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PROJECT MEET NEWS

Mitsubishi Marine Energy & Environment Technical Solution-System

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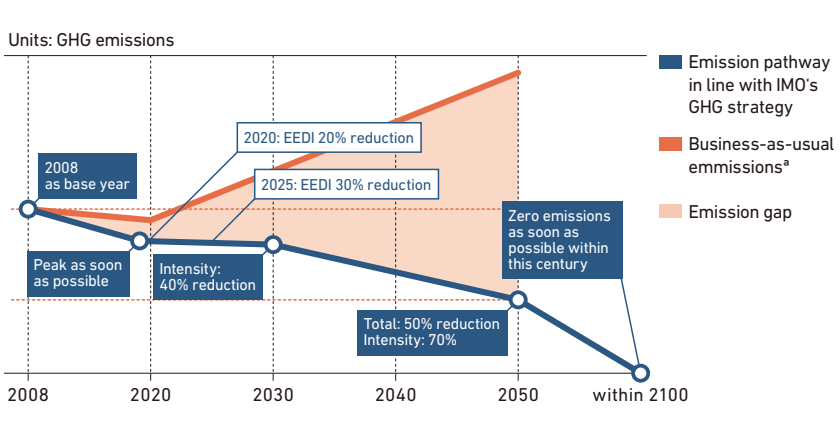
THE PATH TO DECARBONIZATION OF THE MARITIME INDUSTRY

The IMO's GHG Emissions Reduction Target

The international shipping's accounts for 2~3% of total global CO_2 emissions. Using the amount of CO_2 emissions in 2008 as the baseline, the International Maritime Organization (IMO) has set a target of reducing the average carbon intensity by 40% by 2030, and 70% by 2050. It also announced an ambition to reduce greenhouse gas (GHG) emissions by 50% by 2050 to achieve decarbonization of the maritime industry as soon as possible within this century.



(Source : DNV-GL/MARITIME FORECAST TO 2050)

The Maritime Industry's Challenge to Achieve Its Target

As cargo volume keep increasing with global population and economic growth, there are no alternatives to marine transport from efficient point of via. That means that the operation of large, long-haul ships will continue. Furthermore, the dominant thinking is that from the perspective of energy density, internal combustion engines will maintain, for some significant amount of time, their top position as the propulsion method of large, long-haul ships, which account for about 90% of the maritime industry's CO_2 emissions. While the adoption of slow steaming and energy-saving systems as well as the shift to LNG and other fuels with lower CO_2 emissions, and the development of onboard carbon dioxide capture and storage (CCS) technology progress further, there is an urgent need to enable the use of alternative fuels derived from renewable energy in order to achieve the CO_2 and GHG emissions reduction targets set by the IMO toward future decarbonization of the maritime industry. In fact, the introduction of the first net-zero ships to the global fleet by 2030 is indispensable for achieving the IMO's 2050 ambition.

The Challenge by the MHI Group

Toward achievement of the aforementioned ambition, we will participate proactively in global R&D projects. Furthermore, with MHI-MME at the center, the MHI Group will play a central function and role as a marine system integrator of the products and technologies – including alternative energy, naval engineering, internal combustion engines, exhaust gas treatment, and fuel cells – possessed by the Group. To this end, MHI-MME established new division to control development & integration of new technology in January 2020. We will identify changes in the market environment as well as the diversifying needs of our customers, define the direction that our business should take, including toward the decarbonization of the maritime industry, and aim for the development of sustainable new businesses through adoption of state-of-the-art technologies.

Fuel Mix and Market Forecasts After COVID-19 Impacts (DNV GL Pathway Modelling Tool)

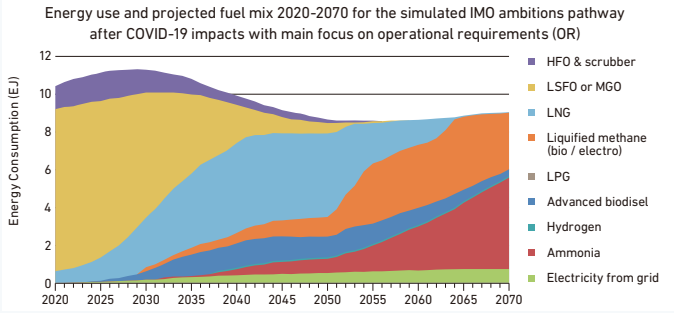
In the Maritime Forecast to 2050, the DNV GL presented "Operational Requirements (OR)" and "Design Requirements (DR)" pathways to achieve the IMO ambition of reducing GHG emissions by 50% by 2050. Together with DNV GL, MHI-MME updated its fuel mix and market forecasts on the basis of these pathways and taking into account the impact of COVID-19.

▪ Operational Requirements (OR)

In this pathway, achievement of the ambition is aimed for with a focus on operational requirements. In addition to improvement of fuel efficiency using existing technologies, CO_2 emissions are primarily reduced through logistics (slow steaming, larger ships, etc.).

Design requirements for new builds :
Existing EEDI regulations

Operational requirements for all ships :
Reduce CO_2 emissions by 70% in stages by 2050, and by 90% by 2070

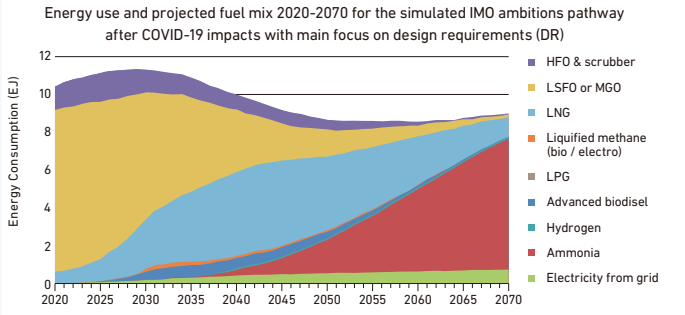


▪ Design Requirements (DR)

Achievement of the ambition is aimed for with a focus on design requirements of new builds. The pillars of this pathway are a further strengthening of EEDI regulations and the suppression of CO_2 emissions in stages for all ships, including in-service ships. A complete fuel shift to carbon neutral fuel would be indispensable.

Design requirements for new builds :
Existing EEDI regulation up to 2035, a 70–80% reduction by 2040, and a 90% reduction after 2040

Operational requirements for all ships :
Reduce CO_2 emissions by 55% in stages by 2050



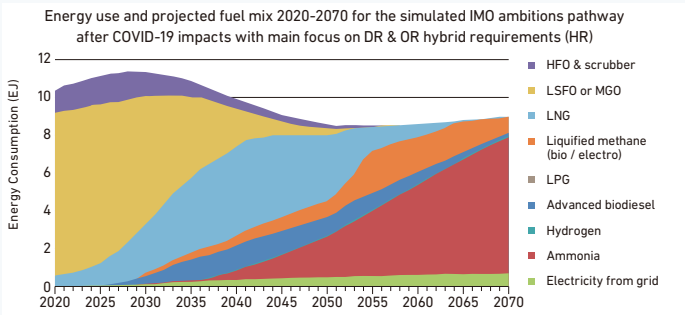
In addition to the aforementioned pathways, MHI-MME has created an original and more ideal hybrid requirements (HR) pathway that combines OR and DR, executing a fuels trends and market forecasts on its basis.

▪ Design & Operational Requirements (HR)

Achievement of the ambition is aimed for with a focus on both DR and OR.

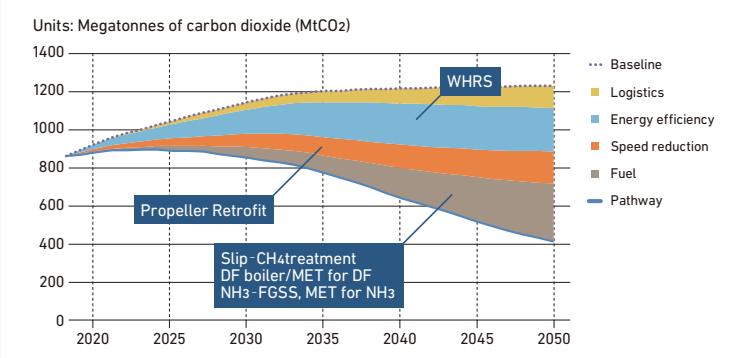
Design requirements for new builds :
Existing EEDI regulation up to 2035, a 70–80% reduction by 2040, a 90% reduction by 2040

Operational requirements for all ships :
Reduce CO_2 emissions by 70% in stages by 2050, a 90% reduction by 2070



For the time being, there would be an increase in LNG fueled ships. In this pathway, fuel diversification would increase significantly from around 2030, with the decarbonized fuel ammonia becoming mainstream among new builds from around 2050. Meanwhile, liquid methane gas would replace existing LNG fuel, and bio diesel fuel would replace low sulphur fuel.

To achieve the challenging GHG reduction goal announced by the IMO, all sectors would need to advance the reduction of GHG emissions. In regard to the improvement of energy efficiency, MHI-MME will contribute to GHG emissions reduction by providing products that meet customer needs, including its lineup of cutting-edge Waste Heat Recovery Systems (WHRS), high-efficiency MET Turbochargers. Meanwhile, for slow steaming, we can offer the retrofitting propellers, and for low carbon and decarbonized fuel, we will offer methane slip treatment devices, dual fuel (DF) boilers, and MET Turbochargers supporting DF engines.



Source : DNV-GL IMO Symposium Oct. 2019

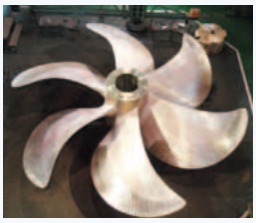
Improvement of EEDI and EEXI

At present, a major issue that will arise if the pathway for future GHG emissions reduction is taken by the maritime industry is what kind of CO_2 reduction measures can be taken for the time being. In fact, the IMO has established CO_2 reduction targets for new builds that are separate from its future GHG emissions reduction targets. That is, the Energy Efficiency Design Index (EEDI) is applied to new builds for the number of grams of CO_2 emissions per tonne-mile. Meanwhile, the improvement of the EEXI (EEDI for Existing Ships), which is applied to in-service ships, will also be necessary to reduce CO_2 emissions. MHI-MME is making a huge contribution to the improvement of the EEDI and EEXI through the following kinds of solutions .

① Performance improvements

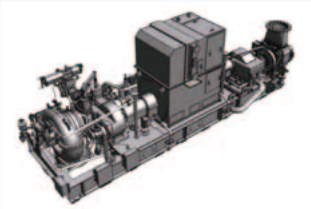
•Propeller retrofits

The need for slow steaming is expected to increase even further in order to improve the EEXI of in-service ships. To do so, replacing the propeller to one that is optimal for slow steaming can improve performance as well as reduce CO_2 emissions. MHI-MME has already retrofitted propellers on over 80 large vessels, but we expect to see such retrofits increase even further going forward.



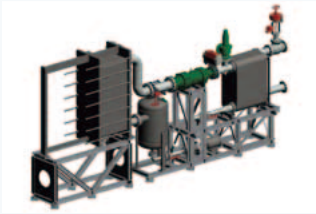
•Waste Heat Recovery Systems (WHRS)

The overall performance improvement of propulsion plants and the reduction of CO_2 emissions can be expected by recovering high temperature waste heat from main engines and using it for power generation. Even greater improvement of performance is possible through the utilization of a hybrid WHRS that is combined with steam extraction from main engines.



•Organic Rankine Cycle (ORC)

Low-temperature waste heat, recovered from sources such as main engine's jacket cooling water, is recovered and used for power generation. This can improve performance as well as reduce CO_2 emissions. Its characteristic is the compact design and ease of placement.



② Fuel-related response

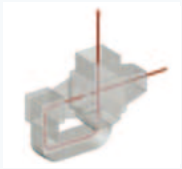
In regard to fuel, the use of LNG is said to be effective as a short- to mid-term measure for the reduction of GHG emissions. MHI-MME handles equipment for use on LNG fueled ships.

•DF boilers

The technology of LNG ship main boilers with multiple records of success is applied to auxiliary boilers for tankers and offshore vessels.

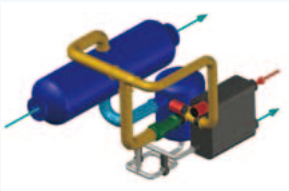
•Methane slip treatment device

With future methane slip regulations in mind, MHI-MME has embarked on the development of a device that deals with the methane slip that arises from DF engines.



•LNG cold energy power generation system

This system utilizes the cold energy from LNG fuel for power generation. In addition to sea water, the LNG heat source regasification system can utilize the excess waste heat from engines and on-board air conditioning. There are expectations that the system will become an effective solution utilizing the demand for LNG fuel, which will increase going forward.



③ The development of MET Turbochargers that match the times

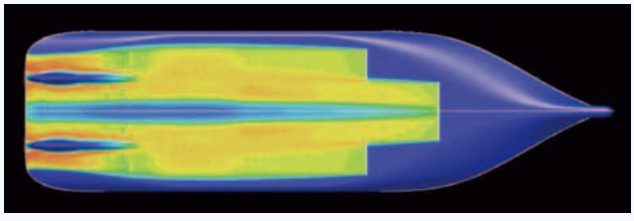
MHI-MME will promote the development of flexible MET Turbochargers that match the needs of propulsion engines and auxiliary engines. Hybrid turbochargers that are suitable for improving the performance of propulsion plants, Electro-assist Turbochargers, and VTI Turbochargers, which are suitable for ultra-low-load operation, enable the reduction of EEDI and EEXI with ease. Furthermore, MHI-MME is developing suitable MET Turbochargers in accordance with diversifying main engine fuels. More than 200 MET Turbochargers have already been adopted for use with DF engines. Response can also be made for DF auxiliary engines.

④ Other MHI Group products

Other MHI Group marine technologies and products that contribute to the reduction of CO_2 emissions include the following.

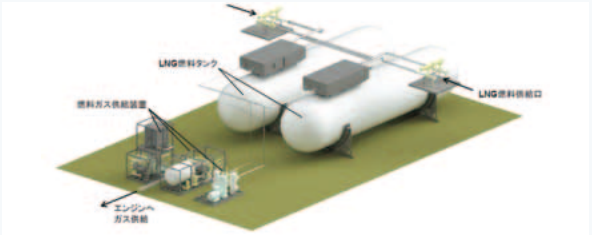
•Mitsubishi Air Lubrication System (MALS)

(Mitsubishi Shipbuilding Co., Ltd.; for ① Performance improvement)



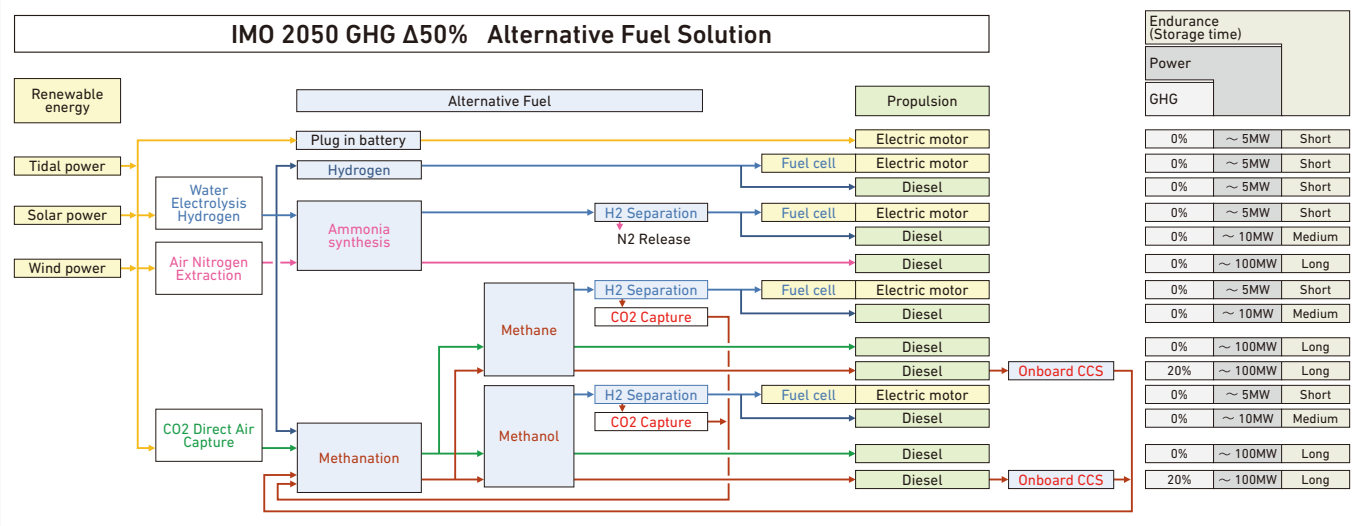
•Fuel Gas Supply System (FGSS)

(Mitsubishi Shipbuilding Co., Ltd.; for ② Fuel-related response)



Use of Alternative Fuel Solutions for GHG Emissions Reduction

The following alternative fuel solution chart shows alternative fuel candidates for use in achieving the IMO goal of reducing GHG emissions by 50%, and beyond that, for realizing zero GHG emissions, and how the fuels are made. Also shown are the expected GHG emissions reduction effect through use of each alternative fuel as well as the engine output levels, range and other ship-related conditions to which the respective alternative fuels can be applied. On left is the type of renewable energy, in the center are the alternative fuels, and on right are the type of propulsion engine to which the alternative fuel can be applied. The far right shows matters such as the expected GHG reduction effect.



Response Toward Alternative Fuel Solutions (Measures for Actualization and State of Technical Preparations)

Concurrent to development efforts being carried out by its in-house R&D units, the MHI Group will also collaborate proactively with domestic and overseas companies to enable swift market injection of solutions for this massive challenge being undertaken by the maritime industry. We will focus efforts on conceivable issues that will arise during the process of manufacturing alternative fuels, such as hydrogen and ammonia, as well as solve, technical challenges related to their transport, storage, and onboard use, including in propulsion systems and auxiliary devices. Assuming that the continued use of fossil fuels is also a possibility, the MHI Group believes that a carbon recycling scheme could also be proposed. Ships would be equipped with an onboard carbon dioxide capture and storage (CCS) system, and the CO_2 captured from the exhaust gas would be used as the raw material for the methanation of synthetic gas fuel.

The MHI Group will leverage its wide-ranging technological capabilities, including the marine engineering capabilities of Mitsubishi Shipbuilding Co., Ltd., and MHI-MME's accumulated expertise in marine machinery, to actively inform our global customer base on the state of technological preparations and measures for the actualization of GHG reduction.

Participation in Global Projects

The MHI Group will become a founding partner of the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping, a new research center to promote decarbonization within the maritime industry that is being established by proposal of A.P. Møller-Mærsk Group. The Center will be based in Copenhagen, Denmark. Seven founding members, including MHI, will collaborate with future members to promote the decarbonization of the maritime industry by 2050. The Center will focus on the development of alternative fuels, their supply chains, and onboard systems.

Photo with Soren Skou, CEO, A.P. Møller-Mærsk

In addition to the aforementioned project, the MHI Group will also actively participate in various decarbonization projects both in Japan and abroad.

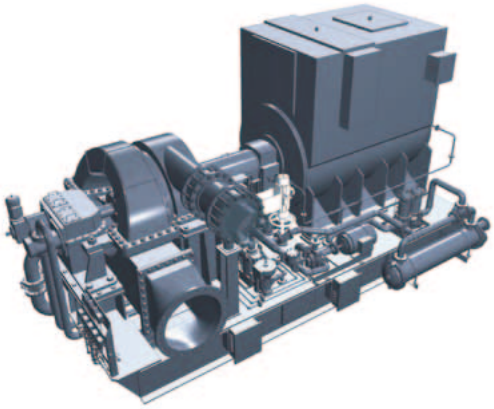
CRYO-POWERED REGAS NEW TECHNOLOGY

Supply of Turbine for Cold Power Generation

MHI-MME will deliver a turbine for use with the prototype of the Cryo-Powered Regas, an LNG cold energy use regasification system currently under joint development by Mitsui O.S.K. Lines, Ltd. (MOL) and Daewoo Shipbuilding & Marine Engineering Co., Ltd. (DSME). The Cryo-Powered Regas is a new initiative that aims to reduce the environmental impact of FSRU(Floating Storage and Regasification Unit) by utilizing LNG cold energy – which up to now has been dumped into the ocean – for power generation. The new technology is expected to significantly reduce the fuel consumption and CO_2 emissions of FSRU during regasification.

As part of development, verification tests are scheduled to take place at a small, land-based facility. In addition to supplying a power generating turbine to the facility, MHI-MME is also providing technical support toward the future installation of the turbine on ships. This will be MHI-MME's first marine turbine for cryogenic power generation, and we will be developing a cutting-edge design while also leveraging the MHI Group's existing technology and expertise in land-based products.

MHI-MME has long been providing support for energy saving on ships, with a focus on waste heat recovery systems (WHRS) for large commercial vessels. With the sharp increase in the use of LNG by the maritime industry, MHI-MME sees the cold energy arising from LNG use as a promising, recoverable energy. The company is proactively engaged in this effort with the view that it can contribute to the achievement of a low-carbon society by expanding the range of its energy-saving solutions.



【Turbine external view】

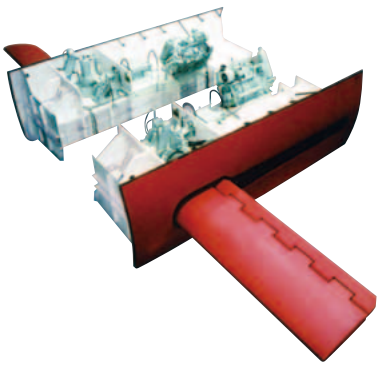
【Cryo-Powered Regas logo】

FIN STABILIZER NEW ORDER

Retractable Fin Stabilizer Orders Received for China Merchants Jinling Shipyard (Weihai) Co., Ltd.'s RoPax Option

China Merchants Jinling Shipyard (Weihai) has been building a series of 1,000-passenger-class RoPax ferries, and MHI-MME has received new order for a retractable fin stabilizer to be installed. To date, MHI-MME has received orders for a total of nine vessels for this RoPax series, with the fin stabilizer for the sixth vessel delivered at the end of June this year. This new order for the ninth vessel is scheduled for delivery to the shipyard in March 2021.

With a focus on China, South Korea, other parts of Asia, and Europe, MHI-MME will continue to proactively engage in overseas sales negotiations for fin stabilizers and other solutions for RoPax, RoRo and other vessels.



Fin Stabilizer

TURBINE & BOILERS NEW ORDER

Receiving Orders for Generator Turbine and VOC Firing Auxiliary Boiler for Shuttle Tankers

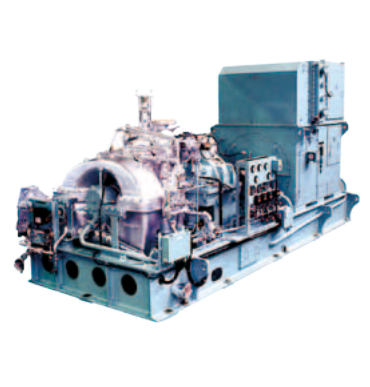
MHI-MME received orders for generator turbines and VOC-firing auxiliary boilers from South Korea's Daewoo Shipbuilding & Marine Engineering Co., Ltd. (DSME). They will be installed in two 124,000 DWT LNG shuttle tankers (Ship No. H.5482/H.5483) for Norwegian shipowner Knutsen NYK Offshore Tankers.*1 Both turbines and boilers are scheduled for delivery to DSME in the middle of 2021.

These vessels will make shuttle runs to transport crude oil produced offshore in the the North Sea and the Barents Sea. The turbine and boiler are being installed to enable the use of the volatile organic contents (VOC), or hazardous air pollutants, that are discharged when crude oil is loaded into crude oil tanks. To render the VOC harmless, it is treated and liquefied through a VOC recovery device. The liquefied VOC as well as the excess VOC that cannot be treated by the recovery device are both recycled as fuel by the VOC-firing auxiliary boiler.

In particular, more than 80% of the content of excess VOC is inert gas, such as nitrogen and carbon dioxide. However, the characteristic of the MHI-MME VOC-firing auxiliary boiler is that it can utilize as fuel such very inert gasses as well as render the VOC harmless. What is more, effective utilization of the power generated using the steam from the boiler to spin the generator turbine for necessary onboard electricity, including its consumption by the VOC recovery device, contributes to the reduction of the environmental burden by decreasing CO_2 emissions while also reducing fuel consumption.

MHI-MME is the only supplier in the industry that offers both marine turbines and boilers of an original design. We plan to optimize both products for these aforementioned orders and will take advantage of these orders to continue proactive sales activities for their use on shuttle tankers.

*1 Knutsen NYK Offshore Tankers (KNOT) is a joint venture between TS Shipping Invest (TSSI), which is the parent company of the Knutsen Group, and Nippon Yusen (NYK).



Generator turbine

Auxiliary boiler

MET-MBII TURBOCHARGER NEW ORDER

First Order for MET53MBII Turbocharger Received from Chinese Engine Builder

Following the receipt of an order in Japan for the first unit of the new MET-MBII Series Turbocharger, MHI-MME received an order for two MET53 MBII Turbochargers from China's CSSC-MES Diesel Co., Ltd. (CMD). We are scheduled to deliver them at the end of 2020 for installation on the 6G60MEC9.5 main engine of an LRII tanker being built at a Chinese shipyard for a European shipowner.

The MBII Series currently has approvals for installation on some MAN Energy Solutions SE (MAN ES) engine models and Winterthur Gas & Diesel Ltd. (WinGD) oil burning engines. We plan to obtain approval for all frame sizes within the year following various verification tests.

Although this is the first time that a MET53 MBII Turbocharger is being installed on a main engine manufactured by a Chinese engine builder, we will work to expand its sales around the world like other existing MET-MB Series Turbochargers.

MET-MB Series Turbocharger

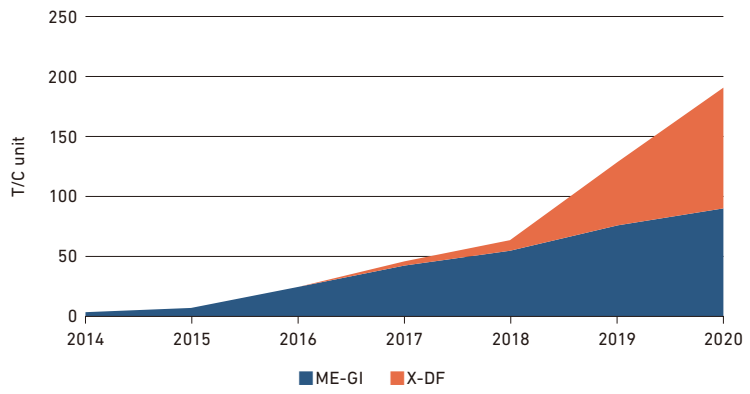
MET Turbocharger DELIVERY

Sales of MET Turbochargers for Dual-fuel Engines Expanded

Ever since the 2014 delivery of the first unit of a MET Turbocharger for dual-fuel engines, MHI-MME has shipped a total of 192 such units to date, with the 200th scheduled to be delivered. The first unit was delivered to South Korea for installation on an ME-GI, which is a MAN Energy Solutions SE (MAN ES) dual-fuel engine. The approval of Winterthur Gas & Diesel Ltd. (WinGD) was later obtained, and the first unit for an X-DF was delivered to South Korea in 2017.

With a focus on LNG carriers, our MET Turbochargers have found favor with customers building ships powered by dual-fuel engines. MHI-MME MET Turbochargers are installed on roughly 40% of LNG carriers built around the world.

With the further tightening of environmental regulations in the future, we expect an increase in the types of vessels – not just LNG carriers – that will be powered by dual-fuel engines. We will continue to provide high-performance turbochargers so that we can contribute to the realization of a decarbonized / low-carbon society.



Adoption Record of MET Turbochargers for Dual-fuel Engines

MET Turbocharger AFTER SALES SERVICE

Recommendation for Safer Maritime Operation: Inspection and Stocking of Tools for MET Turbocharger Overhaul

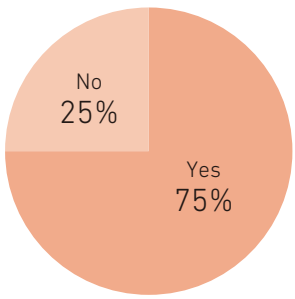
According to the results of a survey we carried out toward workers engaged in the overhaul of MET Turbochargers, we found that many of them had found themselves not having all the needed tools during overhaul work, or discovered problems with the tools that they had. The loss of necessary tools or tools in poor condition become an obstacle for carrying out safe and smooth overhaul work.

We recommend to customers who use MET Turbochargers to refer to their tools list before and after overhaul work and check to see that all tools are present. If, by any chance, there are any tools that are missing, we recommend that you make arrangements to obtain them as soon as possible. Please feel free to contact us if you have any questions. (a-met-service@mhi-mme.com)

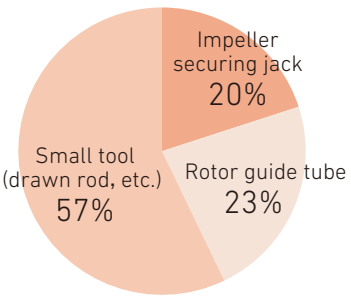
Case in which the journal bearing broke while the rotor was being pulled out because of corrosion and scratches on the surface of the rotor guide tube

Questionnaire Results

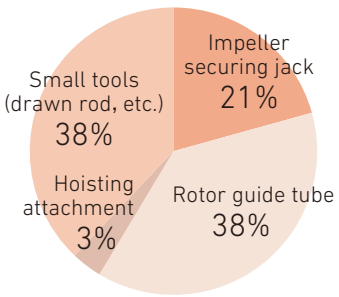
Have you ever experienced any missing tools during turbocharger overhaul?



Which tool was missing?



Which tool was broken?



AFTER SALES SERVICE BOILER

Signing Agreement for the Provision of Drawings During Marine Boiler After-Sales Service

On August 3, 2020, MHI-MME signed an agreement with Mitsui E&S Machinery Co., Ltd., regarding the provision of drawings during the after sales servicing of main and auxiliary boilers. As a result, MHI-MME will be officially obtaining detailed drawings and other technical information from our customer, making it possible for us to provide even more detailed response to customer requests as well as the provision of high-quality, low-cost after-sales work by way of advance reviews. Going forward, we will be offering an after-sales servicing menu in accordance with the age of a ship or equipment condition on ships with main and auxiliary boilers, and we will endeavor to enable the continued stable operation of boilers.

Commemorative photo taken after the signing

AFTER SALES SERVICE BOILER

New Menu of Anti-corrosion Measures for Main Boilers

MHI-MME has developed a new chemical cleaning method as a countermeasure for the improvement of serious corrosion, which is on the rise recently on the main boilers of LNG carriers due to seawater leakage.

Hematite (rust in powder form) forms within water supply pipes when there is a high level of dissolved oxygen due to the poor management of boiler water. It has been discovered in recent years that the adherence and accumulation of this rust on the inner surface of the boiler tends to cause under deposit corrosion (UDC). If seawater leakage takes place upstream of the boiler, the corrosion inside the boiler becomes even more serious. Deposits inside the boiler are removed by chemical cleaning. However, if there is seawater leakage, it causes corrosion of the copper alloy in the parts on the upstream side of a boiler, and copper gets mixed in the deposits inside the boiler. For this reason, it becomes difficult to remove the deposits completely using conventional chemical cleaning methods alone.

However, MHI-MME's new chemical cleaning menu has adopted a method that has a proven track record for use with the MHI Group's land-based boilers and this new method makes it possible to remove deposits containing copper, which are difficult to remove using conventional methods. MHI-MME has already implemented this new menu this year.

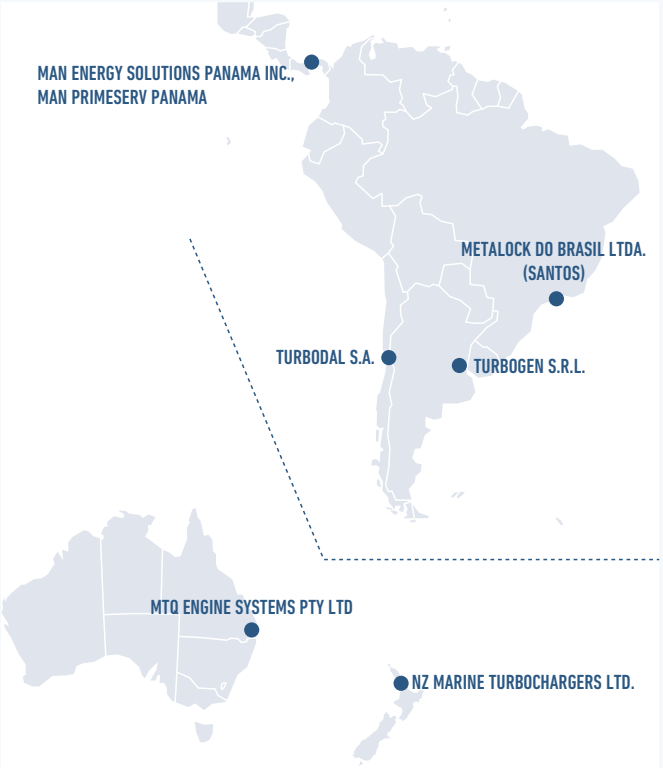
From now, we will be providing this new chemical cleaning menu for customers who are facing serious corrosion of their boilers.

Main boiler

MET After Sales Service Bases in South America and Oceania

A global network of authorized repair agents, consisting of about 70 companies around the world, has been established for MET Turbochargers. Swift and appropriate servicing can be ensured around the world through this framework.

This issue introduces our authorized repair agents in South America and Oceania.



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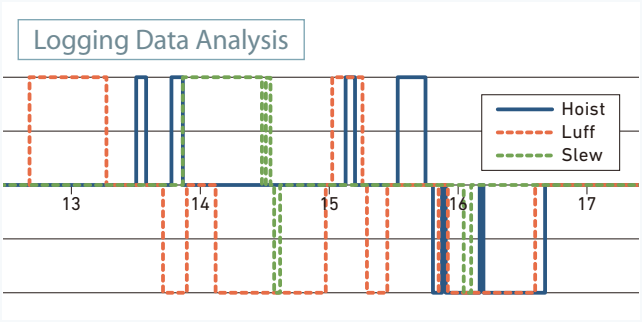
Case Examples of the Utilization of the Data Logging Function

The data logging function has been a standard feature of Mitsubishi electro-hydraulic deck cranes since the models shipped in November 2016. Here are some case examples in which the utilization of the data logging function has contributed to an improved working rate of deck cranes.

【Case example 1】 The swift identification of causes after accident occurrences

Excessive stress arose on a jib, resulting in it breaking, when the operator tried to pull out a grab that was buried in cargo by operating the deck crane using a movement that combined hoisting, luff, and slew. In the past, identifying the cause has often taken time for reasons such as the vague report from operator. However, logging data now enables the swift and easy identification of causes since it has become possible to obtain an accurate understanding of how the crane was being operated when an accident occurs. The logging data also makes it possible to avoid complications with operators over who is responsible for the occurrence of accidents.



Analysis revealed that the operator was carrying out hoisting, luff, and slew of the deck crane when the jib breakage occurred

【Case example 2】 The regular monitoring of crane performance using the self-diagnosis mode

Data Logging Advance (DLA) is an advanced feature that extends the data logging function to enable the monitoring of hydraulic pressure, speed of movement, and so on. Ships equipped with DLA can have crew carry out the regular monitoring of deck crane performance.

①Select the self-diagnosis mode (data regarding deck crane operation will be recorded while this mode is selected and stored)
②Operate the deck crane using a prescribed condition, such as no-load operation or safe working load
③Send the deck crane operation data, which has been recorded and stored on an SD memory card, to Mitsubishi Heavy Industries Machinery Systems, Ltd. (MHI-MS)
④MHI-MS carries out an assessment of crane performance

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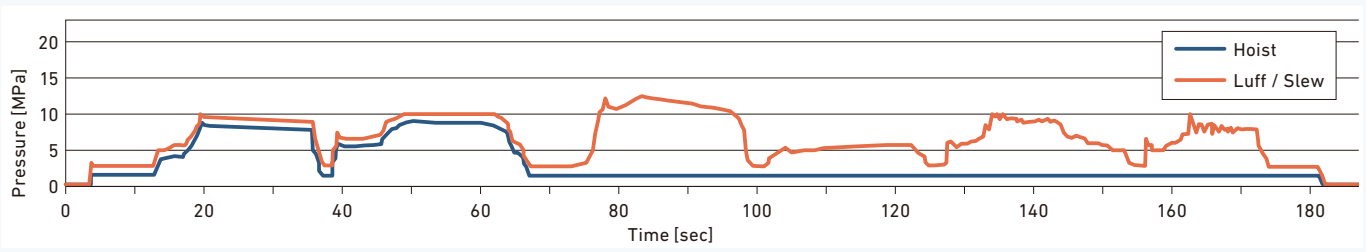
<Sample : Chart of hydraulic pressure and performance evaluation>



	HOIST [m/min]		LUFF [m/min]		SLEW [rpm]	
	UP	DOWN	UP	DOWN	RIGHT	LEFT
SPEED	98%	99%	98%	98%	100%	98%

Message from the President & CEO

Looking Beyond that COVID-19 Pandemic

At the beginning of this year, I celebrated the first New Year's holiday of the Reiwa era. Like others, I was looking forward to the start of the Tokyo 2020 Olympic and Paralympic Games. At my New Year's visit to a shrine, I prayed that the shipping and shipbuilding industry had bottomed out and would start picking up. My heart light and hopeful. How long ago that day now seems.

With the global spread of the COVID-19 pandemic, people's movements were restricted, and the global economy took a huge hit. The market environment of the shipping and shipbuilding industries has become uncertain, with extreme falls in orders for new ships. Projects have been postponed or temporarily suspended.

Various countries are taking an assortment of measures, but we are seeing that after the number of new infections start falling, they tend to go back on the increase when economic activities are resumed. As this trend repeats itself, we know that the recovery of economic activities going forward requires that we find a way to avoid the appearance of any large infection clusters, and suppress any explosive increases in infections. We need to find a way to live with COVID-19 in our midst. While I, of course, look forward to the development of vaccines and miracle drugs, it is also important that we accept that we may have to coexist with the virus and make changes and improvements to our lifestyles and business practices – devise new ways. We need to use this as an opportunity to develop new styles of business.

Meanwhile, global warming is steadily progressing. The frequency of the occurrence of abnormal weather phenomena has been increasing even more in recent years, and there are concerns of an increase in natural disasters. Are these really natural disasters, or are they, in a way, man-made? I think there is room for debate, but what we do know is that we need to spread the mindset that humankind must work together to protect the global environment. I believe that people around the world must shoulder a certain amount of the burden and proactively address environmental issues.

In regard to the shipping and maritime fields, regulations have already been strengthened in relation to NOx and SOx through IMO Tier III environmental regulations. Going forward, GHG emissions reduction measures will follow the strengthening of EEDI measures for the reduction of CO_2 emissions as pathways toward zero emissions. Research and development for the application of countermeasure technologies, such as those for fuel conversion, environmental protection, and the retrofitting of equipment and facilities, are being carried out at a feverish pitch, and consideration of energy management measures, including future propulsion systems and onboard electrical power, has already begun.

In preparation for game-changing times of the future when there will be a transformation of the direction being taken, the shipbuilding and maritime machinery industry has entered an extremely important time for considering matters. Like others, we have been impacted by COVID-19, However, we are carrying out deliberations utilizing methods, such as web conferencing.

This issue of MEET NEWS contains descriptions of the state of efforts being made by MHI-MME. Going forward, we will undertake efforts related to the application of the decarbonized-fuel supply chain technology of the MHI Group and others, as well as environmental conservation technology toward a low-carbon and decarbonized society, to the shipping and shipbuilding fields. We will also engage in efforts to enable use of technologies on ships, such as by making machinery and equipment smaller or by simplifying their use. Furthermore, we will also address fundamental changes to their design, by streamlining operations or incorporating new methods, inclusive of digitalization.

MHI-MME will continue to keep its original intentions in sight while launching bold challenges toward reform. We will carry out our business activities under the motto of remaining to be a company that is needed and trusted by our customers through the provision of high-quality products and services. We look forward to your continued patronage.

Mitsubishi Heavy Industries Marine Machinery & Equipment
President & CEO
Toshiaki Hori

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