Ballast water management system

Quality assurance system for boiler and water treatment systems and on-line maintenance service

Our head office and Hojo factory are sites with a registered environmental management system.
We want to protect this wonderful natural world and pass it on to the next generation.

At MIURA, we will cherish those wishes and use the whole strength of the company to work towards our mission of “Helping customers all over the world in energy conservation and environmental preservation.”

One major support for those efforts is the ballast water management system (BWMS), which contributes to the preservation of the marine environment around the world. Our Ship Machinery Department has over fifty years of proven results and experience and is playing a key role as we utilize our technology and the trust in MIURA and put all our efforts into the achievement of our aims.

Operation tests ongoing in preparation for USCG onboard test

MIURA aims to obtain USCG (United States Coast Guard) type approval during fiscal 2017 and is currently advancing preparations for this. AMS (Alternate Management Systems) approval has already been obtained and operation tests in preparation for onboard test are currently in progress. Discussions on the various evaluation standards and interpretation have been held with MERC (Maritime Environmental Resource Center), which is a certified Independent Laboratory (IL) test site designated by the USCG. The equipment has been installed on a test ship that has a route where it is possible to perform the test in “different sea areas,” as is required by the USCG, and status test is currently in progress. Furthermore, for the live/dead judgment in the biological tests, MIURA is checking the judgment using a staining method based on the USCG ETV protocol conditions for both sea water and fresh water conditions in preparation for the acquisition of USCG type approval.

Schedule:
- January 2017: Start of USCG environmental test
- March 2017: Start of USCG land-based test
- April 2017: Start of USCG onboard test
Environmental friendly system with a uniquely developed filter and UV reactor combination

The greatest feature of the Miura BWMS is its structure, which uses a uniquely developed filter to capture microorganism of 50 µm or larger from the ballast water and then uses a UV reactor to irradiate the organisms with ultraviolet (UV) light to sterilize them. It is an environmentally friendly system with no impact on the organisms where the treated ballast water is discharged, because no active substances (chemicals) are used. It can continue to exhibit its performance in each of the different water qualities of sea water, brackish water and fresh water.

The obligation to install a ballast water management system

It has been decided that the Ballast Water Management Convention will come into force on September 8, 2017. This means that the installation of a “ballast water management system” will be required for all newly constructed vessels that are completed from September 2017 onwards. Furthermore, all vessels currently in service will be required to complete the installation before the renewal of their IOPP certificate, which will be between September 2017 and September 2022. MIURA has sold BWMS since 2014 and has built up a proven record of their installation on newly constructed vessels and their retrofitting on vessels already in service.

Ballast water management systems to maintain the marine ecosystem

Miura BWMS is a clean type of system that combine a filter and sterilization using UV light. One feature of the method of sterilization using UV light is that no active substances are used during the treatment, so there is no impact on the organisms where the treated ballast water is discharged. We developed a filter for the management system that can reliably capture organism of 50 µm or larger and added a multi-stage cleaning function with high maintainability. The medium pressure UV pipe used in the UV sterilization was newly developed to save electricity and extend the service life and the optimal sterilization performance was achieved by using the illumination intensity and the flow rate to calculate and control the amount of irradiation.
An original cleaning system to maintain the capture performance of the filter

MIURA has developed a filter with an innovative structure that makes filter cleaning possible at the same time as the capture of the organisms in the ballast water. With MIURA’s unique multi-stage cleaning function, the maintainability and performance are supported and the capturing function of the filter is maintained. The filter is always maintained in a clean state, so it does not require the time and effort of the crew of the vessel and the primary duties in cargo handling can be performed smoothly.

The three MIURA original cleaning patterns preserving the filter performance

In order to reduce the clogging of the filter, a function is included that can clean the filter element in multiple stages. With these three cleaning patterns, high pressure jet cleaning is performed from the outside of the filter element to keep the filter clean at all times and preserve the filter performance.

Reliable sterilization of organisms with a uniquely developed UV irradiation method

MIURA started the installation of the independently developed BWMS from 2014. As we have accumulated proven results in the installation of the system, we have also received favorable evaluations of the sterilization performance for S-sized and smaller organisms and for fungi. We are implementing repeated improvements to reduce power consumption and extend the service life and are aiming for further quality improvements. A cleaning function has been included inside the UV reactor to reduce the maintenance work that the crew of the vessel must perform.

Proportional control operation to realize reduced electricity consumption and longer service life

The short service life of UV lamp was previously the disadvantage of UV irradiation, but we have improved this with a method of operation that uses proportional control. A UV sensor monitors the UV illumination intensity and the amount of UV irradiation is controlled. This saves electricity and extends the service life.
The touch screen type control panel easily operated from the ship’s office

Day to day operation can be easily performed with remote control from a touch screen placed in the ship’s office. The status of the system can be checked on the display on the control panel and if an alarm for “Filter differential pressure error” ever occurs, it is also possible to perform cleaning with just the press of one button. Furthermore, in order for customers to operate the system safely and with a feeling of reassurance, the equipment status that is displayed on the screen is categorized into the two levels of “Notifications” and “Alarms.”

Tests for USCG approval acquisition ongoing in fresh water and sea water test sites

Under the AMS defined by the USCG, it is necessary to obtain fresh water test data before permission for use in fresh water can be obtained. To achieve this, we constructed a “fresh water test site” separate to our existing “sea water testing site” in 2015. This site is in Ehime Prefecture, which is where our head office is located. In preparation for the acquisition of USCG type approval during fiscal 2017, test is being repeated in both fresh water and sea water and we are continuing to work to improve the quality of the systems.

A compact design that can be easily installed both on newly constructed vessels and in retrofitting

One major feature of the new models of the BWMS HK is their compact design. The equipment can be used for a wide range of applications, including both newly constructed vessels and retrofitting. The filter performance has been improved even further and we offer the high functionality and quality that are characteristic of MIURA.

Manufacturer maintenance provided globally

In-house developed products, support from maintenance to parts supplies

The main parts were developed in house at MIURA, so we provide support for everything from consumable parts to large-scale and functional components. We support the smooth operation of marine equipment with maintenance, preservation and management assistance that meets the needs of the customers.

Single engineer for all maintenance work

MIURA engineers have the technical ability to be able to cover all the maintenance work related to marine equipment on their own, including electrical, mechanical and water management work. As an individual engineer performs the maintenance reliably, this makes rapid support possible and also contributes to a reduction in maintenance costs.

MIURA’s network across the world

In addition to our bases in Japan, we also have engineers at our bases in Singapore, the Netherlands, Taiwan, China and America. We have prepared a system to respond to customer requirements rapidly at any location around the world. This ability to provide the best possible support in both providing parts supplies and engineering services is a distinctive characteristic of MIURA.
Example filter and UV reactor configurations
Select the capacity of the filter and UV reactor according to the ballasting and deballasting capacity.

<table>
<thead>
<tr>
<th>Ballast capacity</th>
<th>Filter capacity</th>
<th>UV reactor capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>300m³/h</td>
<td>200U</td>
<td>200U</td>
</tr>
<tr>
<td>450m³/h</td>
<td>300U + 200U U</td>
<td>300U + 200U U</td>
</tr>
<tr>
<td>600m³/h</td>
<td>300U + 200U U</td>
<td>300U + 200U U</td>
</tr>
<tr>
<td>1800m³/h</td>
<td>600U + 300U U</td>
<td>600U + 300U U</td>
</tr>
</tbody>
</table>

Example: With ballasting of 600 m³/h and deballasting of 1,200 m³/h, it is possible to select the filter from the flow patterns at 900F. 400F = 200F x 2 and to select 300U x 2 + 300U x 2 for the UV reactor.
Previous installation results

We provide the optimal proposals for the customers developed over our previous results and experience in various installations.

Bulk carriers

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>Classification</th>
<th>Country of construction</th>
<th>Installation place</th>
<th>Installation situation</th>
<th>Model</th>
<th>Installation location</th>
</tr>
</thead>
<tbody>
<tr>
<td>28,000 DWT</td>
<td>NK</td>
<td>Japan</td>
<td>E/R</td>
<td>Retrofit</td>
<td>HK450 × 1</td>
<td>Japan</td>
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<td></td>
<td></td>
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<tr>
<td>38,000 DWT</td>
<td>NK</td>
<td>Japan</td>
<td>E/R</td>
<td>Retrofit</td>
<td>HK600 × 2</td>
<td>China</td>
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Chemical vessels

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<tr>
<th>Vessel type</th>
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<th>Country of construction</th>
<th>Installation place</th>
<th>Installation situation</th>
<th>Model</th>
<th>Installation location</th>
</tr>
</thead>
<tbody>
<tr>
<td>12,000 DWT</td>
<td>NK</td>
<td>Japan</td>
<td>Pump room</td>
<td>Retrofit</td>
<td>HK300 × 1</td>
<td>UAE</td>
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<tr>
<td>8,700 DWT</td>
<td>NK</td>
<td>Japan</td>
<td>Pump room</td>
<td>Newly constructed vessel</td>
<td>HK300 × 1</td>
<td>Japan</td>
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Car carrier ships

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<tr>
<th>Vessel type</th>
<th>Classification</th>
<th>Country of construction</th>
<th>Installation place</th>
<th>Installation situation</th>
<th>Model</th>
<th>Installation location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,000 UNITS</td>
<td>NK</td>
<td>Japan</td>
<td>E/R</td>
<td>Retrofit</td>
<td>HK300 × 1</td>
<td>China</td>
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General cargo ships

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<tr>
<th>Vessel type</th>
<th>Classification</th>
<th>Country of construction</th>
<th>Installation place</th>
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We offer the optimal solutions for retrofitting.
MIURA supervisors live up to the trust of the customers.

In the installation of BWMS, for retrofitting in particular, a wide variety of situations is assumed and detailed experience is necessary. MIURA has been developing ballast water management technology for many years and acts as a link between the vessel owner and the shipyard with a support system that has been prepared to realize safer and more flexible retrofitting.

We use the technical ability we have built up in ship repair work and live up to the trust placed in us by customers with retrofits that fit with the dock schedule and also take economic efficiency into consideration.

Installation is possible around the world.
MIURA engineers go wherever necessary in the world to perform all the work from the 3D measurement on the vessel that is necessary at the design stage up to the actual installation work.

We have expanded our support system with the improvement of our bases in China. China could be described as the base for repair work docks globally and MIURA has established four bases in the country, in Shanghai, Nantong, Zhoushan and Shenzhen. We can perform the installation work in China smoothly in cooperation with local engineers.

Highly experienced supervisors provide full support for the installation work.
MIURA supervisors who have a wealth of installation experience support the engineering work and coordinate with the superintendents and the docks to promote the installation work in accordance with the plan. Furthermore, customers feel reassured as the engineers from MIURA provide follow-up support through the commissioning and after-sales service.

The reasons why MIURA retrofits are selected around the world

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We collect the images for the 3D scan data that is the basis for the design. The highly experienced MIURA engineers accurately reproduce the structures inside the vessel.

Actual examples of consideration
We propose remodeling plans that make use of our experience in order to make the installation the best possible.

The flow of retrofitting
1 Planning
We implement sufficient investigations and use 3D scan data to formulate detailed plans.

2 Approval
3 Detailed design
4 Production and order
5 Installation
6 Commissioning
7 After-sales service

1 Preliminary investigations before visiting the vessel
Consideration performed using the documentation related to the vessel
- Parts layout, pump performance curves, piping system diagrams, power investigation tables, etc.

2 Investigation onboard the vessel
We visit the vessel anywhere around the world to perform preliminary investigations.

3 Production of technical proposal
- Carry-in route
- Installation space
- Piping system checks
- Power investigation tables
- Interviews regarding the situation of ballast operation
- HK capacity proposal

MIURA’s Retrofit installation work

Design – 3D scan point cloud data
We collect the images for the 3D scan data that is the basis for the design. The highly experienced MIURA engineers accurately reproduce the structures inside the vessel.

Example: Scan image from engine room on 37,000 DWT bulk carrier
3D CAD layout drawing: Sufficient space is also secured in the design for the passageway and maintenance space.

Actual examples of consideration
We propose remodeling plans that make use of our experience in order to make the installation the best possible.

Before
After
LOWER FLOOR: 3rd DECK main engine – Consideration of filter and reactor installation on the bow side. We recommended the installation of two power panel sets in the passageway on the 2nd DECK port side main engine stern side.

3D scan data imaging. We use the documents related to the vessel concerned to investigate and propose the optimal plan for the vessel.
We produce the basic plan for the installation and prepare the approval documents necessary for the vessel class approval.

We produce the drawings and documents for items such as the pipes and components that will be necessary during the actual manufacturing and execution.
We arrange or produce the components according to the individual specifications.

The MIURA supervisor coordinates with the superintendents, crew and dock and the installation is performed. Support is provided for the installation and construction work.

The MIURA engineer performs the commissioning, checks the operation of the equipment and explains its handling to the crew.

The engineers from bases around the world respond rapidly to customer requirements such as requirements for the maintenance and management of the equipment.
Approval

We produce the drawings to be submitted for the vessel class and other documents.

MIURA prepares the drawings and documents necessary for the approval. (Ballast water management plan, layout drawings, ballast piping system diagrams and ballast water pumping and drainage work system diagrams, ballast water sampling facilities and onboard test method proposals, etc.)

Detailed design

We respond to the requests from the customer and perform more specific design.

This is a more detailed process of design than that of the planning stage. At this stage, we design drawings and documents required for the actual manufacturing and installation. We also prepare drawings for prefabricated pipes, a parts list, and a wiring connection drawing.

Production and order

We produce the parts in line with the design and in accordance with the various specifications.

We prepare the required parts according to the detailed designs. If necessary, we may manufacture new parts.

While there are various possible scenarios that arise in manufacturing pipes and preparing parts, we are able to respond to every situation individually as needed.

* As a general rule, equipment will be delivered at a predetermined domestic warehouse location and Free on Truck.
5 Installation
The MIURA supervisor provides full support for the installation work.

Please rely on the MIURA supervisors for retrofitting installation work.
MIURA supervisors who have a wealth of installation coordinate with the superintendents, crew members, shipbuilding company and repair docks to provide support for the engineering so that the installation work proceeds in accordance with the plan. In addition to checking the progress of the installation and construction work, they also respond rapidly when any trouble occurs. You can feel reassured when leaving the work up to them.

6 Commissioning
MIURA’s engineers carry out commissioning directly.

Commissioning is carried out by maker’s engineers who possess deep knowledge about the equipment for a final check to ensure safe and secure sailing.

- Confirm installation of piping and electrical system
- Confirm operation and performance of each piece of equipment and the system as a whole
- Observe while undergoing inspection
- Confirm spare parts
- Provide instructions for operation

Using the installation work check sheet, we confirm that each installation is carried out according to plan.

Passing water through the pipes → Confirmation of no leakage → MIURA’s SV filling our installation work check sheet → Results reported to the superintendent → Operation commissioning

7 After-sales service
MIURA also provides full after-sales service.

MIURA’s inspection system “MZM” supports our customers’ safe sailing.
We support the smooth operation of marine equipment with maintenance, preservation and management assistance that meets the needs of the customers. We accumulate the operation history data and utilize it for preventative maintenance and trend management.

MIURA’s network across the world
We have opened bases in various locations around the world and have engineers stationed at those bases. We have prepared a system to respond rapidly to customer requirements. We provide the best possible support in providing parts supplies and engineering services.
Delivering reassuring and reliable MIURA technology to the oceans of the world.

In addition to Japan, MIURA also has bases in Singapore, the Netherlands, Taiwan, China and America and we respond to the needs of customers in oceans worldwide.