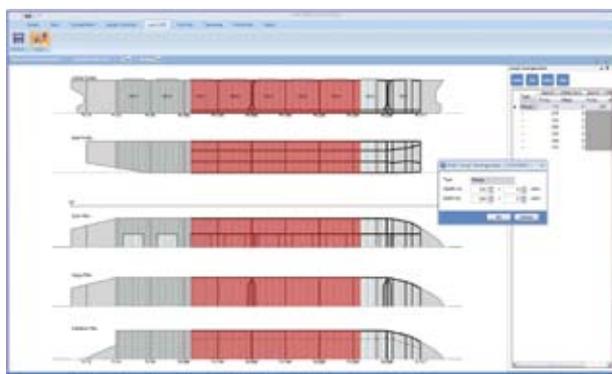
ClassNK announced that it has issued a type approval for a small wind turbine to Zephyr Corporation's Airdolphin GTO wind turbine on 2 July 2012. This marks the first wind turbine type approval to be awarded by ClassNK, and is the first time that an SWT has received certification in accordance with new Japanese renewable energy regulations.

Already the world's largest classification society and a global authority on maritime standards, ClassNK began developing standards for wind turbines last year as part of its effort to support the development and growth of the offshore wind power industry. At the request of manufacturers and industry group, ClassNK expanded its activities to the small wind turbine sector in December 2011. This certification of the Zephyr Corporation's Air Dolphin system marks the first time that ClassNK has issued a type approval for a small wind turbine.

### ClassNK Releases World's First Harmonized CSR Software

On 3 July 2012, ClassNK has released the world's first software package for use with the new IACS Harmonized Common Structural Rules (CSR) for bulk carriers and oil tankers, which were released at the beginning of July 2012. The release makes ClassNK the first classification society to release Harmonized CSR compliant software for use by the maritime industry.

IACS' new Harmonized CSR have been widely anticipated as the next step in shipbuilding requirements, not only unifying the existing CSR for bulk carriers and tankers, which were introduced in 2006, but also incorporating the IMO's Goal Based Standards (GBS) with the aim of further rationalizing shipbuilding regulations.



This new software is not only able to make use of data produced by existing CSR software, but has also been designed to smoothly integrate with all major 3-D CAD software systems and high performance calculation software, making data transfer between systems an easy process. It is indeed not just a calculation tool, but a total design support system.

## ClassNK Academy

The ClassNK Academy was established in 2009 to provide the maritime industry with a working knowledge of shipping and shipbuilding, specifically focusing on surveys, inspections



and ship management. It offers a total of eleven courses with a wide range of topics for newcomers as well as for experienced staff.

3 packages are available:

### **Package A** (Newbuildings)

Classification Society and Statutory Issues  
Classification Surveys during Construction (Hull)  
Classification Surveys during Construction (Machinery & Electrical Installations)  
Material and Welding

### **Package B** (Existing Ships)

Damage (Hull)  
Damage (Machinery)  
Safety Equipment  
Port State Control (PSC)  
Cargo Gear

The two packages mentioned above are recommended for newcomers to the maritime industry, having less than 5 years of experience, with a working knowledge of shipping and shipbuilding.

### **Package C**

(Ship Management (TMSA & ISM))  
Incident Investigation & Analysis and Risk Management  
ISM Internal Audits.

This package is recommended for ships and shore-based staff who require an understanding of the ISM Code requirements and knowledge of internal auditing procedures.

Academy course materials have been developed based on ClassNK's extensive knowledge of maritime regulations, cutting-edge research, and the data and experience gained over our more than a century of classification and other related

activities.

The course content is basically aimed at providing new employees and those with as yet limited practical experience at various companies with basic technical knowledge about shipbuilding and shipping. Of course, the material also includes the latest technical information and thus allows participants to obtain "work-ready" knowledge.

ClassNK wants to empower the younger generation of maritime professionals to go for it when it comes to ship classification operations and it is indeed time to pass the baton of technical knowledge in the 21st century's global environment, as we have seen in recent years a diversification of the needs in the Maritime Industry worldwide. The main purpose of ClassNK Academy is to prepare the next generation of professionals so they will be able to meet the always more changing demands related to this fast growing Industry, and by doing so, contribute to a worldwide improvement of the technological level .

In 2011, while in Japan the participation to those courses was high with more than 1,500 participants, 2,000 people from 9 countries took part in ClassNK Academy courses following the opening of the Oceania Region ClassNK Academy Center in Singapore on 1 September. Furthermore, in 2012, ClassNK has already held Academy courses in China, Korea, Thailand, Taiwan, and Myanmar, and is planning to hold these courses in Singapore, Indonesia, Philippines, India, Greece, Turkey and UAE.

In addition to the countries mentioned above, ClassNK is also able to arrange on-demand lectures at customers' requests.

(Please note the ability of ClassNK to meet such requests depends on the schedule for regular ClassNK Academy and the availability of lecturers.)

Finally, the successful training for overseas ClassNK Academy courses of 35 professors selected from more than 1,000 NK surveyors around the world will not only allow the expansion of ClassNK Academy but also a standardization of its content which is synonym of technical improvement at a global level.

# ClassNK

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