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# BIOFOULING MANAGEMENT PLAN

To meet the requirements of “2011 GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIP’S BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES” adopted as the IMO guideline, Resolution MEPC.207(62).

Ship’s name : \_\_\_\_\_  
IMO No. : \_\_\_\_\_  
Call sign : \_\_\_\_\_  
Flag : \_\_\_\_\_  
Port of registry : \_\_\_\_\_  
Type of ship : \_\_\_\_\_  
Gross tonnage : \_\_\_\_\_  
Length (L<sub>PP</sub>) : \_\_\_\_\_  
Beam (Breadth) : \_\_\_\_\_

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## INTRODUCTION

This Plan is written in accordance with the requirement of “2011 GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS’ BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES” adopted as the IMO guideline, Resolution MEPC.207(62), (Hereinafter “the Guidelines”).

“Biofouling” means the accumulation of aquatic organisms such as micro-organisms, plants, and animals on surfaces and structures immersed in or exposed to the aquatic environment. Biofouling can include microfouling (microscopic organisms including bacteria and diatoms and the slimy substances that they produce) and macrofouling (e.g. barnacles, tubeworms, or fronds of algae).

Studies have shown that biofouling can also be a significant vector for the transfer of invasive aquatic species. Biofouling on ships entering the waters of States may result in the establishment of invasive aquatic species which may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment.

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Note: It is recommendable to attach Resolution MEPC.207(62) as appendix into the Plan

Note: This Plan is to be written in the working language of the crew.

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## 1. PURPOSE

The purpose of the Plan is to meet the requirements and provide standard operational guidance for the planning and management of ships' biofouling in accordance with the IMO guideline, Resolution MEPC.207(62), and describe safe procedures to be followed.

This plan and related documents may be inspected and reviewed on request by a port state authority.

It is the owners', operators' or masters' responsibility to keep this plan onboard adequately, to review the plan regularly and to ensure that the information and record contained therein is accurate and updated.

This plan attaches sample of biofouling record book, where this ship's crew document activities performed for biofouling maintenance.

## 2. DESCRIPTION OF THE ANTI-FOULING SYSTEMS

Anti-fouling systems (Hereinafter "AFS") can be referred to AFS certificate and documents related to the approval of AFS certificate or relevant documents including AFS specifications etc...

Description of AFS is to be referred to those documents.

In case of installation of machineries such as MGPS etc... effective to paint performance, to be referred to the operation manuals.

**Table 1: Description of the Anti-fouling systems**

Item	Reference No. / ID or names of documents
AFS certificate:	<div style="border: 1px solid black; padding: 10px; display: inline-block;"><b>To be filled</b></div>
Documents related to issuance of the AFS certificate:	
Other documents, if any:	

### 3. DESCRIPTION OF OPERATING PROFILE

Ship's operating profile is shown in the following Table 2.

**Table 2: Operating profile**

Item	Operating profile
Typical operating speeds	<b>To be filled</b>
Typical operating areas or trading routes	
Typical periods underway at sea compared with periods berthed, anchored or moored	Underway at sea: months Berthed, anchored or moored: months
Planned duration between dry-docking / slippings	Planned duration: years

### 4. DESCRIPTION OF AREAS ON THE SHIP SUSCEPTIBLE TO BIOFOULING & OPERATION AND MAINTENANCE OF THE ANTI-FOULING SYSTEM

Description of areas on the susceptible to biofouling & operation and maintenance of the AFS is described in the following Table 3.

**Table 3: Biofouling management action plan**

Areas of the ship which are particularly susceptible to biofouling	Management actions required for each area (e.g., inspections, cleaning, repairs and maintenance)	Management actions to be undertaken if ship operates outside its usual operating profile	Timing of operational and maintenance activities (including In-water cleaning and operation of onboard treatment processes)
<b>External hull surfaces:</b>			
- Vertical sides	e.g.: This area is inspected at each dry-docking and cleaned as found necessary.	e.g.: Additional inspection as found necessary	e.g.: During dry-docking
- Flats			
- Boottop			
- Bow dome			
- Transom			
<b>Hull appendages and fittings:</b>			
- Bilge keels	e.g.: This area is inspected at each dry-docking and cleaned as found necessary.	e.g.: Additional inspection as found necessary	e.g.: During dry-docking
- A-brackets			
- Stabilizer fins			
- CP anodes			
<b>Steering and propulsion:</b>			
- Propeller			

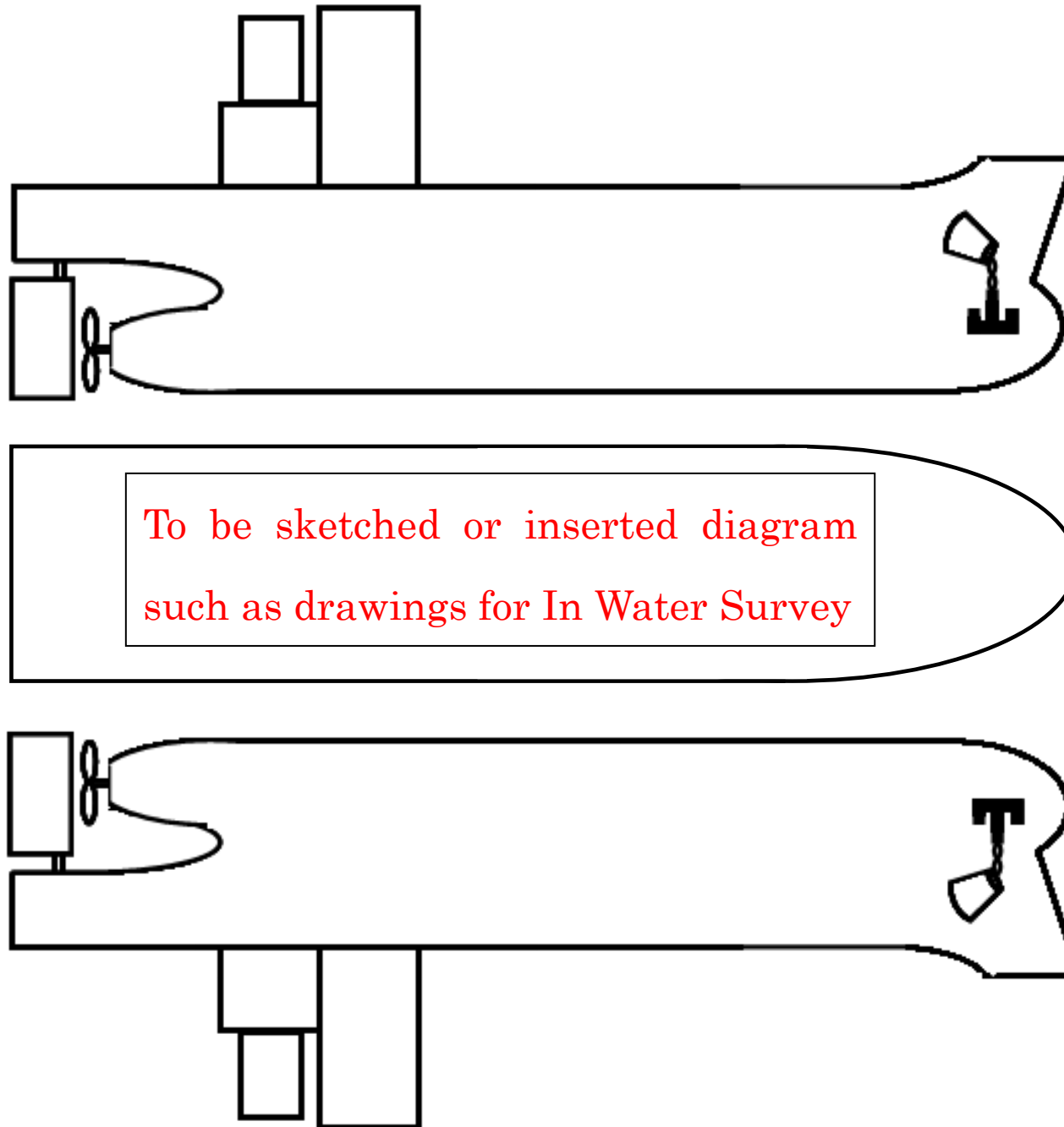
To be filled

Areas of the ship which are particularly susceptible to biofouling	Management actions required for each area (e.g., inspections, cleaning, repairs and maintenance)	Management actions to be undertaken if ship operates outside its usual operating profile	Timing of operational and maintenance activities (including In-water cleaning and operation of onboard treatment processes)
- Propeller shaft			
- Stern tube seal			
- Anchor chain	<div style="border: 1px solid black; padding: 5px; display: inline-block;">To be filled</div>		
- Chain locker			
- Rope guard			
- Rudder	e.g.: This area is inspected at each dry-docking and cleaned as found necessary.	e.g.: Additional inspection as found necessary	e.g.: During dry-docking and In-water cleaning
- Bow/Stern thrusters - Propeller - Thruster body - Tunnel			
- Tunnel grates			

Areas of the ship which are particularly susceptible to biofouling	Management actions required for each area (e.g., inspections, cleaning, repairs and maintenance)	Management actions to be undertaken if ship operates outside its usual operating profile	Timing of operational and maintenance activities (including In-water cleaning and operation of onboard treatment processes)
<b>Seawater intakes and internal seawater cooling systems:</b>			
- Engine cooling system	e.g.: Opened up at regular intervals to inspect growth, cleaned as found necessary.	e.g.: Additional inspection as found necessary	e.g.: MGPS shall be used continuously during voyage and repaired as soon as possible.
- Sea chests (identify number and position)			
- Sea chest grate			
- Internal pipework and heat exchanger	<b>To be filled</b>		
- Fire-fighting system			
- Ballast uptake system			
- Auxiliary services system			



Diagram – Location of areas particularly susceptible to biofouling is to be inserted by drawing or use the below sketch to clarify the area



## **5. SAFETY PROCEDURES FOR THE SHIP AND THE CREW**

Generally, safety procedures for the ship and the crew shall follow manufacturer's recommendation and ship's safety policy. The manuals for machineries used for AFS such as MGPS etc... shall be referred to, if necessary.

## **6. DISPOSAL OF BIOLOGICAL WASTE**

If the crew cleans the ship from biofouling such works shall be conducted by, or under the direct supervision of the ship owner, master or responsible officer. The biological waste is taken care of and disposed in accordance with the relative Conventions and local requirements.

## **7. RECORDING REQUIREMENTS**

Ship maintains and records the details of all inspections and biofouling management measures undertaken on the ship. Contents of the recording requirements are shown in "BIOFOULING RECORD BOOK".

## **8. CREW TRAINING AND FAMILIARIZATION**

Training for ship's crews about biofouling management measures and associated safety procedures, cleaning and maintenance shall be carried out for familiarization to these activities.

During these activities, experienced crew shall carry out coaching other crews for knowledge of health & safety, invasive aquatic species from ship's biofouling and benefits to the ship etc... on this occasion.



# BIOFOULING RECORD BOOK

Ship's name : \_\_\_\_\_

IMO No. : \_\_\_\_\_

Flag : \_\_\_\_\_

Gross tonnage : \_\_\_\_\_

To be filled

## **Entries in the Biofouling Record Book**

The following information should be recorded in this record book:

1. After each dry-docking:
  - a. Date and location that the ship was dry-docked
  - b. Date that ship was re-floated
  - c. Any hull cleaning that was performed while dry-docked, including areas cleaned, method used for cleaning and the location of dry-dock support blocks
  - d. Any anti-fouling coating system, including patch repairs, that was applied while dry-docked. Detail the type of anti-fouling coating system, the area and locations it was applied to, the coating thickness achieved and any surface preparation work undertaken (e.g., complete removal of underlying anti-fouling coating system or application of new anti-fouling coating system over the top of existing anti-fouling coating system)
  - e. Name, position and signature of the person in charge of the activity for the ship
  
2. When the hull area, fittings, niches and voids below the waterline have been inspected by divers:
  - a. Date and location of ship when dive surveyed and reason for survey
  - b. Area or side of the ship surveyed
  - c. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae and slime)
  - d. What action was taken, if any, to remove or otherwise treat biofouling
  - e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts)
  - f. Name, position, signature of the person in charge of the activity
  
3. When the hull area, fittings, niches and voids below the waterline have been cleaned by divers:
  - a. Date and location of ship when cleaning/treatment occurred
  - b. Hull areas, fittings, niches and voids cleaned/treated
  - c. Methods of cleaning or treatment used

- d. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae and slime)
  - e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts)
  - f. Records of permits required to undertake in-water cleaning if applicable
  - g. Name, position and signature of the person in charge of the activity
4. When the internal seawater cooling systems have been inspected and cleaned or treated:
- a. Date and location of ship when inspection and/or cleaning occurred
  - b. General observations with regard to biofouling of internal seawater cooling systems (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae, slime)
  - c. Any cleaning or treatment undertaken
  - d. Methods of cleaning or treatment used
  - e. Any supporting evidence of the actions taken (e.g., report from the classification society or contractor, photographs and receipts)
  - f. Name, position and signature of the person in charge of the activity
5. For ships with a MGPS fitted:
- a. Records of operation and maintenance (such as regularly monitoring the electrical and mechanical functions of the systems)
  - b. Any instances when the system was not operating in accordance with the biofouling management plan
6. Periods of time when the ship was laid up / inactive for an extended period of time:
- a. Date and location where ship was laid up
  - b. Date when ship returned to normal operations
  - c. Maintenance action taken prior to and following the period laid up
  - d. Precautions taken to prevent biofouling accumulation (e.g., sea chests blanked off)

7. Periods of time when ship operating outside its normal operating profile:
  - a. Duration and dates when ship not operating in accordance with its normal operating profile
  - b. Reason for departure from normal operating profile (e.g., unexpected maintenance required)
  
8. Details of official inspection or review of ship biofouling risk (for ships arriving internationally, if applicable):
  - a. Date and location of ship when inspection or review occurred
  - b. Port State authority conducting the inspection/review and details of procedures followed or protocol adhered to and inspector/s involved
  - c. Result of inspection/review
  - d. Name, position, signature of the person in charge of the activity for the ship
  
9. Any additional observations and general remarks:
  - a. Since the ship was last cleaned, has the ship spent periods of time in locations that may significantly affect biofouling accumulation (e.g., fresh water, high latitude (Arctic and Antarctic) or tropical ports)

Ship's name : .....

IMO number: .....

Date	Item (number)	Record of management actions	Signature of officers in charge
e.g.: xx/xx/xx	e.g.: 1. a. b. c. ...	e.g.: xx/xx/xx Ship was dry-docked at xxxx. xx/xx/xx Ship was re-floated. High pressure water cleaning was carried out overall hull body.	

Signature of Master: .....



Ship's name : .....

IMO number: .....

Date	Item (number)	Record of management actions	Signature of officers in charge

Signature of Master: .....

Ship's name : .....

IMO number: .....

Date	Item (number)	Record of management actions	Signature of officers in charge

Signature of Master: .....