



## Causes of The Failure of The Reciprocating Bilge Pump in Supporting The Bilge Transfer Process on Mv. Amanah Halmahera Amc

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**Abstract:** The reciprocating bilge pump is an important auxiliary device in the bilge system in the engine room which functions to pump bilge from the bilge tank or engine room gutter to the OWS (Oily Water Separator) and forward it to the ship's overboard. Reciprocating bilge pump is a type of reciprocating pump (piston pump) which is widely used for pumping viscous liquids or water mixed with oil. This pump generally consists of a pump housing or pump cylinder in which there is a plunger or piston which works by moving from TMB (Bottom Dead Point) to TMA (Top Dead Point) to suck liquid into and push it back out of the cylinder. This study aims to find out the causes of the problems and the efforts that can be made on the reciprocating bilge pump so that it can restore the performance of the reciprocating bilge pump. The research method that the authors used in compiling this research is a qualitative descriptive research. 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 handling the problems raised in this research. Based on research on the reciprocating bilge pump at MV. Amanah Halmahera AMC this pump is not working. This is caused by the release of the piston head from the piston rod so that there is no pressure on the pump and the check valve does not work properly so that it is difficult for the fluid to be sucked into the pump chamber. To prevent this problem, it can be done by reinstalling the check valve and cleaning the check valve.

**Keyword:** Reciprocating Bilge Pump, Piston, Check Valve

## INTRODUCTION

Pump is an auxiliary machine or tool used to move fluids from a low surface to a higher surface or move fluids from a place of low pressure to a place of higher pressure. Pumps have different types and shapes, but basically the way the pump works is almost the same, namely the pressure inside the pump is initially made smaller than the outside pressure, and then increased. This pressure change can run alternately as in a reciprocating pump or pressure can occur regularly such as a centrifugal pump.

*Reciprocating bilge pumps* is an important auxiliary aircraft in the bilge system in the engine room which functions to pump bilge from the bilge tank or engine room gutter to the OWS (Oily Water Separator) and forwarded to the ship's overboard. Reciprocating bilge pump is a type of reciprocating pump (piston pump) which is widely used for pumping viscous liquids or water mixed with oil. This pump generally consists of a pump housing or pump cylinder in which there is a plunger or piston which works by moving from TMB (Bottom Dead Point) to TMA (Top Dead Point) to suck liquid into and push it back out of the cylinder.

Based on the author's experience when doing prala, when the MV. Amanah Halmahera AMC made a cruise from Weda to Bahodopi, the oiler on duty operated the reciprocating bilge pump to dump the bilge from the engine room gutter to OWS then to the ship's overboard, but during the operation, a problem occurred where the pressure read on the pressure gauge decreased from 3.4 Bar to 0.8 Bar. The high level engine room sewer alarm goes on indicating that the engine room sewer is almost completely filled with bilge and must be transferred to the bilge tank or discharged through the OWS to the overboard. Therefore a check and overhaul is carried out by engineer 4 to find out what is causing this pump to not work,

Against the background of the malfunctioning of the reciprocating bilge pump which resulted in the obstruction of the bilge disposal process, the researchers are interested in conducting a study with the title: Causes of a Not Functioning Reciprocating Bilge Pump in Supporting the Bilge Transfer Process on MV. Amanah Halmahera, AMC.

## METHOD

In research writing research conducted by the author on the problem of reciprocating bilge pump, the author uses 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 things 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 in the reciprocating bilge pump. In collecting data there are several techniques and methods used by the author, including the following: a). Observation, Observation is direct observation, this method requires researchers to observe directly the object of research. In this case the author made observations when carrying out sea practice on the MV ship. Halmahera Amc's mandate regarding the reciprocating bilge pump, the author has major problems regarding the non-functioning reciprocating bilge pump. This observation was carried out in order to find out the problems with the reciprocating bilge pump., b). Documentation, Documentation is a way of collecting data through written heritage such as documents, photographs and including books related to the problems in this research, so that the data can be accurate and can be accounted for., and c). Literature Study Literature study is an activity of studying various kinds of reference books and also the results of previous research that are similar and useful as a theoretical basis regarding the problem to be studied. The references taken in writing this research refer to books on reciprocating bilge pumps.

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**

### **Detachment of Piston Head from Piston Rod**

The problem with the reciprocating bilge pump is the condition of the piston head and piston rod being released which is caused by the installation of the piston nut that is not optimal, causing the piston head to easily come off. Pump maintenance that is not in accordance with the procedure is also one of the main factors why the piston head can be separated from the piston rod, and also the operation of the pump that is not in accordance with the procedure can make the pump not run normally. For this reason, it can be done by reinstalling the piston nut to the maximum so that the piston nut does not come off easily and the piston part will become precise. And the most important thing so that this incident does not happen again is to improve the pattern of pump maintenance to be carried out in accordance with the PMS (Plan Maintenance System) which aims to overcome the condition of damage to the reciprocating bilge pump parts, and tightened by the Chief Engineer for machinists. Supervision is needed to ensure the smooth operation of the ship by planning the following:

1. Preventive maintenance

Namely carrying out systematic observations according to the maintenance schedule with technical analysis to ensure smooth performance of the reciprocating bilge pump. Examples include cleaning, inspection, and pump adjustment.

2. Predictive maintenance

Namely by monitoring the condition of the pump in real time by looking at the parameters in the reciprocating bilge pump, for example by looking at the pressure gauge of the reciprocating bilge pump to determine whether the pump is running normally or not.

3. Corrective maintenance

Namely carrying out repairs to the reciprocating bilge pump after the pump is damaged, for example, by overhauling the pump to get the pump performance back to normal.

### **Check Valve Not Working Properly**

The check valve does not work properly due to a number of factor that is accumulation of dirt on the check valve, the filter has accumulated dirt, and the condition of the filter is not proper. Replacing a filter that is no longer feasible for a reciprocating bilge pump according to the time it is used is one of the most effective and efficient measures, because the filter is the first place to prevent dirt from entering the check valve. In order for the condition of the check valve to be maintained, more emphasis is placed on good and correct scheduling and management to get optimal results. Make sure the suction filter is properly attached to the housing so that there is no internal loss or wasted suction power.

## **CONCLUSION**

Based on the results of the discussion and description in the previous chapters, the authors draw the conclusion that the reciprocating bilge pump is not functioning on the Mv. Amanah Halmahera AMC is caused by the following factors: The failure of the pump is caused by:

1. Detachment of the piston head from the piston rod.

The separation of the piston head from the piston rod is caused by the following factors:

- a. Installing pistons Incorrect or inappropriate nut.
- b. Failure to carry out proper operating procedures for the reciprocating bilge pump.
- c. Failure to carry out maintenance procedures for the reciprocating bilge pump.

These factors can cause friction between the piston and cylinder which will result in the release of the piston and piston rod.

2. *Check valves* not working properly.

*Check valves* not working properly due to the following factors:

- a. Accumulation of dirt on the check valve.
- b. *Suction filter* experience accumulation of dirt.
- c. The filter is in an unfit condition

These factors can cause the suction on the pump to become unstable so that the performance produced by the reciprocating bilge pump is not optimal.

## REFERENCE

- Arismunandar, W. 2002. Piston Fuel Motor. Bandung: ITB.
- Budi, Harsanto. 2013. Basic Science of Operations Management. Bandung: Unpad Press.
- Bloch, Heinz P. 1997. Major Process Equipment Maintenance and Repair. Texas: Gulf Publishing Company.
- Daft, Richard L. 2006. Management Edition 6. Jakarta: Salemba Empat
- Haruo Tahara, Sularso. 2004. Pumps and Compressors, Jakarta: PT. Pradnya Paramita.
- Herbert H. Tacket, 2008. Positive Displacement Reciprocating Pump Fundamentals Power and Direct Acting Types. Sheffield
- Kurniawan, Fajar. 2013. Industrial Maintenance Management. Yogyakarta: Science Graha.
- Muslim Mahardika, Andi Sudiarmo, and Gunawan Setia. 2018. Design and Manufacturing of Centrifugal Pumps. Yogyakarta: Gadjah Mada University Press
- Purwoko, Bambang Setiyo Hari. 2015. Machine Maintenance and Repair Management. Yogyakarta: Yogyakarta State University
- Salim, Peter and Yenny Salim. 2002. Contemporary Indonesian Dictionary. Jakarta: Modern English Press.
- Sehrawat, MS, & Narang, JS 2001. Production Management. Nai sarak: Dhanpahat RAI Co.
- Hicks, Tyler G. 2008. Pump Operation And Maintenance. New Delhi