Analysis Of Declining Air Production Pressurized On The Compressor On Board The MV. Uniorder

Miran¹, Doharman Lumban Tungkup², & M Sulthan Abrar³

¹Politeknik Transportasi Sungai Danau dan Penyeberangan Palembang
*email: miran@dephub.go.id

Abstract

Compressor has the most important on the ship, in support the operational of ship. In it is the operational compressor often experience influence that cause low of the pressure air production of compressor on ship, till the writer is interested to create it in skirtion with title the low analysis of pressure air production of compressor.

This research conducted when writer to execute practice of sea (sea object) for MV.UNIORDER property of company PT. Asia Mulia Transpasifik for 1 year. Data source obtained directly from place of research with observation method as well as biography method in the form of documents, instruction manual book and books related to title of this research. The result of this observation is the slags on the valve and scratches of the surface valve which cause decrease low of pressure air production of compressor, till causes the main engine could not started. The suggest of writer in this research is clean the compressor every day in order the our that is absorbed not content any carbon and dust. Attending also the maintenance of every valve. Both the suction valve although pressure valve and attention also the running hours from compressor valve.

Keywords: Compressor, Valve

1. Introduction

In the smooth operation of the ship needs to be supported by optimal and routine maintenance and repairs on the main engine and all auxiliary machines on board, one of which is the compressor auxiliary aircraft. The existence of a compressor on board the ship is very important because as one of the auxiliary aircraft supporting the operation of the ship. The compressor is one of the components of the working air system on board the ship and has a function that is to produce compressed air which is used as the main driver of the main engine and generator, the compressor as an air supplier for wind bottles on board so it is very necessary to pay attention to maintenance and repair to increase air production, but in general there is often damage to parts of the compressor which affects the production of compressed air so that it can inhibit the smooth operation of the ship.

¹ Lecturer of Inland Waterways Journal Transport Polytechnic Of Palembang, email: miran@dephub.go.id
² Lecturer of Inland Waterways Journal Transport Polytechnic Of Palembang, email: doharman_lumban@dephub.go.id
³ Alumni of Inland Waterways Journal Transport Polytechnic Of Palembang, email:
In the operation of the compressor, of course, there are repairs and maintenance that are routine, regular and periodically on the main engine and on auxiliary machinery to support the performance of the machinery in order to obtain a safe and optimal smooth compressor work. To support the smooth sailing at sea, the role of air compressors cannot be ignored because air compressors have a very broad role in almost all engine room activities and on deck.

In connection with the very important function of the air compressor on the ship, the air compressor certainly needs to get special attention in carrying out routine maintenance in addition to other machinery, so that this air compressor can be used in accordance with its function on board because the ship is required to be in prime condition and on time, such conditions, ready to operate according to a planned schedule to reduce unexpected repair costs. This treatment must be supported by spare parts available on board, without spare parts, maintenance or maintenance cannot run according to a predetermined plan.

The problem that the author experienced, namely when the ship experienced a motion failure where the main engine could not be started from Medan to Kalimantan, precisely on September 22, 2021, where compressor no.2 in the bottle wind filling is usually to reach a pressure of 30 kg/cm\(^2\) only 15 minutes, but at no time compressor.2 already 15 minutes has not reached a pressure of 30 kg/cm\(^2\), only 15 kg/cm\(^2\).

Based on the problems mentioned above, the author presents the problem and pours in the form of scientific research or thesis with the title “Analysis of the decline in compressed air production on compressors on board the MV.UNIORDER”.

2. Research Method

The research method used by the author in the delivery of the problem is a qualitative descriptive method, to describe and describe the object in the research. The descriptive sense is a writing that describes the actual state of the object being examined, according to the actual state at the time of direct research. According to Arikunto in 2019, descriptive methods are research that is intended to investigate circumstances, conditions or other things that have been mentioned whose results are explained in the form of a research report.

a. Primary Data
   a. Log Book ship in the event of damage to the compressor
   b. The Survey method is to observe and record directly at the research location.

b. Secondary Data
Secondary Data is complementary data from primary data obtained from library sources such as Literature, lecture materials and data from companies, as well as other matters related to this study.

3. Results and Discussion
On the ship where the researchers carried out prala MV. Uniorder, which is when the ship experiences a motion failure where the main engine cannot be started from Medan to Kalimantan, precisely on September 22, 2021, where compressor no.2 in the bottle wind filling is usually to reach a pressure of 30 kg/cm\(^2\) only 15 minutes, but at no time compressor.2 already 15 minutes has not reached a pressure of 30 kg/cm\(^2\), only 15 kg/cm\(^2\). Then he
checked the suction valve and the press valve on the compressor, it turned out that after checking the suction valve and the press valve did not work properly. The factors that can cause the suction valve and the high pressure pressure valve to not function properly include:

1. The presence of scale attached to the suction and press valves.

![Suction valve and press valve](source: MV. Uniorder)

The suction valve and the pressure valve used in the compressor can open and close again as a result of the pressure difference that occurs between the inside and outside of the cylinder. On the suction valve and the valve press a lot of crust attached so that the valve does not work properly.

There are several factors that cause the appearance of scale on the suction valve and the pressure valve, among others:

a. The presence of dirt or dust sucked from the outside is carried by air.

b. The temperature in the charging area is too humid.

The suction valve at the time of the suction stroke does not open properly, due to the presence of a crust that holds the spring. The existence of a crust that affects the work of the suction Valve is due to the large amount of dust that is carried along with the air, where the suction filter cannot hold the dust that comes with the air flow because the filter is damaged or leaking so that it cannot filter the air cleanly which will be used to enter the vessel.

Based on the problems faced by the author where the air compressor is run manually for 20 minutes tenyata not working optimally so that the air produced by the air compressor is very minimal, whereas if the air compressor can raise the pressure on the bottle of wind 2 to 3 kg/cm²/minute, it means the suction Valve is still good.

2. The presence of scratches on the surface of the suction valve and the press valve
Figure 2. Suction valve
Source: MV.Uniorder

The suction valve and the press valve serve to open and close for each piston stroke. The surface of the suction valve must be maintained as best as possible so that there are no scratches. If there is a scratch on the suction valve, it will cause air to escape when the pressure is high. Scratches on the air compressor Valve are caused by dust or sand sucked in by the air compressor. From this problem will make the production of air in the air compressor will be very minimal.

3. Do not carry out air compressor maintenance at regular intervals.
   Air compressor maintenance has several types of maintenance that must be done to avoid heavier damage, namely:
   a. Daily care
      Daily treatment is carried out daily before surgery.
   b. Routine maintenance
      Routine maintenance is carried out with periodic inspection of the compressor. The duration of regular checks varies depending on the individual product.
   c. Comprehensive care
      Maintenance is done with a thorough examination of the air compressor and overhaul.

The solution to the problem will be discussed about the cause of not optimal production of compressed air in the air compressor caused by the malfunctioning of both the suction valve and the high pressure valve. From the analysis above, the author will discuss what happened at the research site on the ship.
There are several factors that cause the suction valve and the pressure valve, in a state of high pressure do not work properly, among others:
1. The presence of scale attached to the suction valve and the pressure valve
   The cause of the appearance of crust on the suction valve because the air that enters the air compressor still contains dirt and air that is still moist and over time will accumulate into a crust that will be attached to the suction valve hole that will minimize the passage of air into the air compressor and out of the air compressor:
   a) Remove the suction valve and the pressure valve from the holder.
   b) Soak with diesel fuel to remove scale attached to the suction valve and press valve.
   c) Clean the outer side with a brush without causing damage.
Unscrew the fastening nut on the valve, disassemble it carefully then the spring is cleaned and the valve plate is disked using paste or brasso. Brushing is done with the figure eight technique to obtain an even result.

d) After cleaning and repair, then do the installation again, pay attention not to reverse the installation.

The impact of the presence of scale on the suction valve and the pressure valve is as follows:
1) The presence of scale on the suction valve and high pressure press valve then the air flow hole will shrink so as to reduce the air sucked.
2) The presence of scale on the suction valve and the high pressure press makes the spring on the valve unable to work properly, causing the valve to open slowly.
3) Due to the slow work of the suction valve and the press valve, the production of compressed air in the air compressor decreases.

2. The presence of scratches on the surface of the suction valve and the press valve

Not optimal production of compressed air Yan generated by the air compressor caused by scratches on the surface of the suction valve scratches on the surface of the suction valve caused by particles of hard materials, such as ceramics and sand sucked by the air compressor.

The measures to be taken to avoid scratches on the surface of the suction valve are as follows:

a. The dust content around the air suction must be kept as small as possible so that the air suction from the compressor is cleaner so that the suction valve and the press valve are protected from Crust buildup.

b. Maintain the cleanliness of the suction blower to the engine room by adding a wire gauze filter and then doing routine cleaning.

c. At the time of cleaning must be carefully so that the surface there are no scratches that can cause leaking air when there is pressure.

By conducting an examination of the suction valve and high pressure press valve, it turns out that there is an inherent crust and scratches on the valve surface which results in the suction valve and the press valve is not functioning properly, then held repair and cleaning of the suction valve and high pressure press, after the repair and installation of the compressor is run again.

3. Do not carry out air compressor maintenance at regular intervals.

Air compressor maintenance has several types of maintenance that must be done to avoid heavier damage, the following types of maintenance and handling, namely:

a. Daily care
    Daily maintenance is carried out every day before operation, the air compressor should be inspected according to the following ways:

1) The oil surface is kept at the limits specified on the duga glass at 5 line levels.
2) Discharge of air condensing water on the air vessel to avoid water accumulation that may cause disruption of the performance of the air compressor.
3) Safety valve pressure measurement to make sure the safety valve is working properly.
4) inspection of abnormal vibrations of the compressor to determine the problem earlier sehiungga, avoid more severe damage.

b. Routine maintenance
Routine maintenance is carried out with periodic inspection of the compressor. The duration of regular checks varies depending on the individual product. Guidelines for routine maintenance obtained by the author when carrying out the practice is:
1) inspection of bolts and nuts every 250 working hours. Actions taken with the tightening of bolts and nuts.
2) suction filter inspection every 250 working hours and clean the crank chamber and oil surface gauge.
3) air valve leakage check every 3000 working hours. The check is done by leaving the valve as it is for 30 minutes and observe if the pressure has a pressure drop of more than 10% of the maximum pressure.

c. Comprehensive care
Maintenance is done with a thorough examination of the air compressor and overhaul. The treatment done to the compressor is:
1) clean the scale layer in the suction valve and press the air every 3000 working hours to avoid the build-up of scale on the suction valve and the press valve to work properly.
2) inspection of scratches and wear on the piston ring and cylinder every 3000 working hours, if the occurrence of scratches then do skir or replace with a new spare part.
3) measure the diameter of the cylinder liner, piston and piston ring to find out the condition whether in normal size or not, what if abnormal conditions occur then replaced with new parts and the appropriate size.
4) Check metal sitting / metal road make sure in a normal situation if there is a scratch then have to do a new replacement spare parts.

4. Closing

a. Conclusion
From some of the above, especially in the chapter analysis problems, it can be concluded that the cause of the decrease in air pressure in the compressor is the malfunctioning of the suction valve and the press valve properly. Can know the steps-langkahnya, namely:
1) Compressor maintenance can improve the discharge and output pressure on the Tanabe H-64 compressor at MV. Uniorder
2) Valve maintenance on the compressor is able to improve the performance of the Tanabe H-64 compressor in MV. Uniorder

b. Suggestion
The suggestions that the author gives in this thesis include:
1) Clean the area around the compressor every day so that the air sucked by the compressor does not contain carbon and dust or hard objects such as ceramics and sand, as well as regular maintenance of the air filter so that dust and dirt do not accumulate on the filter.
2) Pay attention to maintenance on each valve, both the suction valve and the press valve, because these two valves are very influential when they do not work properly because of the amount of crust that has dried and attached to the valve. Clean the
valve and check for leaks in the valve.

3) Make sure the working hours of a valve and other component parts are adjusted according to the manual.

5. References