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Analysis of The Application of Ultraviolet Water Sterilizer in Maintaining The Quality of Drinking Water on The MV. EPIC PAN

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Abstract: Ultraviolet water sterilizer is a long cylindrical device used for the sterilization of water into drinkable water. Ultraviolet water sterilizer has two main parts: an adapter and UV tubes. The adapter serves to drain the ratio of electricity according to the voltage and current required by ultraviolet water sterilizer. UV tubes contain ultraviolet lamps where light is the main equipment for making the water drinkable and the water will flow along with the ultraviolet rays, so that the water flowing in the tube is passed through the sterilization process with ultraviolet rays so that the water is unfit for consumption. The problems that the authors take in this study are the factors that affect the declining quality of sterilization, the impact of what happens when the quality of sterilization decreases, and what efforts are made to keep the quality of sterilization is not decreased. The data was collected through observations, interviews, and literature directly related to the subject related to the factors, the impact, as well as the efforts of the decline in the sterilization process to the sterilizer in order to improve the quality of drinking water. The cause of the decline to the sterilization process in order to improve the quality of drinking water in MV. PAN EPIC that dirty filters, dirty water tubes, and the dirty ultraviolet lamp or resulting in less fresh water, complaints against the company, as well as the ship's operational costs are reduced. Therefore some efforts are made to improve the quality of the results of sterilization including cleaning filters, cleaning water tubes, and also cleaning the germicidal lamp.

Keyword: Ultraviolet Water Sterilizer, Mv. Pan Epic, Ultraviolet

INTRODUCTION

Water is a natural resource (SDA) which has a useful function for living things on earth. To preserve and maintain the function of water, it is necessary to manage, control and prevent water pollution wisely by observing and taking into account the interests of present and future

generations and ecological balance. Environmental Management Efforts and Environmental Monitoring Efforts, hereinafter referred to as UKL-UPL, are management and monitoring of Businesses or Activities that do not have a significant impact on the environment which is required for the process of making decisions regarding the implementation of Businesses or Activities (Permen No. 72, 2012 paragraph 3). The water management process, especially for drinking water, is intended as defined in government regulations and applied to support the continuity of ship operations from one port to another, so that the need for potable water on board is met. Therefore the use of clean water for consumption of drinking water and other needs on board because clean water is one of the basic human needs, thus the provision of clean water is an important concern in every ship in the world. Management of drinking water quality is an effort to maintain clean water so that it can achieve the desired water quality according to its designation to ensure that water quality remains consistent in its natural state which is useful for body balance and prevents crew members from experiencing severe dehydration when carrying out their duties on board. Water quality is the water quality condition that is measured or tested based on certain parameters and certain methods based on the applicable laws and regulations.

Efforts or actions to maintain drinking water for the purposes referred to in the government regulation are also applied in supporting the continuity of ship operations from one port to another, so that the need for proper drinking water on board is met. As for the MV. PAN EPIC to get drinking water besides being supplied from land also with a sterilization system. Only 40% of the percentage of water obtained from land in the form of bottled water and the remaining 60% is obtained from the process of sterilizing drinking water in an ultraviolet (UV) sterilizer on board. On August 18, 2021, on the way to Qingdao, China, there was a difference that immediately affected the drinking water on board the MV. PAN EPIC deals with drinking water produced by ultraviolet water sterilizers that is not like the previous normal conditions. We know that the results produced by the ultraviolet water sterilizer are starting to experience a decrease in the quality of the production results, namely the color of the water which turns cloudy and smells. And also the output of drinking water at the water fountain has the problem of being very small unlike normal conditions where water flows out very fast/fast, this indicates a decrease in the quantity of drinking water produced in the ultraviolet water sterilizer. And also on October 7 2021 there was a low intensity alarm on the ultraviolet water sterilizer which indicated a change in the intensity level from the initial set value of the ultraviolet water sterilizer maker which was 102%, down to 60%, besides that the running hours of the machine have exceeded the time limit set by the company that makes the ultraviolet water sterilizer which is also explained in the instruction manual book is to replace the lamp every 8000h, whereas when the problems described above occur the running hours of the machine have reached 8687h. This value was far enough from the standard intensity and running hours, so the operation of this tool was temporarily suspended. In addition, when performing an overhaul on the ultraviolet water sterilizer, the engineer 3, who was in charge of the machine, found moss sticking to the wall of the UV lamp and the sand filter in the rehardening system, a lot of dirt adhering to the sand filter. This indicates the infrequent periodic maintenance of the ultraviolet water sterilizer which should be carried out every 4 times a year according to the instruction manual book, whereas when viewed from the log book data on board, there is no data found that has ever carried out maintenance on an ultraviolet water sterilizer in almost the past year, this is due to the crew's lack of understanding in carrying out maintenance procedures on the auxiliary aircraft. Because it was judged that the water produced was inadequate, some of the crew experienced health problems because the water was unfit for drinking, so when they were still on their way to Qingdao, In China, many ship crews tend to depend on bottled drinking water which is supplied from land so that the use of ship operational costs is reduced because they have to buy bottled water from land. In connection with the conditions of these

problems, the authors are interested in conducting a study entitled Analysis of the application of ultraviolet water sterilizers in maintaining the quality of drinking water in MV. EPIC PAN.

RESEARCH METHOD

A qualitative research approach is an approach that places more emphasis on the in-depth understanding of a problem rather than looking at the problem for generalization research. This research method prefers to use in-depth analysis techniques, namely examining problems on a case-by-case basis because qualitative methodologies believe that the nature of one problem will be different from the nature of other problems. The aim of this qualitative research approach is not a generalization but a deep understanding of a problem. Qualitative research functions to provide substantive categories and qualitative research hypotheses. In this study, the authors used a qualitative research approach as described above. Because according to the author, This approach is suitable for use in this study and is in accordance with some of the data that the authors have obtained. In addition, because of its elaborative nature, qualitative research can easily help writers to dig deeper information related to a research topic which later the information obtained can be used to determine research objectives. In this approach, the researcher creates a complex picture, examines words, reports detailed views of respondents, and conducts studies in natural situations. Qualitative research can easily help writers to dig deeper information related to a research topic which later the information obtained can be used to determine research objectives. In this approach, the researcher creates a complex picture, examines words, reports detailed views of respondents, and conducts studies in natural situations. Qualitative research can easily help writers to dig deeper information related to a research topic which later the information obtained can be used to determine research objectives. In this approach, the researcher creates a complex picture, examines words, reports detailed views of respondents, and conducts studies in natural situations.

In order to obtain objective, actual, accurate, and accountable data in compiling data for this study, the author will explain how data collection techniques and are very important as material for analysis to solve the formulated problems. These data are arranged systematically and are also in accordance with the problem of the researcher, in this case the related problem is the decrease in the intensity of the ultraviolet water sterilizer in producing drinking water.

Data analysis was carried out with the aim of simplifying the results of data processing so that they are easy to understand. In this research, it is clear that the data obtained is a type of qualitative data, so that the data analysis process is carried out by understanding the data that has been collected. In the data analysis method, this research uses descriptive analysis techniques in which events or incidents that occur on the ship are described that are related to the less than optimal performance of the ultraviolet water sterilizer in producing drinking water which is caused by several problems. Then analyzed with relevant theories to get the causes of problems and to find the right solution.

RESULTS AND DISCUSSION

Irregular Cleaning of Ultraviolet Lamps Due to No Schedule in the Planned Maintenance System (PMS)

Irregular cleaning of the ultraviolet lamp and no schedule in the planned maintenance system (PMS) can cause dirt such as moss or other microorganisms that can reproduce on the wall of the ultraviolet lamp with a glass base, so that the moss blocks the process of releasing UV rays to the fullest.

Lack of Monitoring Working Hours (Running Hours) on Ultraviolet Lamps

Lack of monitoring of working hours (running hours) on this ultraviolet lamp can also

cause decline the performance of the lamp in the process of irradiating UV light during the sterilization process if the running hours have exceeded the time limit set by the maker of this ultraviolet water sterilizer. We can see that stated in the instruction manual book on the ship the working hours (running hours) on the UV lamp is 8000h, whereas when a problem occurs the working hours (running hours) have exceeded the time limit, reaching 8687h, this indicates that there is a lack of monitoring of the working hours (running hours) on the ultraviolet lamp.

CONCLUSION

Based on the results of the research, data analysis, and discussion of the problems that have been described and discussed in the previous chapter, regarding "Analysis of the Application of Ultraviolet Water Sterilizers in Maintaining the Quality of Drinking Water on MV Ships. PAN EPIC, the authors can draw the following conclusions:

1. The reduced intensity of UV lamp light in the drinking water sterilization process is due to the absence of a maintenance schedule and monitoring of ultraviolet lamp running hours in the planned maintenance system (PMS), causing the ultraviolet lamp irradiation process to be disrupted.
2. Changes in the quality of drinking water to become cloudy, smelly and the pH value decreases due to irregular cleaning of the sand filter in the rehardening filter and fresh water tank.

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