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Efforts To Sustain Fresh Water Production in Order to Improve The Performance of Fresh Water Generator On The Mt. Rubra

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Abstract: Fresh water generator is an auxiliary aircraft aboard a ship that produces fresh water by evaporating seawater in the evaporator and the seawater is cooled by condensation in a distillation vessel or condenser (condenser), thus producing condensed water called condensate. Fresh water generator running optimally is one of the important factors to support ship operations, especially the results of the fresh water generator used for cooling systems and daily needs on board. This study aims to find out the causes of the problems and efforts that occur in the fresh water generator so that it can maintain fresh water production results in the fresh water generator. While data analysis is to identify the data set that has been obtained, so that the data can be analyzed and the purpose is analyzed in order to get a clearer picture in the preparation of this research both from the problems and the final results. It is hoped that this research research can produce ideas, solutions and appropriate problem solving, both in observing and dealing with the problems raised in this study. Based on research on fresh water production on fresh water generators in MT. Rubra has decreased from 19 tonnes/day to 12 tonnes/day. This is caused by the occurrence of salt deposits on the evaporator plate so that evaporation becomes late and the low pressure of sea water leading to the fresh water generator causes fresh water production to decrease

Keyword: Fresh Water Generator, Evaporator, Decreased Production, Fresh Water

INTRODUCTION

The ship is a means of sea transportation that has been known since ancient times. Ships Move Across The Ocean For Days, Weeks And Even Months. The Ship Is Also A Proper And Efficient Means Of Transportation. The reason for this alternative is that apart from the large transportation capacity, the costs considered are also relatively cheap. Ships Require Maximum Maintenance And Repair. Owners and Charterers Perform Effective Maintenance To Support The Smooth Operation Of Ships In The Long And Short Term. For the Fleet to Keep Running as Well as Possible. Including Freshwater Supplies And Supply On Board.

Freshwater on board is one of the requirements that must be met for the smooth operation of a ship. To save the budget, therefore, there is an auxiliary machine that converts seawater into fresh water, namely fresh water generator, the process of turning seawater into fresh water by means of a seawater temperature of around 30oC. After Passing From The Condenser The Water Vapor Turns Into A Liquid Called Distilled Water. This Distilled Water That We Know As Fresh Water On The Ship Which Then The Fresh Water Is Pumped To The Fresh Water Storage Tank Using A Distilled Pump.

When the author carried out marine practice on the MT Rubra ship on October 8 2020 – December 11 2021, there were problems or obstacles that occurred in the fresh water generator, namely the occurrence of salt deposits on the evaporator plate on the fresh water generator, low vacuum on the fresh water generator, the condenser plate contained dirt, the demister filter contained dirt and low seawater pressure from the ejector pump to the fresh water generator. 9 tons/day down to 12 tons/day.

Based on the reasons above, in compiling this research, the author is interested in taking the title: Efforts to Maintain Fresh Water Production to Improve Fresh Water Generator Performance on MT Ships. Rubra.

RESEARCH METHOD

In research writing research conducted by the author on the problem of fresh water generators, the authors use a qualitative approach method. This is so that in research the writer is able to present data in accordance with the facts that occur and can manage it through an analysis so that a conclusion can be obtained regarding solving the problems experienced by the writer. 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 to be processed and researched in order to get a correct and clear picture of the problems in the fresh water generator. In this case the author chose a fresh water generator on the MT ship. Rubra belongs to the company PT. Kemas Sejahtera Lestari as a research subject. 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

Presence of Salt Deposits in the Evaporator

Fresh water generator auxiliary machinery on the evaporator plate component is very vulnerable to dirt or hard salt deposits, because it is in direct contact with sea water. Salt deposits are deposits that occur from the evaporation of sea water which has a high salt content that occurs in the evaporator, if left alone it will accumulate which can be insulating so that it inhibits the heat transfer process which results in decreased production of the fresh water generator. The process of heat transfer is the transfer of heat from a place with a low temperature to a place with a high temperature. In this case the low temperature is sea water around 29 – 32oC and which is then heated by the jacket cooling of the main engine which is around 76 – 80oC or from a steam boiler with a pressure of around 2 Bar. this process occurs when seawater with a low temperature then receives heat from high temperatures as a result of which seawater will evaporate. the process occurs in the evaporator shell, the main thing is to maintain a minimum vacuum level of 90%, therefore the temperature of the liquid's boiling point will rise and evaporate. The steam will move up through the demister and be given cooling, this process occurs by absorbing heat from the steam to the coolant in the condenser, so that condensation occurs and the steam will become water which is called distilled water. In

the process of seawater into distilled water there are several problems, namely seawater that boils and evaporates on the heating plate on the evaporator and causes a lot of water to stick and concentrate on the plate. over time salt deposits will appear on the plate and will reduce the evaporator's ability to produce steam, which results in the fresh water generator not working optimally on the evaporator plate components. In accordance with the manual for maintenance of the evaporator plate which is 8000 hours, but maintenance time is often reduced, due to too much salt deposits that arise, this problem can cause the amount of fresh water generator production to decrease if left unchecked which will have an impact on accommodation and cooling systems. To remove salt impurities on the evaporator plate can be done by two methods, namely by mechanical and chemical means. The chemical method is to use a chemical, namely descalex, the mechanical method is to use a wire brush by rubbing it so that the evaporator plate becomes clean and then wipe it using a cloth until the plate is completely clean.



Figure 1. Salt Deposits On Evaporator

Low Sea Pressure

The low seawater pressure leading to the fresh water generator is caused by several reasons, namely the sea chest filter which is dirty and also the filter on the ejector pump which is dirty. A dirty sea chest filter can be identified through the temperature of the sea chest cooling system which suddenly increases. If this happens, the dirty sea chest filter must be cleaned immediately or replaced with a new or clean sea chest filter, if left alone it will have an impact on other machinery. A dirty ejector pump filter can be identified by looking at the decreased pressure gauge leading to the fresh water generator, this occurs due to lack of maintenance by the machinist. A clogged filter will have an impact on the amount of fresh water production which will decrease and can also have an impact on the amount of sea water entering the cooling system which will decrease which can result in disruption of ship operations. The ejector pump filter is often ignored by machinists because they think that it is clogged or dirty very minimally, because sea water, before entering the ejector filter, first enters the sea chest filter by assuming this. The engineer ignores maintenance and checks on the ejector pump filter. To avoid the above, it must be checked and maintained by Engineer IV who is responsible for the auxiliary machinery. To avoid the above problems as a responsible machinist must pay special attention, if you carry out maintenance on the sea chest filter, then the ejector pump filter is also carried out maintenance. Because if you just ignore it, it will disrupt the performance of the fresh water generator and the ship's operations will also be disrupted. When there is a change of machinist, when doing a hand over as the old machinist must provide fresh water generator maintenance data to the new machinist, so that the new machinist can carry out proper maintenance on the fresh water generator so that the fresh water generator can operate optimally.

Impeller the ejector pump has damaged impeller blades with holes and has experienced corrosion caused by seawater which has a high salt content, resulting in a drop in the pressure

of the ejector pump which can be seen on the pressure gauge as a result of low seawater pressure leading to the fresh water generator and the production of the fresh water generator also decreases.

Perform cleaning maintenance on the sea chest filter and ejector pump filter and on the ejector pump impeller should be replaced with a new impeller so that the age of the pump lasts a long time and the pump can work optimally, even though it requires a higher cost. Maintaining a harmonious relationship can make people on the ship more calm in working on the ship and when asking for new spare parts it is better for the company to look for new ones, so that engineers can carry out good maintenance and ship operations can run well.

CONCLUSION

Based on the discussion in chapters I to chapter IV relating to efforts to maintain fresh water production in order to improve the performance of fresh water generators. Therefore it can be concluded as follows:

1. Decreased fresh water production can be overcome by cleaning salt deposits on the evaporator plate using manual methods (brushing with a wire brush) and chemically (descaler).
2. The low seawater pressure that goes to the fresh water generator can be overcome by:
 - a. *Impeller* the ejector pump is maintained by immersing the ejector pump impeller in a chemical liquid (Eon Descaler 505), you can also carry out a brushing process on the ejector pump impeller.
 - b. *Filter sea chest* and the ejector pump filter can be maintained by means of a brushing process and by spraying high pressure water.

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