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## Maintenance of Steam Bottle Water to Keep Operational Auxiliary Steam Bottles on The Mv. Ile De Re

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**Abstract:** Various types of marine vessels require fuel to drive the main engine and auxiliary engines. The fuel requires hot steam as a heater so that the fuel reaches the appropriate temperature, not only fuel but hot steam is also needed for the accommodation space on the ship. The steam boiler is a closed vessel that can produce hot steam with a pressure greater than one atmosphere, to be able to produce hot steam, a heated medium is needed, namely fresh water. The water used in the steam generation process greatly affects the condition of the boiler. Therefore, the quality of water in the boiler must always be considered and maintained so that it is always in good condition, so that the boiler will always be in prime condition. In reality, steam boilers often experience disturbances, such as on the MV. ILE DE RE there is a decrease in the quality of boiler water and the occurrence of scale in the boiler. In this case, the research used an observation research method on boiler water by testing boiler water and it was found that the quality of boiler water was not up to standard with low pH levels up to 6.8, high alkalinity and high chloride up to 200 ppm. there is also a scale formation on the boiler water pipe which can be seen from the dirty condition of the boiler water when taken.

**Keyword:** Maintenance, Boiler Water, Water Treatment

### INTRODUCTION

In the activity of transporting goods at sea, from ancient times to the present, it requires sea transportation in the form of ships which develop over time in order to serve the increasing needs of sea transportation, a large number of ships are needed but efforts are made so that these ships are always ready when used.

Various types of marine vessels require fuel to drive the main engine and auxiliary engines. The fuel requires hot steam as a heater so that the fuel reaches the appropriate temperature, not only fuel but hot steam is also needed for the accommodation space on the ship. A steam boiler is a closed vessel that can produce hot steam with a pressure greater than one atmosphere. In order to produce this hot steam, a heated medium is needed, namely fresh water. The water used in the steam formation process greatly affects the condition of the boiler. Therefore, the quality of the water in the boiler must always be considered and maintained so that it is always in good condition, so that the boiler will always be in top condition. The availability of hot steam is very important for absolute matters on board, such as fuel heating, accommodation heating, heater on the main engine and auxiliary engines, and others. Shipping activities can be disrupted if the production of hot steam experiences problems, due to the influence of the equipment and work of the boiler components that are not good or other reasons that cause the boiler to experience interference.

In reality, boilers often experience disturbances, as happened at MV. ILE DE RE on June 8 2021, when testing boiler water based on the manual, it was found that the level of chloride contained in the water was above the normal limit, namely 120 parts per million (ppm), which should have met the standard water conditions in the steam boiler, namely 20 – 50 parts per million (ppm). As a result, boiler water needs to be treated/blown down to overcome this, and when blowdown is done there is scale which makes the water look cloudy. This condition lasts for approximately two weeks during the water checking period every two days while the ship is on a voyage. If this is not resolved immediately, it will affect the condition of the steam boiler,

Against the background of the difference between theoretical statements that are different from the reality that occurs, the authors are interested in conducting research with the title: Steam Boiler Water Treatment to Maintain Operational Auxiliary Steam Boilers on the MV Ship. ILE DE RE.

## **RESEARCH METHOD**

In this study, the authors examined the boiler water on the MV ship. ILE DE RE. This study uses a qualitative approach method. Data collection and sources of information are very important for conducting research, the data collected is complete, objective and can be accounted for so that the data collected will be used for processing and research in order to get a correct and clear picture, namely regarding the problems that exist in boiler water.

The analysis technique used in order to compile this research, namely using a qualitative descriptive method. The descriptive method is to contain an explanation or description of an object problem that arises at a certain time. This method is used to describe in detail the data obtained with the aim of providing information regarding the handling of problems that arise related to the discussion in this study.

## **RESULTS AND DISCUSSION**

### **Decreasing Quality of Steam Boiler Water**

Good quality steam boiler water has a pH level of 9-11, chloride less than 50 parts per million (ppm), and alkalinity less than 150 parts per million (ppm). But on the MV. ILE DE RE, water quality is not as it should be. The decline in the quality of boiler water occurs because the boiler filling water produced by reverse osmosis does not meet the standards. The filling water still contains high salinity because the reverse osmosis membrane is dirty so that the mineral and salt content in the processed water is not properly filtered. In addition, the treatment of steam boiler water is not in accordance with procedures, such as adding chemical doses that do not follow the manual. To resolve the issue,

### **There is a scale in the boiler water**

The thing that can cause scale in boiler water or more specifically in boiler water pipes is high levels of chloride in boiler water, because chloride is an acidic compound that can form scale and even corrosion in boiler pipes. In addition, the boiler water content is not up to standard, such as the presence of vaporized gas containing carbon dioxide and oxygen, which can form scale on the boiler water pipes. The thing that is needed to overcome this problem is to treat boiler water according to the results of boiler water testing to avoid the formation of scale and corrosion. It is also necessary to add chemical boiler water treatment in the form of a boiler cougulant which can break down scale in the boiler water pipes, the addition of which is carried out through a chemical dosing pump.

### **CONCLUSION**

Based on the discussion above relating to boiler water, the following conclusions can be drawn:

1. The occurrence of a decrease in the quality of boiler water is caused by boiler filling water that is not according to standards and boiler water treatment that is not in accordance with procedures.
2. The presence of scale in boiler water is due to the high chloride content in the boiler water and the boiler water content is not up to standard, such as the presence of vaporized gas which causes scale to form in the boiler water pipes.

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