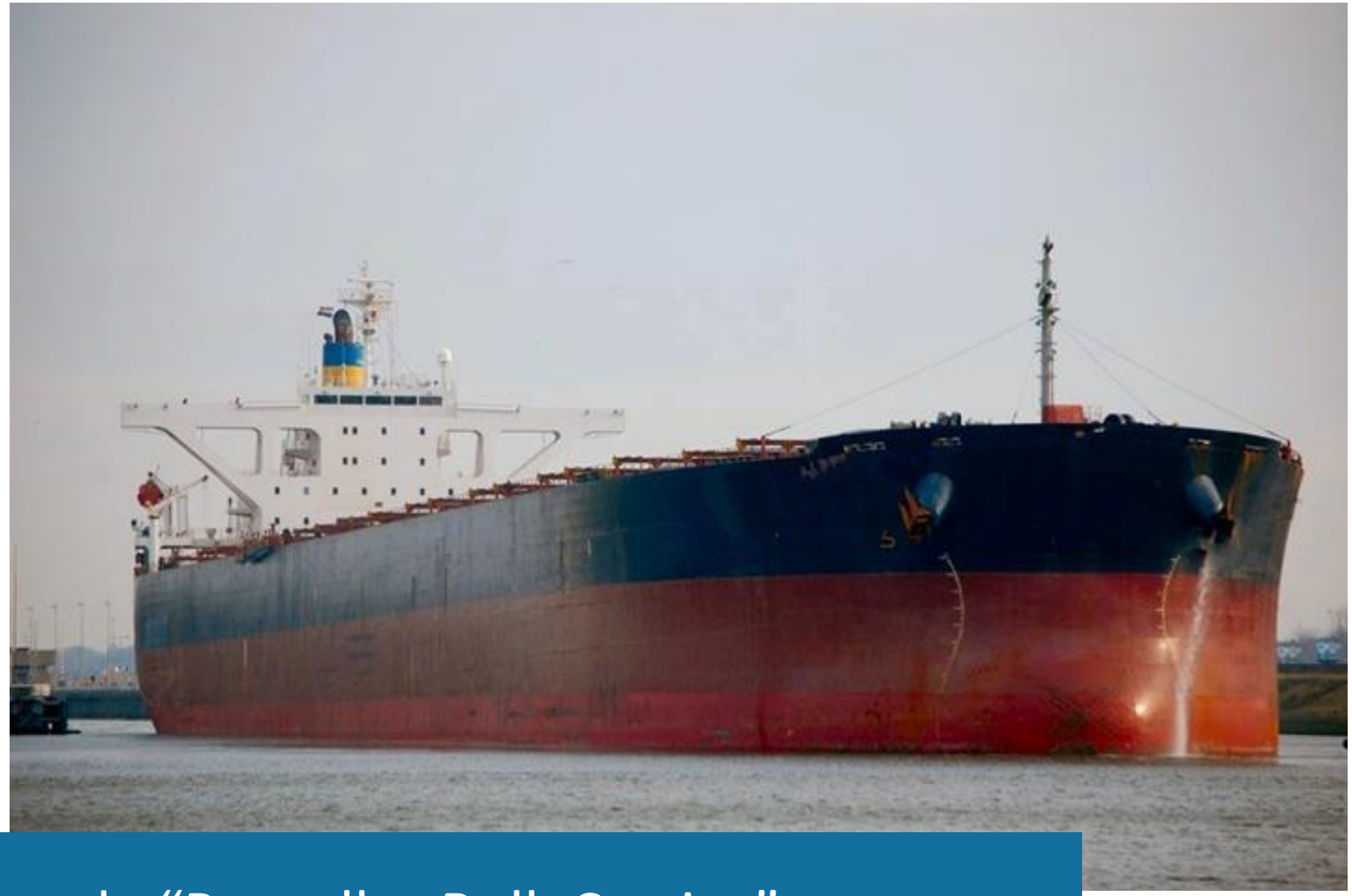
LamersSystemCare
System Solutions for Industry, Maritime & Agriculture



Case study “Propeller Bulk Carrier”

The case

The company treated in this case study is an international ship management company.

This study describes the problems of fouling on propellers in general, the installation of our system on this vessel and the results observed after 8 months since installation was completed.

The situation

The propeller is an important part of the propulsion system on a ship and is custom made and calibrated to the millimeter for each ship. All specifications are tailored to the activities and characteristics of the vessel. There are many factors that are taken into account: the complex hydrodynamic streamlining of the hull, the desired sailing speed, the work that the ship performs and the waters in which the vessel moves.

These variables all affect the propeller design. The height and width, the thickness, the angle of the blades: everything is designed in such a way that the least possible fuel is consumed and the most efficient speed is maintained.

Example of a propeller

The problem

Fouling on the propeller can lead, in the most extreme cases, up to an efficiency loss of more than 30% compared to the performance of a smooth, fouling-free propeller. Even a small amount of fouling is already noticeable in the fuel consumption. Biofouling therefore has a direct impact on operational costs.

In many cases, fouling is removed with a high-pressure cleaner when the ship is in dry dock. If the ship cannot wait until the next dry dock, propellers are also regularly cleaned under water. Fouling on the propeller is an inevitable problem for some vessels in sensitive conditions after just three months. This maintenance costs money and has long term disadvantages for the propeller's performance.

Fouling on propeller

The problem

In this case study we will cover the propeller of a large bulk carrier. The propeller of this vessel has a diameter of 8,4 meters. The vessel was experiencing fouling on their propeller which lead to unnecessary maintenance costs.

In addition to the costs involved in cleaning, it is also not desirable to physically clean (sanding, polishing) the balanced blades each time under water. These cleanings are in some cases noticeable in fuel consumption because the surface of the propeller blades can be damaged.

The owners of the vessel chose to test the Ultrasonic Anti-Fouling System on board of a large bulk carrier, since the system was never tested on the propeller of a large vessel before.

Propeller of large bulk carrier

The solution

By preventing fouling on the propeller and making regular cleaning unnecessary, it can be ensured that fuel consumption does not increase. A solution for this is the Ultrasonic Anti-Fouling System.

The Ultrasonic Anti-Fouling system consists of a control box and one or more transducers. These ensure that an ultrasonic sound wave is created on the surface of a construction. This leads to bubbles forming at a microscopic level, which then implode with force and thus combat the first phase of fouling: the adhesion of single-celled organisms that together form the layer of biofilm. By preventing this layer of biofilm, multicellular organisms, such as larvae of mussels or cockles, have no chance to attach themselves to the surface. This makes the Ultrasonic Anti-Fouling system a preventive, environmentally friendly and sustainable solution.

SH08 control box

SH08 Transducer

The solution

For the installation on this vessel, the SH08 system was used once, with 8 transducers. Four transducers were installed on the Aft stern tube bearing and 4 transducers on the intermediate bearing.

The Ultrasonic Anti-Fouling system must always be switched on and therefore will always transmit the ultrasonic signal, but is actually transmitted extra well through the propeller shaft when the ship is idle. This is also the moment when fouling forms the fastest, because there is no flow.

When the ship is idle, the oil film of the hydrostatic bearing is not active and a better sound transmission of the ultrasonic signal can take place because direct contact of the shaft to the bearings is made.

Correct installation is essential for a good transmission of the ultrasonic signal. The installation itself is not difficult, but locating the transducers and gluing the rings require careful attention. For this part of the installation we advise to always contact Lamers System Care.

SH08 control box


Glued transducer ring on stern tube bearing

The solution


Transducers on aft stern tube bearing


Transducers on intermediate bearing

The result

About 8 months after installation, the vessel went into dry dock and the propeller could be inspected. During this inspection, the customer was relatively satisfied with the result.

As can be seen in the images, the screw has no hard fouling (shells, barnacles etc.) on the blades, only some seagrass, which can be removed easily.

On the boss of the propeller some small fouling can be seen. According to the customer this was quite easy to remove.

Propeller after installation Ultrasonic Anti-Fouling system

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