Analysis Of The Lack Of Air Pressure Generated By The Main Air Compressor No.1 On Board KM.Logistik Nusantara 1

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Abstract
Compressor is an auxiliary engine that use to produce pressure air. On ship compressor have important role as compressed air generator because this pressure air use for starting main engine and use for control air on the main engine. As one of auxiliary engine so more attention needed for this compressor for the smooth operation of the ship when sailing. The resulting impact of this lack of air pressure is failure at starting system on main engine. So analysis must be done on compressor as the producer of compressed air to find out the cause of this problem. the most influential component to produce compressed air is lp/hp valve. After knowing the cause of the lack of compressed air produced so maintenance must be do to lp/hp vale so compressed air can be produced without problems.

Keyword : Compressor, air, Pressure, Engine, Valve

1. Introduction
The air compressor on the ship is one of the important auxiliary machines for various purposes and activities on board, such as to turn on the ship'S MI, or help with work that uses compressed air. The air compressor makes / produces compressed air by sucking and compressing the air and then stored in an air tank to be supplied to the user (pneumatic system).
In connection with the constraints or obstacles experienced on the air compressor, the attention to maintenance and repair of the air compressor is treated in order to be optimally efficient and in accordance with the limits of its work, so as not to interfere with the performance of MI.
Compressor drives that are often used are usually electric motors and combustion motors. Low-power compressors use two-phase electric motors or gasoline motors, while large-power compressors require 3-phase electric motors or diesel engines. The working pressure of the air compressor is calculated by the pressure loss that occurs in the pipeline, while the equation is that both can produce a pressure of 7 (Seven) BAR in order to run the control air. At the time of the voyage is not desirable condition where the compressor pressure below the compressor capacity. If no treatment is done on the compressor there will be damage to the compressor itself, therefore to perform maintenance we need to know the components and how to care for the compressor. So for that the author is interested in taking the title: "Analysis of the lack of wind pressure generated by the MAIN air compressor NO.1 ON BOARD KM LOGISTIK NUSANTARA 1"

2. Research Method
The research method that the author uses in this study to solve this problem is to use qualitative descriptive analysis method which is done by starting the step of observing the
object under study and record the data, then analyze the object to be described in detail the
data obtained with the aim to provide information about the planning of the problems that
arise related to this research material.

Data Collection Methods
a. Library
Literature is a supporting method in this study that the data obtained are obtained from
books related to auxiliary aircraft studied in this study cadets examine compressors which
means cadets study books related to compressors such as manual book compressor itself.
b. Interview
Interview is a method that the data obtained comes from a resource person who has
expertise in the field in the compressor problem studied by the cadets, the interviewee is
the crew of the engine and on the ship that the cadets ride during sea practice who is
responsible for the compressor is machinist II.
c. Observation
Performed by direct observation of the air compressor and analyze the cause of the
problem under study by overhoul/disassemble the compressor so as to find the source of
the problem and explain how to solve the problem.

3. Results and Discussion
a. Result of Research
1) Data Presentation
Based on the table of time required compressor to fill the air from 0 Bar to 25 Bar above
it can be concluded that every time the maintenance on the air compressor then the
charging time required will be faster.
2) Data Analysis
As an important tool, the compressor is needed to produce pressurized wind which is
used to start the engine, control air and other purposes.
As the main producer of compressed air, we as crew members must be able to
determine the cause of compressed air produced by the compressor less / not add to
the manometer bottle of wind, in order to directly address the problem for the smooth
operation of the ship, the problem of the compressor can come from various
compressor components such as low / hight pressure valve, or cover bolt bonds that are
not tight on the compressor.
Based on the analysis conducted by cadets during the prala in KM.Logistik Nusantara 1
taruna conducts observations once a month when the ship rests on compressed air
generated by the compressor in the wind bottle and poured in the following data table:

<table>
<thead>
<tr>
<th>No</th>
<th>Date of observation</th>
<th>Filling Time (Minutes)</th>
<th>Pressure on the wind Bottle (Bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before treatment</td>
<td>After treatment</td>
</tr>
<tr>
<td>----</td>
<td>---------------------</td>
<td>------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>1 October 2021</td>
<td>61 Minute 43 second</td>
<td>55 Minute 26 second</td>
</tr>
<tr>
<td>2</td>
<td>16 October 2021</td>
<td>65 Minute 12 second</td>
<td>57 Minute 53 second</td>
</tr>
</tbody>
</table>
Based on the data table above, it is known that the time required for the compressor to fill the wind bottle from 0 Bar to 25 Bar and found the longest time to fill the wind bottle occurred on January 05, 2022 which took 68 minutes 55 seconds before treatment and the fastest filling time in filling the wind bottle occurred on March 11, 2022 which took 45 minutes 36 seconds after treatment.

With the problem of filling the old then checked on the compressor problem and after research found the following problems:

1. Factors causing lack of wind pressure in the air tube:
   a. Loose nuts on high pressure and low pressure valves
      The Bolt bond on the high pressure and low pressure valve is very influential on the suction and Press process on the compressor because it will result in the displacement of the valve plate and also the spring plate which is on the high pressure and low pressure valve so that the air sucked in by the compressor does not press perfectly which results in the
   b. Leakage in the connecting pipe installation between low pressure and high pressure on the compressor
      When the compressor turns on, the compressor will produce a strong vibration so that it can make the lock nut on the compressor pipe loosen so that it can make a gap in the pipe connection and make the compressed air produced by the compressor can come out and not enter the wind bottle and result in a decrease in wind pressure.
   c. Worn piston rings
      Piston rings that experience wear and tear are also one of the factors of compressed air produced by the compressor is not optimal because the air that has been sucked will pass through the piston rings that have experienced wear and enter the crankcase and can cause hot compressed air mixed with lubrication oil which can cause smoke or fire on the compressor. The piston ring clearance limits on sperre HL2/120 compressors are as follows.

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>Time</th>
<th>Time</th>
<th>Pressure</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3 November 2021</td>
<td>64 Minute 18 second</td>
<td>59 Minute 44 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>4</td>
<td>18 November 2021</td>
<td>66 Minute 49 second</td>
<td>60 Minute 38 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>5</td>
<td>05 January 2022</td>
<td>68 Minute 55 second</td>
<td>62 Minute 24 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>6</td>
<td>25 January 2022</td>
<td>65 Minute 33 second</td>
<td>60 Minute 41 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>7</td>
<td>11 March 2022</td>
<td>54 Minute 57 second</td>
<td>45 Minute 36 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>8</td>
<td>9 April 2022</td>
<td>55 Minute 32 second</td>
<td>46 Minute 30 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
<tr>
<td>9</td>
<td>15 Mei 2022</td>
<td>52 Minute 23 second</td>
<td>45 Minute 56 second</td>
<td>0 Bar</td>
<td>25 Bar</td>
</tr>
</tbody>
</table>
2. Effect of wind pressure drop on the main engine:
   As for some of the effects of decreasing compressed air to the main engine is:
   a. Starting failure on the parent machine
      For the main engine on board, both 4-stroke and 2-Stroke diesel engines use air to start
      the main engine, this air is produced from an air compressor and accommodated from
      an air vessel (air reservoir). The working pressure for this starting Air starts from a
      pressure of 25 (twenty five) to 30 (thirty) bar. According to SOLAS, that for machines
      driven directly without reduction gear (gear box) should be able to start 12 (twelve)
      times without filling again, while for machines with gear box can be started 6 (six) times.
      For starting the main engine the minimum air pressure used is 15 Bar when the pressure
      is below 15 bar because when the air pressure is below 15 Bar, the air is not able to
      press the piston down. The pressure valve in the air vessel is fully opened, then the air
      will exit to the main starting valve. After the air is reduced pressure to 9-10 (nine to ten)
      bar.
   b. Not optimal process of opening the exhaust valve lid on the engine
      Special Engine 2 stroke compressed air also serves to close and open the valve and when
      the pressure of the wind bottle is less because the compressor performance is less than
      the maximum because the compressed air needed to open and close this valve is
      7(Seven) Bar.

3. Efforts to overcome the decline in road air pressure
   Here are the efforts made to overcome the decline in air pressure road:
   a. Perform maintenance on low pressure/high pressure compressor valve
      Carry out maintenance on the low pressure/high pressure compressor valve by cleaning
      the valve from carbon-carbon attached to the valve, menskir valve and replace parts
      that have started to break down.
   b. Tighten the bonding bond between cylinder head and cylinder
      Tightening the cylinder head and cylinder ties is also important because the air from the
      low pressure/high pressure valve pressure can leak through here, resulting in
      pressurized air coming out and reducing the results that enter the wind
      bottle.

4. Closing
   a. Conclusion
      Based on the above research can be concluded the factors causing the lack of wind
      pressure generated by the air compressor:
      1) After observation by cadets can be seen the factors causing the lack of wind pressure
         generated by the compressor can be caused by dirty low pressure/high pressure
         compressor, a leak in the connection or piping system on the compressor, influenced by
         the age of compressor components and piston ring wear that causes air to pass through
         the piston.
      2) The effect of air pressure drop on the main engine is that it cannot start the main engine
         and the exhaust valve cannot open and close.
      3) Efforts made to overcome this is by doing maintenance on the compressor at any time
         such as changing the lubrication oil, menskir compressor valve, checking the compressor
         components and replace when the component is no longer possible to use.
   b. Suggestion
      1) Clean the area around the compressor at any time so that the air sucked in by the
compressor does not contain dirt and dust, as well as hard objects such as k and sand. And regular maintenance of the air filter to always function properly.

2) In order for every one hour notice before the machine stand by to confirm the back and forth test of the ship's engine to find out whether the required wind pressure is sufficient or not.

3) Pay attention to the working hours of the compressor component because if it is not considered there will be problems suddenly when the ship if the motion.

5. References
7) Amien Nugroho, 2005, Encyclopedia Of Automotive