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Optimizing Air Compressor Productivity in Supporting Operational Activities on The Mt Ship. Gamalam

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Abstract: Air compressors are auxiliary machines on board that can produce high pressure air. This research was conducted because the productivity of the air compressor was less than optimal, causing air production and the performance of the air compressor to be less than optimal and disrupting operational activities on the ship. The impact that occurs when air production is reduced in the air compressor, the ship cannot operate according to the contract specified by the company, because the initial start of the main engine or main engine on board requires compressed air. Many factors can cause reduced production of air produced by air compressors, including the lack of performance of the suction valve and exhaust valve on the high pressure section which causes less maximum or longer time for filling air into the air bottle, low flow of the lubrication system on the piston which causes no compression to produce air. This research was carried out with the aim of identifying and analyzing the causes of the lack of performance of the suction and exhaust valves on high pressure sections and low flow of the piston lubrication system which results in less optimal performance of the air compressor when filling into air bottles. The method used in this study uses a qualitative descriptive method using primary and secondary data collection approaches and techniques. The lack of performance of the inlet and exhaust valves can be corrected by cleaning the carbon deposits on the valves and leveling the valve surfaces. The low flow of the lubrication system on the piston can be done by checking the lubricating oil pump, cleaning the lubricating oil filter, changing the lubricating oil periodically according to the instruction manual book, and adding lubricating oil according to the specifications of the air compressor.

Keyword: Air Compressor, Suction Valve, Exhaust Valve, Lubricating Oil

INTRODUCTION

The smooth operation of the ship is greatly influenced by the work of the main engine and is inseparable from the support of auxiliary aircraft with good maintenance. The auxiliary aircraft consists of auxiliary generators, fresh water generators, purifiers, boilers, pumps, air

compressors, and so on. One of the important auxiliary machines on board is the air compressor. Air compressors are auxiliary machines aboard ships that produce compressed air. Without an air compressor, compressed air production is not available, so working air services in the engine room and deck sections as well as the air starting process on the main engine and generator cannot be fulfilled. Not only that, the air compressor is useful for pneumatic control.

The air compressor used does not rule out the possibility that things will occur which will reduce air production in the air compressor which can disrupt operational activities on board. The impact that occurs when air production is reduced in the air compressor, the ship cannot operate according to the contract determined by the company, because the initial start of the main engine or main engine on board requires compressed air. Many factors can cause reduced production of air produced by air compressors. Among them is the lack of performance of the suction valve and exhaust valve on the high pressure section which causes less maximum or longer time for filling air into the air bottle, low flow of the lubrication system on the piston which causes no compression to produce air,

Filling air from the compressor into the air bottle takes place very slowly so that the air in the air bottle runs out or is lacking which causes the operation of the main engine or main engine to be disrupted at the initial start. The way an air compressor works in producing compressed air is by sucking in and compressing the air and then accommodating it with an air pressure of ±30kg/cm². During the operation of the main engine on the ship's propulsion equipment, sometimes there is a drop in air pressure of up to ±18kg/cm² on the air compressor. In connection with the very important function of the air compressor on board the air compressor, of course, needs special attention in carrying out routine maintenance in addition to other machinery. So that this air compressor can be used according to its function on board. Based on the background description above, the authors put it in the form of research with the title: Optimizing Air Compressor Productivity in Supporting Operational Activities on the MT Ship. Gamalama.

RESEARCH METHOD

The method used in writing this thesis is a qualitative descriptive method, which is a technical analysis method used to describe one or more events that occurred on a ship based on observations and opinions by looking at the existing data. The writer's data collection method for this thesis is based on knowledge and facts that were encountered personally while training as sailors. Then the information, facts and data are used as the basis for the preparation of this thesis. The event in question is the lack of performance of the inlet and exhaust valves (high pressure) on the air compressor and the low flow of the lubrication system on the piston.

The data analysis technique used in this writing uses 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

Insufficient Performance Of The Suction And Exhaust Valves In The High Pressure Section

The lack of performance on the compressor, especially the suction valve and delivery valve is very sensitive, because if these valves cannot function properly there will be an overload on the air compressor so that the air compressor trips. Where this makes the machinists have to analyze what happened to the air compressor. This has been described in the descriptive above so that there are several problems, namely:

1. There is carbon deposits on the intake and exhaust valves.

The valve at high pressure has 2 valves, namely the suction valve and the delivery valve. These valves are very sensitive. Therefore it should require special attention. In this discussion, this is due to the presence of carbon deposits which cause air to be obstructed when passing through high pressure, so the compressor heats up and trips occur. The presence of carbon deposits is affected by abnormal temperatures in the engine room which are too hot. Usually the outside air temperature that may be inhaled is limited to 40°C, but for the tropics it is likely to be higher than that. If the temperature of the sucked air rises, then the compressed air on the compressor will also rise on the air compressor, if what is sucked from the compressor room has a high temperature. Then the high temperature will accelerate the process of carbonization of lubricating oil and produce carbon. This also shortens the life of the compressor.

2. Leaking inlet valve and exhaust valve (high pressure) on the air compressor. The occurrence of leaks in the suction valve and exhaust valve on the high pressure section has an important role in the process of producing air that enters the wind bottle. If the valves are leaking, the air produced will decrease and will mix with water, so that air mixed with water will interfere with the performance of the compressor. This leak can be caused by the uneven surface of the valve spring which results in gaps for leaks.

   For this problem, action can be taken by cleaning the carbon deposits on these valves and carrying out a process of equalizing the surface of the valves, so that the performance of the suction valve and exhaust valve on the high pressure section can run normally.

Low Flow Piston Lubrication System.

The performance of the air compressor is not optimal because each lubricating oil has been given the ability to work how many hours the oil is used, lubricating oil that is used for too long as a lubricant, the viscosity value will decrease, so that the pressure in the pressure gauge is below the average of 0.2 – 0.4 Mpa (2.0 – 4.0 kg/cm²). If the viscosity of the lubricating oil decreases, the ability to lubricate it will also decrease, and if this lubricating oil is continuously used it will cause cracks in the pistons, bending of the connecting rods, and the presence of scale on the cylinder walls. There are several factors that cause this problem to occur, namely:

1. Poor lubrication system. The important role of the self-lubrication system is to reduce friction between the moving parts of the compressor and remove the heat generated. The air compressor lubrication system consists of an oil sump tank, a lubrication pump, and a filter. If there is a problem with the lubrication system, the friction between the components of the air compressor will be rougher which causes the engine pull to become heavier and experience wear and tear between the parts that rub against each other and can even experience more severe damage.
2. Irregular replacement of lubricating oil. Irregular replacement of lubricating oil in air compressors can cause various problems in the compressor, which can affect its performance and reduce its operating efficiency. If the lubricating oil is not replaced regularly, dirt and deposits can accumulate on the engine components. The maintenance of the self-lubrication system is as follows:
   a. Replacement of lubricating oil every 1000 running hours interval.
   b. Replacement of the lubricating oil filter every 2000 running hours interval.
   c. Fill lubricating oil not too much and not too little, namely between high level and normal level.
   d. Every machinist or engine room crew, before or after working hours is expected to check the capacity of the lubricating oil in the gauge glass, this is done to prevent further damage to the air compressor components due to lack of lubricating oil

This problem can be solved by checking the lubricating oil pump and cleaning the lubricating oil filter, as well as changing the lubricating oil periodically according to the instruction manual book and adding lubricating oil according to the specifications of the air compressor, so that the lubrication system is maintained.

CONCLUSION

The smooth operation of the ship is supported by the main engine as the main propulsion engine on the ship and auxiliary engines with good systems and maintenance. The compressor as a producer of compressed air that will be used for the initial start of the main engine, is an important part of main engine operations, and auxiliary machinery as well as working air services in the engine section and deck sections.

However, from the results of the research and based on the reality in the field, in the operation of the main engine, problems related to the air system are often found which disrupt the smooth operation of the ship MT. GAMALAM. As for the description above, it can be concluded that the problems include:

1. The lack of performance of the suction valve and exhaust valve on the high pressure section of the air compressor is done by removing carbon deposits, as well as equalizing the surface of the valves so that leaks in the suction valve and delivery valve can be avoided. And maintain the normal temperature of the engine room..
2. The low flow of the lubrication system on the piston can be done by paying attention to the lubricating oil pump on the air compressor and cleaning the lubricating oil filter, as well as replacing and using lubricating oil in accordance with the instruction manual book.

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