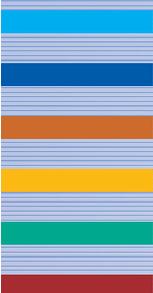


2003
55th EDITION

MAGAZINE

ClassNK



TECHNICAL ESSAYS

Studies on Ballast Water

SPECIAL ARTICLE

Electronically Controlled Diesel Engines

FOCUS ON JAPAN

Hakodate



ClassNK



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Kenji Ogawa, Chairman and President

Chairman's Message: *ClassNK Magazine 2003*

Welcome to the 2003 *ClassNK Magazine*, which now reaches over 4,000 NK clients and associates around the world. As a once a year publication, the magazine must be both informative, updating readers on major issues, and interesting enough to please a wide readership. I think this year the magazine offers a mix of features that cut across the breadth of what NK is and what we do. Hopefully there is something for everyone!

If I were to ask readers what they think are the four greatest threats to the world's oceans, I am sure I would get a wide range of answers. But I am not sure many would be right... Most readers would not be surprised that the International Maritime Organization (IMO) lists "Land-based sources of marine pollution," "Over-exploitation of living marine resources," and "Physical alteration and destruction of coastal and marine habitat" as three of the greatest threats to the world's oceans. But I think many readers would be surprised to find "Invasive marine species" as one of the top four greatest threats to the world's oceans. In many cases, when a marine species is transferred to a new environment, it may become invasive, have a devastating impact on the local environment and/or a serious economic impact, and can even affect human health. And it is now clear that many marine species, such as algae, plants and animals, are transferred with ballast water. This year's magazine has two features covering an introduction to this issue, as well as current NK research

into ballast water management. Also on the technical side there is a most useful update on the new so-called "intelligent" diesel engines. Electronically controlled fuel injection, so familiar to us in cars, has finally come to marine diesel engines, albeit on a slightly more complex and grander scale.

"Focus on Japan" this year looks at Hakodate, the last story in the series covering the three original international trading ports that opened Japan to the world in 1854. As with Nagasaki and Yokohama, this international trade port status has been instrumental in giving Hakodate a unique look and feel despite its smaller size and location in the far north of Japan.

Overseas offices profiled this year are Buenos Aires in Argentina, and Sydney, Australia. Personally, I have never visited Buenos Aires, but after reading this story I look forward to my first opportunity. I have, however, been to Sydney, and must say that the fame attributed to the beauty of Sydney Harbour is well deserved.

Last, but certainly not least, please do read the topics and events to be sure to be up to date with the latest topics of interest. As always, I hope you enjoy reading this year's magazine as much as I have.

Kenji Ogawa
Chairman and President



ClassNK Studies on Ballast Water Exchange Methods

Marine species transferred around the world in ballast water are a major problem that needs to be addressed on an international scale. Briefly, while ballast water is essential to the safe and efficient operation of ships, by providing stability when they are empty of cargo, the world fleet transfers billions of tons of ballast water around the world each year, and thousands of species of plants and animals are therefore also transported globally. It is these species that can pose serious ecological, economic and health threats when introduced to foreign environments. For interested readers, the story entitled "Ballast Water Blues" on pages 8 and 9 of this year's magazine details the background of this problem. For the purposes of this technical essay, however, the importance of this issue is well established.

CURRENT INTERNATIONAL AGREEMENTS

The 1992 United Nations Conference on Environment and Development (UNCED) requested the IMO to consider the adoption of appropriate rules on ballast water discharge from ships. Recognizing the potential impacts of ballast water on the marine environment and human health, the IMO resolved to tackle the problem and to put a mandatory legal instrument in place to minimize the risks associated with ballast water transfer.

In November 1997, the IMO developed voluntary guidelines for the control and management of ballast water and adopted them as assembly resolution A.868 (20). The 45th through 49th meetings of the Marine Environment Protection Committee (MEPC), from October 2000 to July 2005, have since progressed the development a draft international convention for the control and management of ships' ballast water and sediments.

Though discussions are continuing on two key issues in order to finalize the new international convention, (i.e., acceptable standards for ballast treatment that meet agreed criteria of environmental acceptability, and ballast water sampling criteria), the IMO approved the convening of a Diplomatic Conference in early 2004 to adopt the new ballast water management convention.

THE DRAFT INTERNATIONAL BALLAST CONVENTION

The agreed draft text of the international convention for the control and management of ships' ballast water and sediments is contained in an Annex to MEPC 49 working paper 16, together with five guidelines:

- Guidelines for the design, construction and operation of ships that use Ballast Water Exchange
- Guidelines for certification of ballast water treatment systems (Type Test)



- Guidelines supporting coastal States when considering additional measures under B-5.2 and Section C of the Regulations
- Guidelines on ballast water sampling/inspections on board ships by Port State Administrations
- Guidelines for ballast water management for pleasure yachts

STANDARDS FOR BALLAST WATER MANAGEMENT

The draft convention includes standards for ballast water management in Section E. Regulation E-1 includes the ballast water exchange standard, and Regulation E-2 includes the ballast water performance standard (treatment standard).

Regulation E-1 says:

1. Ships performing Ballast Water exchange in accordance with this Regulation shall do so with an efficiency of 95 percent volumetric exchange of Ballast Water
2. For ships constructed before [the date of entry into force of the Convention], pumping through three times the volume of each Ballast Water tank shall be considered equivalent to the standard described in paragraph 1

It is widely acknowledged (and commonly implemented) that currently the only practical ballast water management technique is ballast water exchange at sea. However the MEPC considers the ballast water exchange described in E-1.2 as only an interim option, because of its limited effectiveness in removing organisms from ballast water.

For ship safety reasons, in current ship designs there are various limitations to ballast water exchange operations at sea. These could be solved technically by new designs with different

ballast tank arrangements and ballast pump capacity. However, it cannot be denied that abundant bio-diversity would still remain in ballast water after exchange. Therefore, it is hoped that more effective ballast water management methods can be developed.

BALLAST WATER EXCHANGE METHODS

Taking into account the current situation, where the approval criteria for new treatment technologies are still not finalized, as well as the current requirements in Regulation E-2, where implementation dates are also still not finalized, for the time being the ballast water exchange method is still the only acceptable technique. It is also worth noting that many authorities that have implemented ballast water control in their ports currently accept this (ballast water exchange) method.

Two methods of ballast water exchange at sea are identified in the agreed text of the Convention. One is the so-called “sequential exchange method” and the other is the so-called “flow-through exchange method,” both defined in the Convention as pumping through three times the volume of each ballast water tank.

THE IMPACT OF BALLAST EXCHANGE AT SEA AND NECESSARY SAFETY PRECAUTIONS

Due to the structural and other impacts of conducting ballast water exchange operations at sea, there are certain limitations in terms of ship safety, and all ships must take safety precautions irrespective of the exchange methods.

Table 1 shows a summary of ship safety issues relevant to each exchange method.

TABLE 1

SUMMARY OF ISSUES TO BE CONSIDERED WITH BALLAST WATER EXCHANGE METHODS

	SEQUENTIAL METHOD	FLOW-THROUGH METHOD
METHOD	Ballast tanks are pumped out and refilled with clean ocean water. All of the ballast water should be discharged until suction is lost.	Ballast tanks are simultaneously filled and discharged by pumping clean ocean water in and allowing the water to overflow from the tanks. At least three (3) times the tank volume should be pumped through the tank.
GENERAL CAUTION	Particular attention should be given to the ballast tank layout, total ballast capacity, individual tank configuration and hull girder strength. If the Ballast Water Management Plan requires simultaneously emptying and refilling closely matched diagonal tanks, then the consequential torsional stress should be considered. Still water bending moments, and shear forces should remain within permissible levels when simultaneously emptying and refilling closely matched diagonal tanks.	Adequate provision should be made to avoid the risk of over pressurization of ballast tanks or ballast piping. Enhancements in this regard may include the installation of additional air pipes, installation of tanker hatches (as an alternative to deck manhole(s)), and internal overflow pipes (to avoid water flowing over the deck).
IMPACTS ON SHIP STRENGTH	<ul style="list-style-type: none"> ▪ Increase of longitudinal bending moment and shearing force ▪ Reduction of stability ▪ Occurrence of sloshing in tanks ▪ Occurrence of slamming as a result of insufficient fore draft ▪ Occurrence of hull vibration due to variations of draft and loading conditions 	<ul style="list-style-type: none"> ▪ Excessive pressure to ballast tanks and piping ▪ Damage to air pipe heads due to large amounts of flow-through water ▪ Negative impact on stability due to frozen ballast water on deck in very low temperature areas
SHIP OPERATION	<ul style="list-style-type: none"> ▪ Can result in insufficient bridge visibility for navigation ▪ Impacts on ship maneuverability and propulsive efficiency by deviating from adequate drafts and trims 	[No impact on ship operations because of no change to ship condition]
MAINTENANCE WORK	Restrictions on time for maintenance work on generators	<ul style="list-style-type: none"> ▪ Restriction of deck maintenance work due to overflow of water on the deck ▪ Acceleration of corrosion of deck structural members due to overflow of water on the deck ▪ Restriction of time for maintenance work of generators
CREW SAFETY AND ADDITIONAL WORK	When the hold ballast water is exchanged, the crew must continuously monitor the water level in the hold by level gauges in order to prevent damage to hatch covers and hull structure from over filling and finally confirm by ullage measuring using access hatches. In bad weather, this work on deck to check ullages is quite dangerous for crews.	<ul style="list-style-type: none"> ▪ Opening manholes to release excess pressure from the water pumped into tanks is essential to prevent damage to tanks/holds. This work is weather-dependent and is additional work for the crew ▪ Opening/watching manholes on deck occupies the crew for a long time ▪ It is dangerous to open and close manholes during bad weather and/or at night

Various parts of NK's flow-through ballast water exchange research

Regardless of which is the most practicable or common method of ballast water management, the choice of which method and the safe operation of the exchange is left in the hands of individual shipmasters.

NK has commenced a study on ballast water exchange in order to develop precise guidelines for the safe operation of ballast water exchange at sea, which should include acceptable sea conditions for ballast water operation. Besides the technical and operational issues listed in Table 1, other important general issues relating to ballast water exchange at sea include the following:

Restrictions on time and location:

Due to specific operational reasons, such as a short voyages, coastal routes, and encounters with rough seas, the ship may be prevented from undertaking ballast water exchange operations.

New problems for the marine environment:

Due to additional long running of diesel engines for ballast pumps during the operation, the emission of carbon dioxide into the air will increase.

Commercial pressures:

If the ship encounters difficult conditions, such as heavy seas, in which it would not usually carry out the exchange of ballast water at sea, there may be cases where the ship is ordered to carry out the ballast water exchange at sea regardless of safety or other concerns, in order to avoid any delay to the ship's schedule.

Additional costs:

Additional fuel oil costs for ballast pumps and the additional burden of the ballast water exchange operations for crews are to be considered.

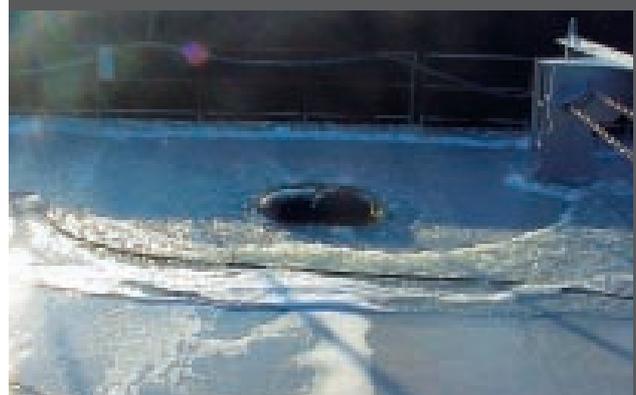


TABLE 2

SUGGESTIONS FOR THE SEQUENTIAL BALLAST WATER EXCHANGE METHOD

PROBLEM	BACKGROUND/EXPLANATION	SUGGESTIONS
FORWARD DRAFT	This requirement is to prevent forward bottom damage by slamming force in rough seas. Therefore, if there is a restriction that ships do not carry out ballast water exchange in rough seas, the forward draft is not an issue.	Evaluation of the sea conditions in which ballast exchange operations can be carried out safely may provide a guide as to what sea conditions are safe for the sequential method.
LONGITUDINAL STRENGTH, PROPELLER IMMERSION, AND BRIDGE VISIBILITY	It is obvious from the results that these three requirements cannot be complied with at the same time in current ship designs.	In the case of existing ships, the sequential method could be applied subject to: 1. Longitudinal strength criteria being relaxed subject to specified sea conditions 2. If relaxation of the visibility standard subject to prohibition of ballast water exchange in traffic congestion areas is considered

NK STUDY ON THE SEQUENTIAL METHOD OF BALLAST WATER EXCHANGE

As seen in Table 1, the sequential method entails various risks to ship operations, such as stability, longitudinal strength, sloshing impact force in tanks, slamming due to the light draft, bridge visibility, and propeller immersion. This method requires very complicated ballast exchange operations.

NK investigated the following safety aspects during the sequential ballast water exchange procedure for several types and sizes of ships:

- Longitudinal strength
- Intact stability
- Forward draft (a minimum draft at the forward bottom)
- Propeller immersion
- Trim
- Bridge visibility

The investigation resulted in the following conclusions relating to future designs for ships to carry out ballast water exchange safely using the sequential method:

- Currently, the forward draft requirement cannot be complied with in heavy seas
- Stability and trim requirements can be complied with even in current designs
- The requirements regarding longitudinal strength, propeller immersion, and bridge visibility depend on the condition of each ship

It was concluded that it is impossible for ships of current ballast water tank arrangements to comply with accepted structural and safety standards while exchanging ballast water by the sequential method. The report then summarizes some suggestions to solve the problems of the sequential method, as described in Table 2.

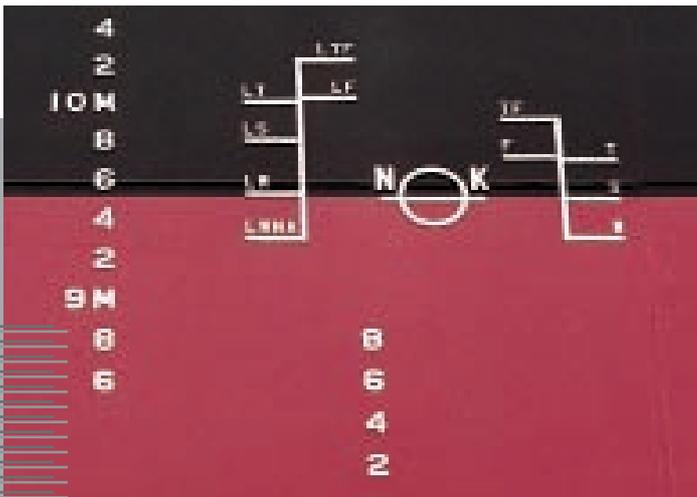
SLAMMING AND SEA CONDITIONS

Following on from the above, NK has commenced a study investigating the sea conditions in which ships can avoid the occurrence of slamming, yet still undertake ballast water exchange safely using the sequential method.

It should be possible to elucidate the sea conditions under which slamming will happen with a certain occurrence probability, varying the parameters of significant wave height and average wave period for each condition of the ship. The final goal is to provide masters with information on the Beaufort scale at which slamming may occur (if undertaking ballast transfer at sea using the sequential method). This information will include variable parameters, such as ship speed or ship length.

NK STUDY ON THE FLOW-THROUGH METHOD OF BALLAST WATER EXCHANGE

As noted earlier, the flow-through exchange method entails relatively less risk than the sequential method. One possible risk is excess pressure in tanks caused by pumping operations. In order to estimate the excess pressure in tanks during overflow operations, and in order to develop guidelines for safe opera-



tion, NK has developed a calculation program to estimate the excess pressure on ballast water tanks. NK has verified the accuracy of this calculation program experimentally using a Panamax bulk carrier with the following results:

1. Accuracy of calculation program: The accuracy of the excess pressures calculated by the program was verified as accurate by the experiment
2. Additional excess pressure in tanks: The calculation and experiment demonstrated the additional excess pressure impacts on the tank structure during the flow-through ballast water exchange operation
3. Additional excess pressure in Panamax bulk carriers: In the case of Panamax bulk carriers, it was confirmed that pressure about 9% greater than the design pressure allowed in accordance with NK Rules could occur in the inner bottom plate during flow-through ballast exchange operations
4. How to relieve the additional pressure: The additional pressure could be released by opening manholes or increasing the sectional area of tank overflow pipes

As opening manholes to relieve the excess pressure raises other problems, such as danger to the crew, NK is investigating other solutions to the excess pressure resulting from the flow-through method. For example, using the calculation program NK is investigating the appropriate sectional area of air escape pipes (in relation to the sectional area of filling pipes) required to avoid excess pressure in ballast tanks during flow-through operations.

CONCLUSIONS AND FUTURE TOPICS

Given the lack of practicable treatment alternatives so far, NK has had to consider the real need to manage the vast amount of ballast water from ships, as well as the practical implementation

regimes of local port authorities, which have been having a serious impact on ship operations.

The IMO has developed a draft international convention for ballast water management, and within this context two ballast water exchange methods are considered as workable options. Hence, NK has investigated ballast water exchange methods in order to develop a guideline for ballast water management by exchange methods. Based on our research, we agree that the exchange method is the only appropriate technique for ballast water management, pending the development of new practical treatment technologies.

Furthermore, the research has another important function, which is to contribute to the development of new ship designs that allow ballast water exchange at sea more safely and effectively.

An investigation of both methods of ballast water exchange has identified inherent technical limitations in the methods for current ship designs. For the sequential method, ships cannot comply with accepted ship safety requirements, which are essential for safe operation and navigation, because of the change of the ballast distribution in ships. The flow-through method also raises the problem of the excess pressure in ballast tanks.

Recognizing that the exchange methods are not compatible with current ship designs, NK has extracted useful clues for safer ship operation formulating practical solutions to the technical limitations of the exchange methods for incorporation into new ship designs.



Ballast Water Blues

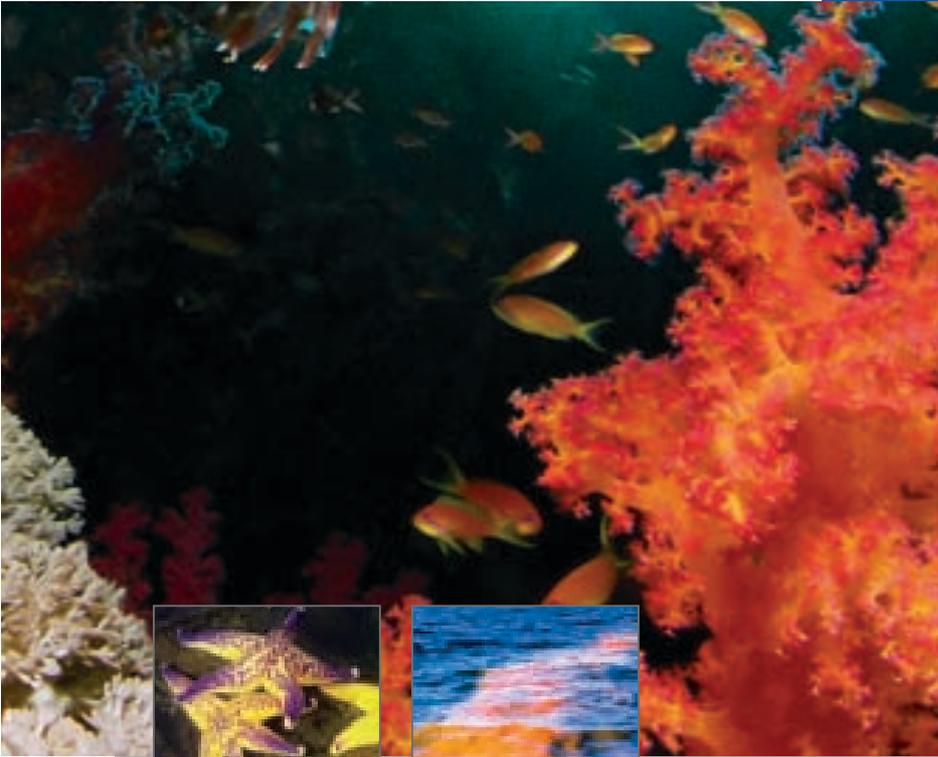
The previous article detailed ClassNK's involvement in a range of studies on ballast water management. It is clear that much time and money and effort is being spent on this issue. What may not be clear to some readers is why this is so!

Ballast water is the water stored in tanks on ships and used at different times in different ways to maintain balance, stability and structural integrity. Typically, when a ship discharges its cargo in a port, it becomes much lighter and therefore sits much higher in the water. In most cases, this makes the ship unstable and more vulnerable to the effects of heavy seas. If the ship does not take on any cargo, it will fill its ballast water tanks to balance the effect of the lack of cargo. Then, when it gets to the next port where it will take cargo on board, it will discharge the equivalent amount of ballast water to compensate. Estimates of just how much ballast water is transferred around the world vary from three to ten *billion* tons per year.

For many years, this was considered a quite benign practice. After all, it's just seawater, so what's the problem? Well, the problem is that it's not just seawater that is transferred. It is now clear that many marine species, such as algae, plants and animals, are transferred with the ballast water. And the potential for transfer is made worse by the fact that so many marine species that are physically large or are usually sedentary, and could therefore reasonably be expected to be controlled by some simple physical barrier, actually have planktonic stages in their lifecycles, allowing them to bypass most physical barriers in ballast water intake ports or pumps.

In many cases, when a species is transferred to a new environment, it may become invasive, and have a devastating impact on the local environment and/or a serious economic impact, and can even affect human health.

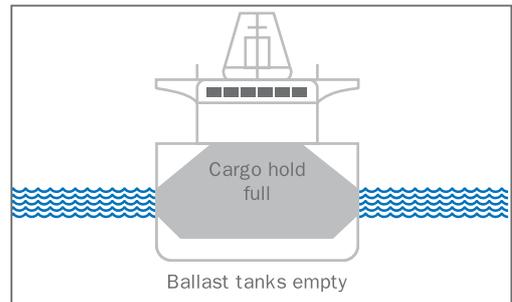
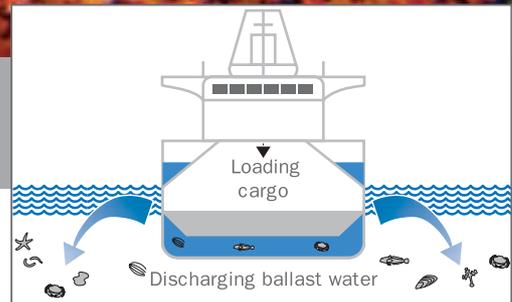
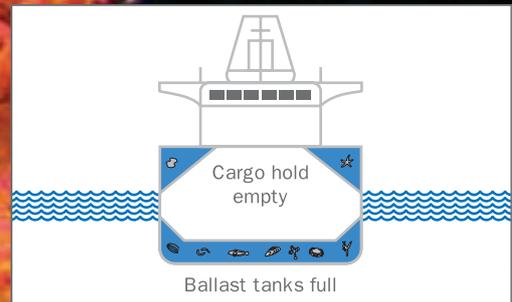
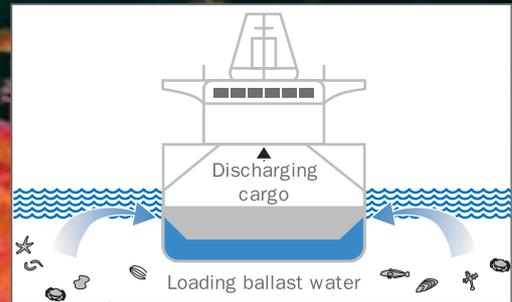
A typical example is the North Pacific Seastar (*Asterias Amurensis*), which is normally native to the North Pacific, where its population and activities are generally kept in balance by the local ecology in which it has developed. The Seastar has been introduced to southern Australia,



North Pacific Seastar



Toxic algae



where the local ecology is so favorable that it has reproduced in plague proportions. In just one estuary in Tasmania (southern Australia), estimates put the local population at over 30 million, at densities even greater than its natural habitat. The Seastar is a voracious predator and not only devours the local shellfish population, but also threatens commercial shell fisheries, such as for oysters and scallops.

The other most famous example that would be familiar to most readers is the so-called "toxic algae." In fact, there is not just one, but a number of different, usually dinoflagellate algae, that when transferred to favorable conditions multiply prolifically, resulting in algal blooms or the so called "red tide," which of course can actually be brown or even green, depending on the species. Sometimes the algae can contaminate shellfish, which if eaten by humans can result in paralysis or even death.

Numerous other examples abound, from crabs to kelp, from jellyfish to real fish, and even cholera. The question is what can be, and is being, done to tackle this problem? Naturally, a global problem requires a global response, and this response is being led by the IMO, through the Globallast

Program. The IMO has developed "Guidelines for the control and management of ships' ballast water, to minimise the transfer of harmful aquatic organisms and pathogens," as well as model ballast water management plans, and an International Convention is in the final stages of development.

Extensive research and development is being undertaken on treatment options. However, at this stage there is no total solution, hence the focus on ballast water exchange at sea, and the contribution NK is making to researching this process.

An Outline of Electronically Controlled Diesel Engines

INTRODUCTION

Three licensors of two-stroke diesel engines—**MAN-B&W, Wärtsilä, and Mitsubishi**—have started developing electronic control systems to be utilized on marine propulsion engines, and are now moving toward the practical installation of such engines on board actual ships. ClassNK has attended a number of type approval tests for these newly developed engines, and has now developed relevant rules and guidance applicable to them. An electronically controlled diesel engine will be installed on board a ClassNK ship for the first time early next year. This article outlines the fundamental structure and distinctive features of the respective diesel engines developed by each licensor, as well as their electronic control systems.

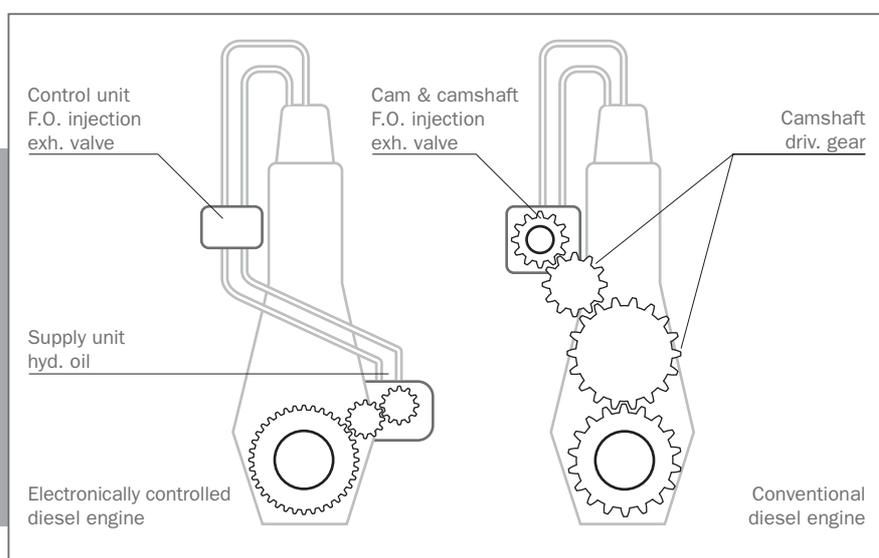
FUNDAMENTAL STRUCTURE OF ELECTRONICALLY CONTROLLED DIESEL ENGINES (FIG. 1)

For conventional diesel engines, fuel oil injectors, exhaust valves and starting air distributors are driven and thus mechanically controlled by crankshafts via cams and camshaft linkages. In electronically controlled diesel engines on the other hand, they are powered by hydraulic oil pumps and controlled electronically by solenoid valves, which act according to instructions from a computer.

DISTINCTIVE FEATURES

No doubt the most notable feature of electronically controlled diesel engines is that the timing and duration of fuel injection and exhaust valve operation can be controlled by solenoid valves, which admit hydraulic oil according to instructions from computers, irrespective of the crankshaft's rotating angle. This makes it possible to achieve optimum operational conditions, at any engine rotational speed, and to reduce specific fuel consumption, especially at lower engine speeds.

FIG. 1





Other key features of electronically controlled diesel engines include:

- The amount and timing of fuel injected into a cylinder can be governed independently from every other cylinder. Stress imposed on engines during emergency operation with one cylinder cut off is therefore expected to be minimized
- NOx reduction mode is one option, and fuel economy mode is another option

Other advantages of electronically controlled diesel engines claimed by the manufacturers include:

- Reduction in engine weight
- Elimination of vibration induced by the mechanical cam drive
- Simplified engine construction

- Longer operational life of combustion chamber components, including liners and covers
- Consequent longer maintenance intervals and reduction in workload for component changes

OUTLINE OF THE FUNDAMENTAL STRUCTURE OF THE ENGINES FROM EACH LICENSOR

Outlined below is the basic structure of each of the licensed electronically controlled diesel engines, notably the MAN B&W “ME” model and the Wärtsilä Sulzer “RT-flex” model, respectively. Mitsubishi has not officially announced the development of this kind of diesel engine as yet.

MAN B&W ME ENGINES (FIG. 2)

Hydraulic oil is pressurized to about 20 MPa by engine-driven high-pressure oil pumps, kept in intermediate accumulators, and then fed to servo pistons for the fuel injectors and exhaust valves, respectively. In the fuel injection actuator, the amount, timing and injection pressure of fuel are controlled by proportional control valves, which admit hydraulic oil from intermediate accumulators. The exhaust valves are driven by hydraulic oil admitted by on/off control valves. Operation of all the control valves is fully computerized and monitored.

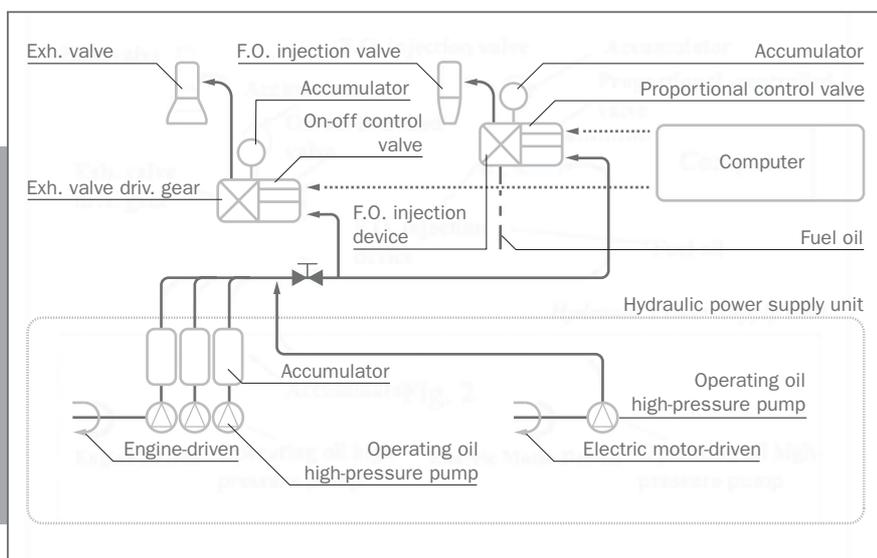
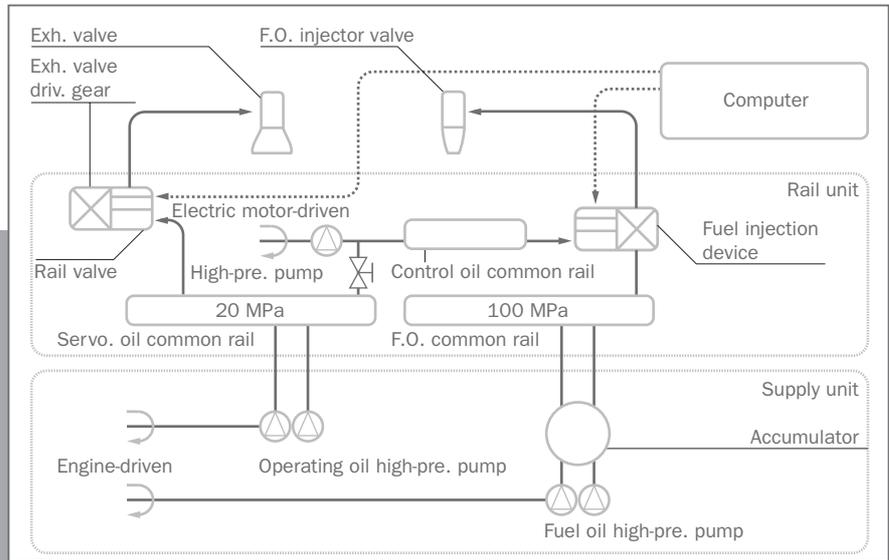


FIG. 2

FIG. 3



WÄRTSILÄ SULZER RT-FLEX ENGINES (FIG. 3)

Fuel is pressurized to about 100 MPa by an engine-driven fuel oil high-pressure pump, and kept in a common pressure vessel called a common rail. High-pressure fuel is supplied from this common rail to fuel injection devices, and the amount, timing and injection pressure are controlled by operating oil admitted by computerized rail valves. The driving gear for exhaust valves is controlled by operating oil, in a similar manner to the fuel injection system. Operating oil is pressurized to about 20 MPa by an engine-driven operating oil high-pressure pump, and supplied to exhaust valve driving gears through the servo oil common rail, which is another common rail.

OUTLINE OF ELECTRONIC CONTROL SYSTEMS (FIG. 4)

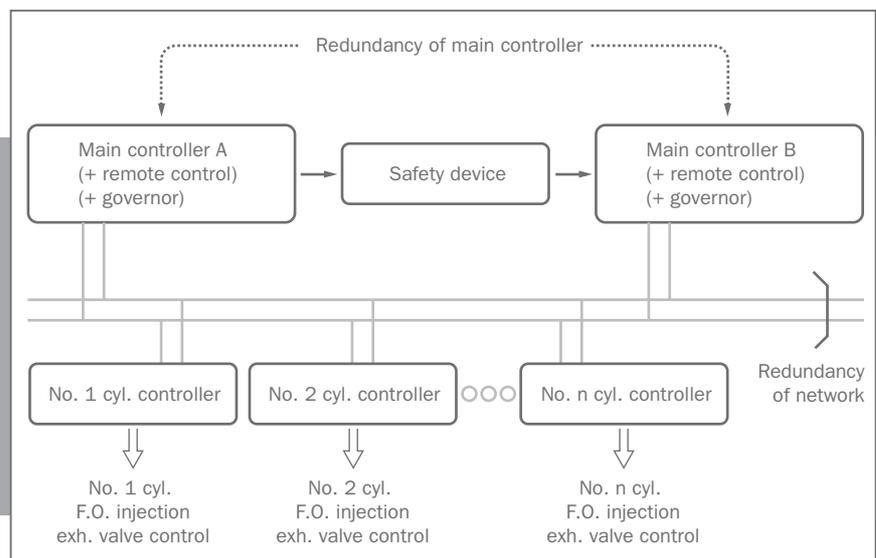
Electronically controlled diesel engines are fully dependent on computers, which are supposed to control solenoid valves. These are the proportional control valves and on/off control valves on the MAN B&W ME model and the rail valves on the Wärtsilä RT-flex model. A cylinder controller on

each cylinder can readily be replaced with a spare in case of breakdown. Network and main controllers fulfill redundancy requirements for a major failure, and therefore the system can maintain safe operations even when one network and/or main controller breaks down. Main controllers undertake both the remote control function and the governor function, and have a mutual connection with external safety devices.

RULES AND GUIDANCE APPLICABLE TO ELECTRONICALLY CONTROLLED DIESEL ENGINES

ClassNK has recently developed new rules and guidance applicable to electronically controlled diesel engines as additional requirements to those prescribed in Chapter 2, Part D of the Society’s Rules. Wärtsilä RT-flex and MAN B&W ME engines, which are now undergoing type approval process, have been examined for compliance with the new requirements of ClassNK through both design review and functional bench tests.

FIG. 4





Hakodate

This year marks the 150th anniversary of the arrival, in 1853, of U.S. warships in Japan under the command of Commodore Matthew Perry. Perry's so-called "Black Ships," have become symbolic of the "opening" of Japan, as part of his mission was to obtain a treaty from Japan that would guarantee trade for American merchants in Japanese ports. Perry was successful, and in 1858 Japan concluded a friendship and trade treaty with America (as well as the Netherlands, Russia, England, and France). Through this

treaty, three ports—Hakodate, Nagasaki and Yokohama—obtained the status of "international trade port," and trade was permitted from June 2, 1859.

Astute regular readers of the NK Magazine will recall that both Nagasaki and Yokohama have featured in the "Focus on Japan" section in recent years, so it should come as no surprise that this year we take a look at Hakodate, the last of the three original "international trade ports."

A double side skin bulk carrier under construction at Hakodate Dock



As with Nagasaki and Yokohama, this international trade port status has been instrumental in forming a unique look and feel for the city. Despite a relatively small population of just under 500,000 and a relatively remote location in the south of Japan's north island, Hokkaido, Hakodate has a genuinely cosmopolitan look and feel, far removed from similar rural cities throughout Japan. Whether it be the streetcars (trams), the European architecture or the friendly but nonchalant attitude to foreigners, there can be no mistaking Hakodate's international pedigree.

My Business Department colleague Matsumoto-san and I arrived late morning to a fine and pleasant 24 degrees centigrade, grateful to escape the oppressive heat and humidity that is Tokyo in the summer. Leaving our bags at the hotel, we decided on one of Hakodate's historical and cultural icons as our lunch venue. First opened in 1879, "Gotoken," was one of the first French/Western style restaurants in Japan, and despite a turbulent history, has survived and prospered. The complex still has a classic French restaurant, famous for its excellent French cuisine. However, in keeping with the more modest NK daily allowance, we opted for lunch in the "lounge." Although offering more traditional Japanese fare, the French influence remains strong and Matsumoto-san and I both enjoyed a "French-style" curry rice lunch, which was extremely delicious and very nicely presented, at a quite reasonable price. Keen to avoid the drowsiness that always follows such a satisfying meal, we elected to walk the 10 minutes to the NK Hakodate Branch Office, located midway up the hill overlooking Hakodate port. The office, while no architectural wonder, is spacious and very functional, accommodating the General Manager, Mr. Takio Kuwahara, four surveyors and

their support staff, and offering them a very nice panorama of the port, especially from the rooftop viewing area. Although relatively small, it is not surprising, given its history that, the NK Hakodate Branch Office is one of the oldest NK offices, originally opening in 1925. Although its size and status have varied from time to time, it has always been a vital link in the NK network. We had timed our visit to coincide with a launching ceremony at Hakodate Dock, so after formal greetings we headed to Hakodate Dock, a five-minute taxi ride away, with principal hull surveyor, Mr. Nobuhiro Makino.

Hakodate Dock Co., Ltd., was founded in 1896, 28 years after Japan's first shipyard was established in Nagasaki. Hakodate Dock specializes in shipbuilding but also undertakes ship repairs, builds bridges and large steel structures, and employs around 800 workers, including subcontractors. The yard currently builds five ships per year, but will next year increase its building capacity to six ships, and all will be built to NK class. The shipyard can build handy size bulk carriers up to 48,000 dwt, Ro/Ro ships, and patrol ships, which are uniquely designed with advanced construction. In the last 10 years, 24,000–32,000 dwt class smaller handy size log/bulk carriers with a shallow draft of 9.50–9.55 m have become a specialty. Over 40 ships of that types have been proudly delivered to ship-owners, and enjoy an excellent reputation around the world.

The launching ceremony we attended was for one such log/bulk carrier, the new 32 000 GT *Maritime Sirinant*, built for Orient Line Co. Ltd, for charter to IMC Singapore. The ceremony was a grand affair attended by numerous VIPs, including the Chairman of IMC Singapore, Mr. Frederick Tsao, son of the prominent shipping magnate (and NK Hong



NK Managing Director
Dr. Minoru Oka (left) with
Mr. Frederick Tsao,
Chairman of IMC Singapore

*The Maritime Sirinart
slides into Hakodate Bay*

Kong committee member) Mr. Frank Tsao, as well as NK Managing Director Dr. Minoru Oka. Our hosts from Hakodate Dock, Mr. Mutsuo Ishida (Manager) and Mr. Seiji Ettchuya of the Quality Assurance Department, pointed out that we were quite lucky to see this particular ceremony, because traditional slipway launches were increasingly rare these days. And indeed he was right... After the traditional cracking of the champagne and exploding of the streamers, it truly was impressive and exciting to watch 32,000 tons of ship slide majestically down the slipway into Hakodate Bay and the waiting arms of a couple of friendly tug boats. Early evening, we retired to the Hakodate beer hall with the whole Hakodate Branch Office team, to research the delights of the local primary industries, seafood, buttered potatoes, and beer...

One of the reasons that Hokkaido is so famous for its primary products is its “green” reputation as an environmentally safe and clean place. Local governments, keen to maintain and cultivate this image, are encouraging a range of environmentally friendly development projects, especially in “clean energy.” One such local government is Setana, located just 170 km along the coast from Hakodate, which is actively encouraging the development of wind-powered electricity generation. The constant winds that are a feature of coastal northern Japan are well suited to wind power generation, and a large number of projects are coming to fruition. At the Setana local government office, we met Mr. Masashi Kanda, who is in charge of their wind power development project. Kanda-san is clearly passionate about this project and happily took us out to the construction site to explain how it will develop. On the way into town, we couldn’t help but notice two huge wind turbines towering over the local landscape.





Kanda-san explained that these two 155-m tall, 400-kw Mitsubishi turbines belonged to the Tokyo-based company Ecopower and had been in operation since the year 2000, generating power for local consumption and feeding excess power back into the grid when able. The soon to be completed first stage of the Setana local Government project will be two 600-kw Danish turbines located about 200 m offshore. The offshore location allows the turbines to take advantage of better wind conditions and minimizes the impact on the local landscape. A total of six offshore turbines are planned for the complete project. On the way back, we visited the local lookout, which afforded a magnificent view of the beautiful coastline as well as the development site, and Kanda-san explained that his office was already researching the next clean energy project, a biomass generator. Given his otherwise fairly typical demeanor for a local government official, this passion for the environment was perhaps the only clue to a later confession by Kanda-san that in his younger years he was actually the vocalist for a heavy metal band in Sapporo's famous Susukino entertainment district!



The three-hour return drive got us back to Hakodate after nine p.m. and somewhat famished, so we were pleased to find one of the 10 Lucky Pierrot stores open. Popularly claimed



Famed culinary delights of Hakodate:
Gotouken Curry, *ome-rice*, and *shio ramen*

to be Japan's number one ranked hamburgers, we were keen to make our own evaluation. While Matsumoto-san was more adventurous, trying the Chinese chicken burger, I stuck with the classic cheeseburger. In the final analysis, we agreed that they were excellent, possibly number one, but then it really is hard to be objective when you are so hungry!

Before flying back to Tokyo the next day, we wanted to check out a few of the more famous tourist sites of Hakodate. Unfortunately for me (not a morning person), this included a trip to *Asa Ichi*, the famous early morning market in front of Hakodate station, where we were hawked everything from crabs, to melons and local souvenirs.

Again like Nagasaki and Yokohama, one of the most obvious effects of being among the earliest international ports is the impact on local architecture, the best example being the Old Public Hall of Hakodate Ward. Located on the hill overlooking Hakodate port near the NK office, it was built in a classic Western style in 1909, and was designated as an important cultural property in 1974. It has been beautifully restored, and even today the grand ballroom is regularly used for concerts.

Given its proximity, it is not surprising that there is also a strong Russian influence in Hakodate, one of the nicest examples being the Russian Orthodox Church.

As we headed to the airport, we agreed that it would be most remiss of us to depart Hakodate not having sampled one more of its most famous offerings, so *shio ramen* (noodles in a salt-based broth) it was for lunch before flying back to the grind of Tokyo.

Facing page (from top):
Hakodate streetcar
Asa Ichi (Morning Market)
Hakodate Ward Old Public Hall
Hakodate Russian Orthodox Church

Staff of the Hakodate Branch Office (from right):
Mr. T. Kuwahara (General Manager), Mr. T. Matsushita,
Mr. N. Makino, Ms. K. Okamura, Mr. K. Oohara, Ms. M. Takada,
Mr. K. Hirota, Mr. T. Tanimoto, and Mr. Y. Mariko



ClassNK Hakodate Branch Office





Sydney skyline

Sydney

Australia, the world's oldest continent, has been inhabited for more than 40,000 years by Aborigines and was settled by the British just over 200 years ago, in 1788. Since then, it has been transformed from a colonial outpost into a prosperous nation with a population of almost 20 million.

Australia's landscape is highly diverse, encompassing the famous Outback, the high plateaus of the Great Dividing Range, the lush forests of Tasmania, the tropical rainforests and coral reefs of the tropical north and has almost 18,000 km of coastline. Almost 90 percent of the population lives in cities dotted along this coast and actually has little more than passing familiarity with the Outback.

Within only one generation of the arrival of the First Fleet in 1788, Australia had become a nation of immigrants. Originally hailing almost entirely from the British Isles, today one in three Australians originates from elsewhere, and the majority of new immigrants is from Asia and Africa. Although isolated incidences of racism do occur, this blend of nations has, on the whole, been a very successful experiment, and Australia is justifiably proud to have one of the most harmonious multicultural communities in the world.

For many years, Australia was said to have “ridden on the sheep's back,” a reference to wool being the country's main money earner. However, the wool industry is no longer dominant. Much of Australia's quite robust economy is now derived from other natural resources, such as coal, liquefied natural gas (LNG), iron ore, oil, and diamonds, as Australia is the largest diamond producer in the world, not to mention manufactured goods.

As Australia's natural resources like coal, gas, and iron ore, were further developed for export and the large number of ships transporting them increased in the 1970s and 1980s, ClassNK established a representative office in Australia for the first time, in Sydney in 1982. During the nearly 20 years since then, the representative office in Sydney managed to cope with surveys requested from all over Australia and as far as Papua New Guinea, the Solomon Islands, New Zealand and across the other Pacific Islands, with assistance of non-exclusive surveyors based in major



Sydney Harbour Bridge and Opera House



Staff of the ClassNK Sydney Representative Office (from left): Mr. N. Hossain, Mr. N. Ikeda, and Ms. N. Prochazka

ports, until another representative office was established in Auckland, New Zealand in 1996. Thereafter, New Zealand and the Pacific Islands, such as Fiji and New Caledonia, came under the jurisdiction of the Auckland Office.

In recent years, Port State Control has been incorporated into the SOLAS Convention and PSC inspections have become more stringent and more detailed, with more ships being detained in Australia. At the same time, IACS has agreed among its members on restrictions to statutory and other surveys only being done by exclusive surveyors. As a result, ClassNK Sydney established a sub-office in Fremantle, Western Australia in 2001 and two more sub-offices in Melbourne and Brisbane in 2005.

These days, the Sydney Representative Office handles nearly 300 surveys a year, with five surveyors in New South Wales, Queensland, Victoria and Western Australia. With these

three sub-offices established in Fremantle, Melbourne and Brisbane, ClassNK Sydney is very confident that it can offer clients services of a much higher quality, with a greater number of well trained and organized exclusive surveyors, reduced access time for attendance and lower costs associated with travel expenses compared with when there were no sub-offices and fewer exclusive surveyors.

The types of ships coming into Australia for surveys are diverse and can be broken down as per the graph in Figure 1 on the following page. About half the total number are bulk carriers with oil/chemical carriers coming in second with 54 percent last year. The types of surveys are as shown in the graph in Figure 2, with more than half the surveys being occasional surveys, followed by statutory surveys and class periodical surveys, all being carried out afloat. Australia has few major repair dockyards, and docking surveys are carried out only a couple of times a year, if at all.

FIG 1: TYPES OF SHIPS SURVEYED IN 2002

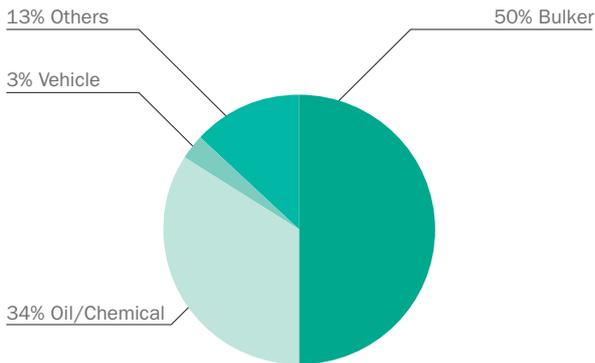
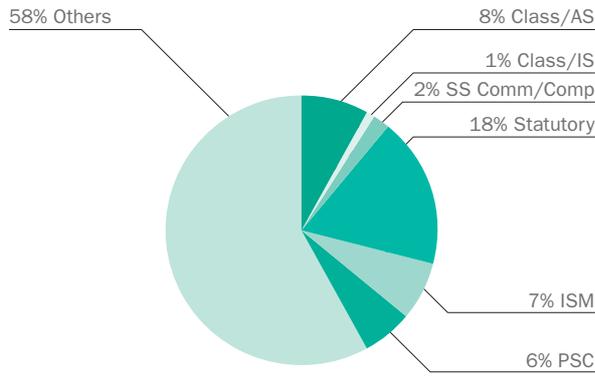
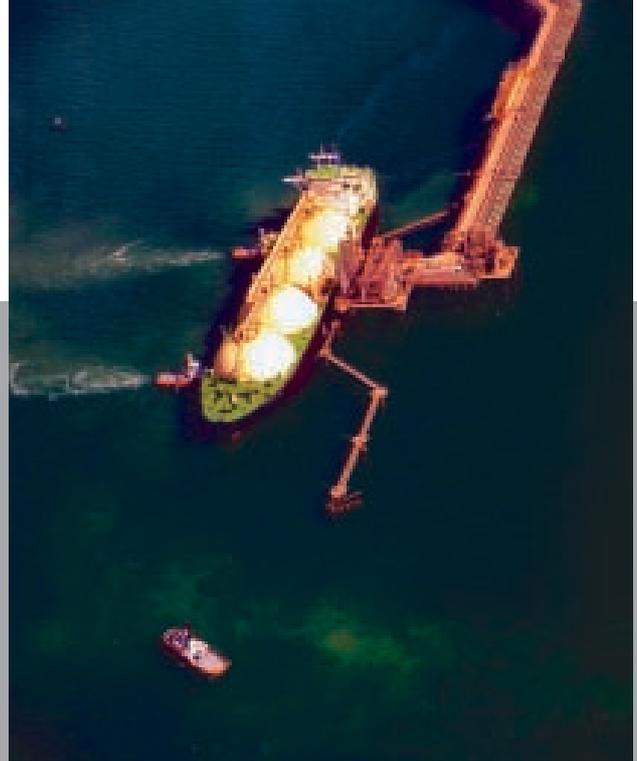


FIG. 2: KINDS OF SURVEYS PERFORMED IN 2002 (TOTAL: 269)



The Sydney Representative Office is located in North Sydney, together with most of the other class societies' offices, in a neighborhood just across the Harbour Bridge, which is a business center, unlike the central city area of Sydney, which has many tourists sightseeing all year round. Sydney is the largest city in Australia, with a population of over four million. There are two major commercial ports, Port Jackson and Port Botany, which handle various cargoes, including containers, oils, gas, chemical, and general cargoes.

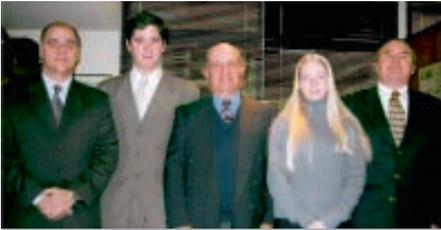
Other major ports in the jurisdiction of the Sydney Representative Office include Newcastle, which is one of the largest coal ports, Hay Point, located about 150 km north of Sydney, and Port Kembla, about 100 km south of Sydney for coal, iron ore, grain, and steel products.



The major survey ports in Queensland are Townsville, mainly used for nickel ore and sugar. Hay Point as Australia's largest coal port, Gladstone for coal, alumina, and wheat, in the north region, and, of course, the capital of the state, Brisbane, which is the largest port for oil, oil products, grains, chemical products, vehicles, meat, and animals.

In the southeast region of Australia, NK has a local representative office in Melbourne and the surveyor, Richard Wright, looks after surveys in three states: Victoria, South Australia, and Tasmania. There are several ports in Melbourne for various cargoes, including Geelong for crude and product oils, in Victoria, as well as Adelaide, Whyalla, and Wallaroo in South Australia, and Hobart and Launceston, in Tasmania.

In Western Australia, Fremantle is one of the biggest ports and the site of an NK representative office. A wide variety of ships uses the port, and there are a number of aluminum fast boat shipyards in Fremantle, that have grown to become one of the most successful export industries in Australia. There are a couple of major material ports in the Northwest region, such as Dampier, Port Hedland and Port Walcott for exports of iron ore, LNG, and salt. In particular, Australia LNG's North West Shelf is one of the largest developed gas fields (7.7 million metric tons) in the world and is operated by a consortium made up of several oil majors and energy companies.



Staff of the Buenos Aires Office (from left): Mr. Gonzales Ceballos (Accountant), Mr. Gustavo Villen (Technical Staff), Mr. Jorge Deuardo Vazquez (General Manager), Ms. Silke Lienhard (Secretary), and Mr. Nicolas Grimaldi (Surveyor)



Buenos Aires

Argentina, located in the lower half of South America, is like a triangle between two oceans, extending from the majestic Los Andes Mountains and Pacific Ocean in the east to the Atlantic Ocean in the west, and from the tropic of Capricorn in the north, almost to Antarctica in the south. The climate is very warm in the north (tropical area), mild in the center and very cold in the south.

In the country's center are the rich lands famously known as the "Pampas," which are extensive flat areas with rich soils and generous rains that have helped turn Argentina into a worldwide grain exporter and famous meat producer. Mention Argentina and people will immediately picture a country of lonely "gauchos," cows, soccer players, and sultry tango dancers and singers. The country is blessed with abundant natural resources and a highly educated population. The country also boasts a stunning geography, blessed with a variety of natural wonders and cultural attractions. Unfortunately, in spite of all this potential, a succession of administrations has left the country economically and socially unstable, with high rates of unemployment and crime.

Buenos Aires, one of the world's major metropolises, is home to one in three Argentines and is the capital of the largest Spanish-speaking country in the world. This complex, energetic and seductive port city, which stretches south to north along the big, wide Rio de la Plata, possesses a rich and elaborate cultural identity, generated by its multinational population, mainly of Spaniards, Italians, Germans and British, but also including Japanese. The lifestyle and architecture are unmistakably more European than any other city in the Americas. Due to this diversity, the spirit of a global city is present

everywhere in Buenos Aires. Despite Buenos Aires being well known for its sophistication, there are from time to time travelers who, ignorant of such a reputation, come seeking adventure in the spirit of their image of a "Latin American City" and may feel disappointed by its European character.

NK's Buenos Aires Office was opened in 1980 and is well located in an elegant district near the downtown area, with easy access to the main highways and airports. The Office undertakes survey work in 21 ports in Argentina, Uruguay and Paraguay. This very large service area stretches more than 3,500 km from Paraguay's Asuncion Port in the north, to the southernmost port in the world, called Ushuaia, near the famous Cape Horn, and involves some 50,000 km of driving, as well as many hours of domestic and international flying per year, in order to carry out the survey work requested.

The Buenos Aires Office conducts regular in-service surveys mainly for bulk carriers and oil tankers but also has vast experience in surveying new buildings built to NK class at local shipyards. This work has included one oil tanker, five bulk carriers, one ferry (vehicle/passenger ship) and several river barges. In recent years, due to rapid increases in Argentina's exports of grain and oil, the work in the Office has increased to more than 200 surveys per year.

The coming years will no doubt be interesting and challenging, due to the continuous growth of the Society and the great changes in ship technology. The Buenos Aires Office staff are looking forward with pride to representing NK with their best efforts.

Accepting Special Award certificates from the Society of Naval Architects of Japan (from left): Dr. Hironori Arai, Mr. Hiroshi Sone, Mr. Masataka Hidaka, and Mr. Noboru Ueda



Topics and Events

01 MARITIME SECURITY

The Diplomatic Conference of the SOLAS convention held in December 2002 adopted a set of new requirements for maritime security measures, notably, the new SOLAS Chapter XI-2 and the ISPS Code (the International Ship and Port Facility Security Code), which will come into force on July 1, 2004. Not later than this date, all passenger ships, cargo ships of 500 GT and above and MODUs engaged on international voyages are required to conduct a Ship Security Assessment (SSA), establish a Ship Security Plan (SSP) based on the results of the SSA, operate the SSP onboard, and undergo an Initial Audit in order to obtain an International Ship Security Certificate (ISSC).

ClassNK has developed RULES FOR THE AUDIT AND REGISTRATION OF SHIP SECURITY MANAGEMENT SYSTEMS and will conduct audits for ships registered in those States that have authorized the Society to act on their behalf as a Recognized Security Organization (RSO). As a first step, NK commenced approval of ship security plans at Head Office from August 2005, and will commence actual ship security audits at field offices from September 2005.

For details of the application process, please refer to the NK website under the heading: "ClassNK Maritime Security" ("Handbook" in the section entitled "Gateway to Maritime Security") (http://sms.classnk.or.jp/ispsph/html/English/handbook_e.htm)

02 CLASSNK RECEIVES A SPECIAL AWARD FROM THE SOCIETY OF NAVAL ARCHITECTS OF JAPAN

The Society of Naval Architects of Japan (SNAJ) presents a number of awards each year, and this year has made a Special Award for Innovation in Technical Development in recognition of the development by NK of practical methods for the evaluation of hull structure strength and the publication of the related Guidelines. The Guidelines consist of the "Technical Guide Regarding the Strength Evaluation of Hull Structures, December 1999," "Guidelines for Tanker Structures, November 2001," and "Guidelines for Bulk Carriers Structures, August 2002."

In recognition of specific contributions to the development of these guidelines, award certificates were presented to Mr. Masataka Hidaka, NK Adviser (previously Executive Vice President), Mr. Noboru Ueda, Managing Director (previously General Manager of the Hull Dept.), Dr. Hironori Arai, General Manager of the Training Center (previously General Manager of the NK Research Institute), Mr. Hiroshi Sone, General Manager of the Yokohama Branch (previously General Manager of the Development Dept.), and Mr. Noriaki Hikasa, Lecturer (previously General Manager of the Technical Investigation and Information Dept.). The award was presented at a special ceremony at the Tokyo University of Mercantile Marine on May 14, 2005.



Recent exhibitions:
 NOR-SHIPPING 2003 (top)
 The 22nd World Gas Conference Tokyo (center and bottom)

03 EXHIBITIONS

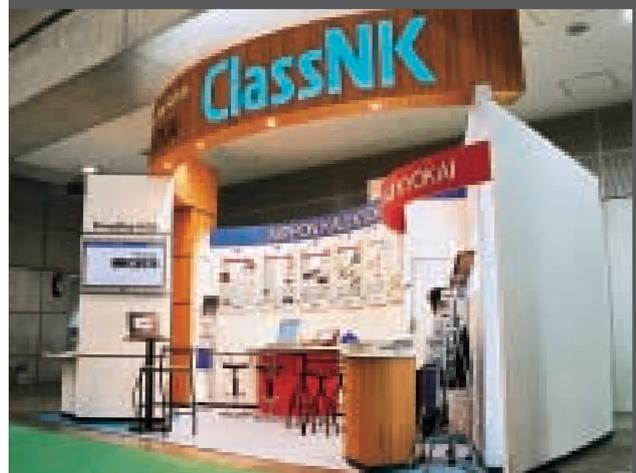
The Society exhibited at several major international maritime fairs this year.

NOR-SHIPPING 2003

The biennial international maritime trade fair, which is held in Oslo, Norway, was held at the Norway Trade Fairs in Lillestrom, a suburb of Oslo, from June 5 to 6 this year.

The 22nd World Gas Conference Tokyo

The 22nd World Gas Conference was held at Tokyo Big Sight from the June 1 to 5, 2003, under the auspices of The International Gas Union (IGU). With the aim of "Catalyzing an Eco-Responsible Future," the conference had over 230 participants from 38 countries, and there were more than 30,000 visitors.



The first meeting of the ClassNK British Committee

Note: The ClassNK British Committee comprises:

Mr. J. G. Davis CBE* (Chairman, IMIF)
 Mr. Robert Houston (Managing Director, Anglo-Eastern Ship Management UK)
 Mr. Enys Dan (Manager of Vetting Service, BP Shipping)
 Capt. F. M. Marchant (Director for Marine Affairs, P&O)
 Mr. Alan Davey (General Manager, Shell Shipping Technology)
 Mr. Vivek Puri (Director, Wallem Ltd.)
 Mr. Epaminondas G.E. Embiricos (Chairman, Embiricos Shipbrokers Ltd.)
 Mr. Philip Atkinson (Technical Director, Graig Ship Management Ltd.)

*Chairman of ClassNK British Committee



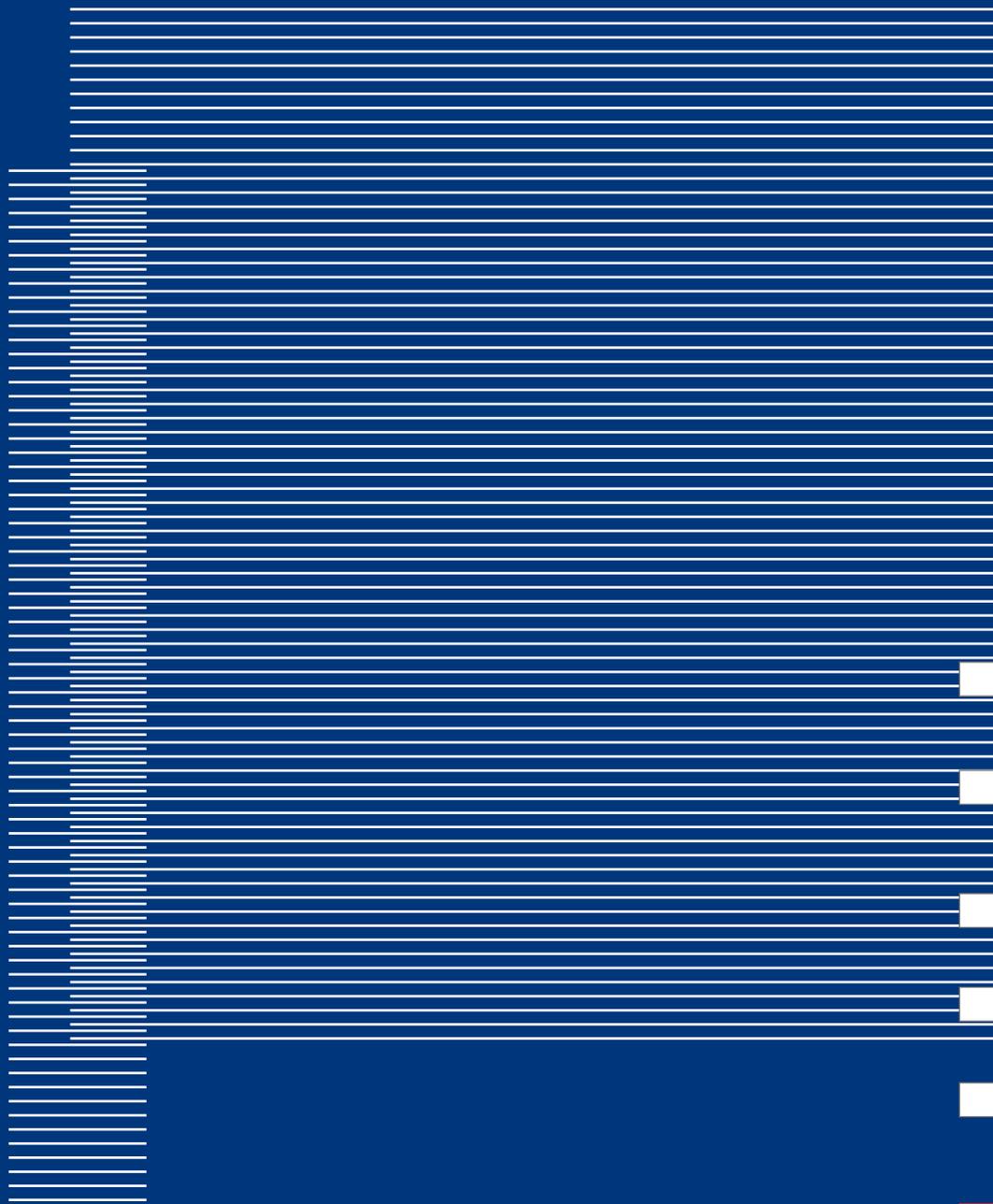
04 FIRST MEETING OF THE BRITISH COMMITTEE

The first meeting of the British Committee was held on July 5 at The Dorchester Hotel in London. Six of the eight members of the committee were in attendance. Chairman and President K. Ogawa, T. Kinoshita, a Manager of BND, and H. Suga, a senior surveyor from NKLN, participated in the meeting from the Society. Also, T. Tsunoda, Regional Manager, Europe & Africa, attended the meeting as Secretary. Chairman and President K. Ogawa chaired the meeting as the temporary Chairman until the formal election of a Chairman according to the procedures of the first meeting. Mr. J. G. Davis CBE, Chairman of the International Maritime Industries Forum (IMIF), was elected the first Chairman of the British Committee of the Society and subsequently chaired the meeting. The Society presented reports on "NK Activities," "PrimeShip-Hull," and "Topics from IACS/IMO." The reports were followed by a question and answer session. The meeting was a great success, with fruitful discussion and a most interesting exchange of views. The full list of Committee members is presented beside the photo at the top of this page.

05 NK HOME PAGE EXPANSION

The information services available on the NK website have been substantially increased. A form for general inquiries was established so NK can respond promptly to opinions and questions from site visitors. In addition, a mail distribution service has been started for customers, and a variety of important information, including technical guidance, is offered to customers by e-mail. Registration for this service can be made on the website (<http://www.classnk.or.jp>).





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