

Noise and Leak Handling in Main Cooling Sea Water Pump in MV. DK 03

Mustholiq¹, Fitri Kensiwi², Kemal Joy Setiawan³

¹Maritime Polytechnic Semarang, Indonesia

²Shipping Science Polytechnic Semarang, Indonesia

³Politeknik Negeri Medan, Indonesia

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Abstract

Auxiliary machinery on board is one of the supports in the smooth operation of the ship. Noise and leakage occur in the main cooling sea water pump in MV. DK 03 will hinder the shipping process. The main cooling seawater pump is one of the pumps on board that functions to drain or transfer seawater to the ME plate cooler as a fresh water cooler jacket cooling ME. This study was conducted to determine the causes of noise and leaks in pumps, the impact that occurs due to noise and leaks in pumps, and efforts that can be made to overcome noise and leaks in the main cooling seawater pump. Researchers use qualitative descriptive methods, triangulation of observations, interviews, and literature studies. Researchers identified the causative factors, impacts, and treatments carried out related to the causes of noise and leaks in the main cooling seawater pump. Researchers will also use data analysis techniques methods Software, Hardware, Environment, and Liveware, which can be referred to as the SHELL model. The results obtained from this study show that the cause of noise and leakage in the main cooling seawater pump is caused by damage to the pump foundation and affect the shaft impeller and other components on the main cooling seawater pump, with the damage having an impact on the freshwater cooling process on the main engine. Handling carried out to prevent this is to carry out maintenance according to PMS (plan maintenance system) replace ship spare parts with standards in accordance with the manual book and carry out operations according to the manual book.

Keywords *handling, leakage, pump, main cooling sea water pump*

INTRODUCTION

When the MV. DK 03 carried out a voyage from Cilacap to load coal in Bunati, Kalimantan on December 8, 2021 the auxiliary machinery experienced damage to the Main Cooling Sea Water Pump which was discovered by the duty oiler when checking every 30 minutes, marked by an increase in the temperature of the cooling piston which normally 76°C-78°C rose to 80°C. This incident made the prime mover engine experience excessive heat. Upon noticing the change in temperature of the prime mover, the duty oiler immediately reported to the engineer. Then 2nd engineer ordered 4th engineer to check the Main Cooling Sea Water Pump. The problem with the Main Cooling Sea Water Pump is that there is an uncharacteristic noise and water is seen coming out of the pump plus a decrease in pump pressure from 3 Kg/cm² to 1.5 Kg/cm² so that the pump temperature is hot which causes the pump performance to decrease. After the 4th engineer checked and reported to the 2nd engineer, the 2nd engineer took action to turn on the ballast pump as a substitute and turn off the Main Cooling Sea Water Pump which was in trouble. 2nd engineer ordered 4th engineer who is responsible for auxiliary machinery, especially pumps, to immediately

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Corresponding author's email: kemaljy43@gmail.com

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recheck and overhaul the Main Cooling Sea Water Pump. Motivated by the occurrence of noise and leakage in the centrifugal pump coupled with the Main Cooling Sea Water Pump pressure decreases which is normally pressurized from 3 Kg / cm² to 1.5 Kg / cm² increasing temperature on the piston cooling the main engine which has a normal temperature of 76oC-78oC rising to 80oC, then the researcher is interested in conducting a study with the title "Handling Noise and Leaks in the Main Cooling Sea Water Pump on the MV. DK 03".

Based on the background above, the problems can be formulated as follows;1)What factors cause noise and leakage in the main sea cooling seawater pump on the MV. DK 03?, 2)What are the impacts caused by noise and leakage on the main sea cooling water pump on the MV. DK 03?, 3)What efforts are made to overcome the noise and leakage of the main sea cooling water pump on the MV. DK 03?

LITERATURE REVIEW

Troubleshooting

Onno W. Purbo explained that the definition of troubleshooting is Purbo. Purbo (in Prihatna, 2005) explained that Troubleshooting is a term in English, which refers to a problem. Troubleshooting is a systematic search for the source of the problem so that the problem can be solved.

Noise

According to Siswanto (2002) in Ramdan (2013), noise is the occurrence of loud sounds that interfere with and or endanger health. So noise on the pump is an undesirable condition because it will affect the condition of the pump and the surrounding environment.

Leakage

According to Soegiyono (2006: 156), leaks are perforated so that media (water, air, gas) can exit or enter. Leakage is the state of leaking.

Pump

According to Tyler G. Hicks in his book Pump Operational And Maintenance (2008: 48), pumps function as machines or mechanical equipment used to raise fluids from low to high parts or to drain fluids from low-pressure areas to high-pressure areas and also as flow rate boosters in a piping network system. Pumps are classified into 2 parts, namely positive displacement pumps and dynamic pumps.

Maintenance

According to Assauri (2008), maintenance is defined as an activity of maintaining factory facilities and making repairs, and replacements needed so that there is a state of production operations in accordance with the plan.

Troubleshooting

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Research Framework

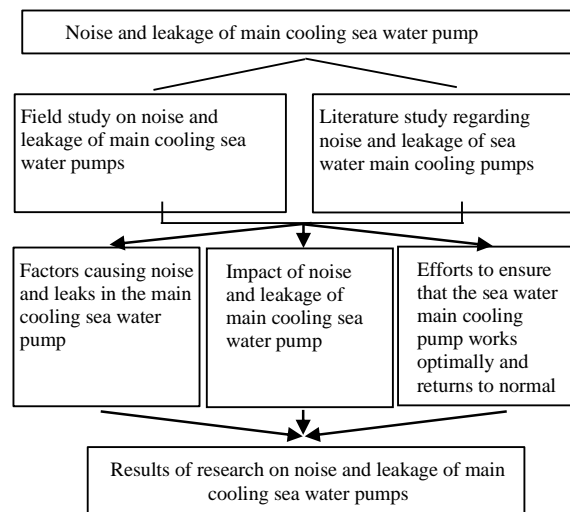


Figure 1. Research framework

METHODOLOGY

The research method used in this study is a qualitative descriptive method.

Time and Place of Research

The research was conducted from August 19, 2021, to August 26, 2022, on the MV. DK 03. This ship is owned by the shipping company PT Karya Sumber Energy.

Sample of Research Data Sources

Samples of data sources for this research are primary data and secondary data. Primary data is obtained through direct observation and interviews. While secondary data is obtained from books, documentation, literature, and others.

Data Collection Technique

The methods used to collect data in this study are observation, interviews, and documentation studies. Observations were made on the handling of noise and leaks in the main cooling seawater pump MV. DK 03. For interviews, interviews were conducted with KKM and Machinist IV. While documentation is obtained from ship operational information and manual books. As well as documentation obtained from pictures and manuals when repairing pumps.

Research Instruments

In qualitative research, the data collection tool is the researcher himself, non-human tools (for example questionnaires, interview guidelines, instructions, observations, and field notes) can also be used, but their function is limited to supporting research work.

Qualitative Data Analysis Technique

The data analysis technique used in the preparation of this research is the SHEL method (Software, Hardware, Environment, and Liveware).

Data Validity Testing

To check the validity of data in qualitative research, namely triangulation. With triangulation, the truth of certain information will be obtained by using various data sources such as documents, archives, interview results, and observation results.

FINDINGS AND DISCUSSION

Discussion of Research Results

- a. Factors causing leakage and noise in the main cooling sea water pump
 - 1) Software
 - a) Mismatch Plan Maintenance System (PMS) on the machine
 - b) Non-conformity of operation by the manual book
 - 2) Hardware
 - a) Unstable foundation/holder on the pump
 - b) The condition of the cover that has been eroded due to corrosion
 - c) The occurrence of rust on the pump shaft and bearings that have loosened
 - 3) Environment
 - a) The high salt content of seawater
 - b) Erratic ship conditions
 - 4) Liveware
 - a) Lack of cooperation between ship crews
 - b) Spare parts on the ship are not sufficient

- b. Impact of leakage and noise on the main cooling sea water pump
 - 1) Decrease in pump efficiency.
 - 2) Operational disruption and environmental damage

- c. Efforts to handle leakage and noise in the main cooling sea water pump
 - 1) Software
 - a) Implement a regular Plan Maintenance System (PMS)
 - b) Carry out pump operation according to the manual book
 - 2) Hardware
 - a) Make improvements to the pump foundation/mount
 - b) Patch the cover that has been eroded
 - c) Replacing shafts and bearings with new ones
 - 3) Environment
 - a) Carry out maintenance on the eroded pump cover
 - b) Strengthening the foundation or seat on the main cooling sea water pump
 - 4) Liveware
 - a) Establish good communication between ship crews
 - b) Perform emergency requests for spare parts

CONCLUSION AND FURTHER RESEARCH

Conclusion

From the results of the discussion carried out when researchers carried out sea practice on the MV. DK 03. The following can be taken from this entire research; The occurrence of noise and leakage in the main cooling sea water pump on board MV. DK 03 is caused by damage to the pump foundation which results in the synchronization of the drive motor with the pump, because of this, other components of the main cooling seawater pump experience various damages, such as shaft shafts and loose bearings, The impact caused by noise and leakage on the main cooling seawater pump on board MV. DK 03 is a decrease in pressure in the pump increasing the temperature of the cooling jacket cooling on the main engine, Efforts must be made to the occurrence of noise and leakage in the main cooling sea water pump, namely carrying out a regular planning maintenance system, requesting emergency spare parts for main cooling seawater pump components that are often damaged, and repairing damaged components such as pump mounts and patching covers so that the efforts made can improve the operational work of the main cooling seawater pump.

Suggestions

Based on the results of research that has been conducted by researchers during sea practice on the MV. DK 03, then the researcher provides suggestions for the problems that occur, namely; To

prevent noise and leakage in the main cooling seawater pump on MV. DK 03 the entire engine crew is expected to pay attention to the condition of the main cooling seawater pump as little as possible, especially on the pump foundation which is the initial cause of vibration in the main cooling seawater pump on board MV. DK 03, To prevent and improve the performance of the main cooling sea water pump, the responsible machinist immediately repairs the noise and leaks in the main cooling seawater pump, so that the pump can return optimally, To prevent and improve the performance of the main cooling sea water pump, the IV machinist should request spare parts according to the situation and condition of the components on the main cooling seawater pump which often experience problems and for operational companies should be able to provide spare parts according to the spare part requests sent from the ship, because the crew on the ship knows firsthand the situation and condition of the components that are experiencing problems.

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