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HOT ABSORPTION OF HEAT ABSORPTION IN MAIN ENGINE LUBRICATING OIL COOLER

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ABSTRACT

Ships are a means of sea transportation that use diesel engines as the main driving force. This is because diesel engines are easier to maintain and faster to operate. Considering this, diesel engines need special attention so that they are always ready to use and work well to support activities on board. The aim of this research is to determine the causal factors and what efforts must be made to overcome the obstruction of heat absorption in the lubricating oil of the main engine on the MT.AnnaBella ship. The research results show that the cause of the lack of oil cooler lubrication absorption on the main engine at MT.AnnaBella is due to lack of maintenance on the lubrication system components, namely dirty Lo cooler sea water pipes, dirty sea chase filters, resulting in decreased sea water pump suction, and dirty impellers. pump the sea water pump so that the sea water pump pressure decreases. Efforts to overcome the obstruction of heat absorption in the lubricating oil of the main engine on the MT AnnaBella include paying attention to the cleanliness of the sea water pipes in the lo cooler. By spraying compressed air and using rattan, always pay attention to the cleanliness of the sea water filter and regularly check the sea water pump impeller for dirt.

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1. INTRODUCTION

One of the supporting factors for the smooth operation of diesel engines is a good lubrication system. Without lubrication on the engine will cause damage quickly, because on surfaces that rub against each other will cause heat and eventually diesel engine components will wear out (damaged)(Madyantoro et al., 2022).

Lubrication system is one of the main systems in the engine, which is a series of tools ranging from lubricating oil storage, oil pumps, oil pipelines, and lubricating oil pressure settings to reach the parts that require lubrication (Subekti et al., 2022).

Lubricating oil is quite important its role in an engine, lubricating oil is responsible for the temperature of the engine. It is only responsible for cooling the upper part of the engine, while the rest (crankshaft, camshaft, and many more engine components are cooled by lubricating oil. (Rachman et al., 2023).

Heat in the engine is generated due to the process of fuel combustion and friction between engine components. When lubricating oil passes through hot parts of engine

components, the heat is transferred to lubricating oil. Because lubricating oil becomes hot, the lubricating oil needs to be cooled, usually the lubricating oil is cooled using seawater (Klara et al., 2022).

In the lubrication system itself, lubricating oil needs to be kept clean so that the quality of lubrication is in accordance with the requirements. One of the efforts made is to separate lubricating oil from impurities and mixed water, the role of lubricating oil is very influential in engine performance, so the selection of lubricating oil must be considered in order to achieve excellent engine conditions to expedite the process of operating the main machine (Subekti et al., 2022).

A lubricant is a chemical, generally liquid, that is applied between two moving objects to reduce frictional forces. The lubricant acts as a protective layer separating two related surfaces. Lubricating oils have different viscosity, The viscosity of lubricants is specifically classified by the International Organization for Standardization (ISO) (Ziliwu et al., 2021).

One of the supporting factors for the smooth running of a diesel engine is the operation of the machinery system on board the ship properly. In a machining system on board a ship, it certainly cannot be separated from the lubrication system, for that an orderly and systematic lubrication system is needed. The development of the ship's main propulsion diesel engine is getting bigger and more modern, it is very challenging for the next generation to improve professionalism as a Marine Engineer to learn more (Wibowo & Astriawati, 2021).

The lubrication system has a very important influence on the smooth operation of the main engine because lubrication serves to reduce friction and wear that extends the life of an engine component and maintains the quality of the components in the machine is in good condition (Wibowo & Astriawati, 2021). To maintain the temperature of lubricating oil, so as to create more efficient lubrication and moving engine components are not damaged and the engine can operate longer according to working hours (Nizam & Syahrizal, 2018).

2. METHOD

This research was carried out on the MT. ANNABELLA Ship which is a type of ship, Tanker owned by the company PT. Maritime Archipelago. The ship has DWT 4999 TON and GRT 2826./1462 TON with a length of 98.90 meters and a width of 7.3 meters. This ship is made by Yamamaka shipbuilding japan in 1992. purchased by the company PT. Maritime Archipelago. This ship operated in the eastern waters of Indonesia until now. This ship has a class BKI, Indonesian flag, Port Register Semarang IMO Number 8001282

3. RESULTS AND DISCUSSION

Factors Causing Inhibition of Heat Absorption in the lubricating oil of the MT. AnnaBella ship's main engine.

Lubrication System is one of the main systems in the engine, which is a series of tools ranging from lubricating oil storage (Lo Storage Tank), oil pump (Lo *pump*), Lo cooler line pipes, filters and lubricating oil pressure settings to reach engine parts that require lubrication.The causes of inhibition of heat absorption in the main engine lubricating oil are as follows:

1. Lo cooler sea water pipes.

After opening, it turns out that there are impurities that cause lack of heat absorption in lubricating oil, so the sea water pipes lo cooler need to be cleaned by spraying compressed air and bribed using rattan

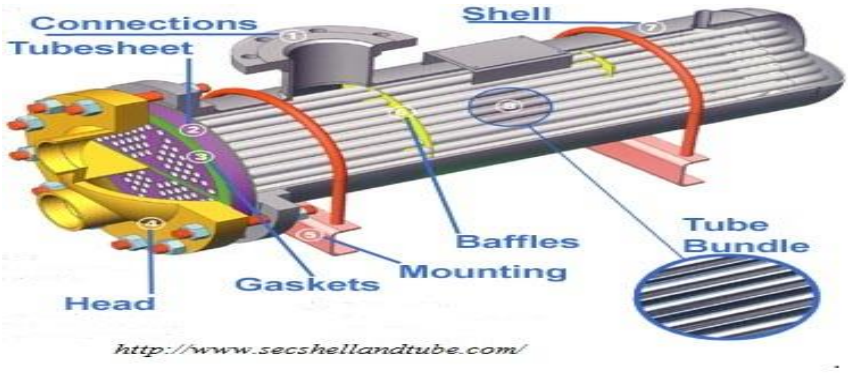

Figure 1. Lo cooler sea water pipes

As a result of the process of fuel combustion and friction between engine components. When lubricating oil passes through hot parts of engine components, the heat is transferred to lubricating oil. Because lubricating oil becomes hot, the lubricating oil needs to be cooled, usually the lubrication oil is cooled using seawater. This heat exchange process occurs in an aircraft called *Lubrication oil cooler*, where *the fluid is cooled by lubricating oil*, *while* the *cooling fluid* is seawater. For the place where you put the *cooler* on a particular machine is placed into one with the engine, but there is also a separate one with the machine so that it requires more piping systems.

2. Filter sea chase

Dirty seawater filters from sea chase can inhibit cooling on the Lo cooler. Lubricating oil is sucked from the lubrication oil sump tank by a *screw* or centrifugal *type pump through a* suction filter and *flowed to the* main diesel engine *through* a second filter *and* lubrication oil cooler. *The temperature of the oil* coming out of *the cooler* is automatically controlled at a constant level determined to obtain the desired viscosity at the *main diesel engine inlet*. Then the lubrication oil *is flowed to the* main engine bearing *and also flowed back to the* lubrication oil *sump tank.* Proper maintenance of the lubrication system on all moving machinery parts is a very important issue, in machining.

Figure 2. Sea Chase filter,the dirty one
Source : MT. Annabella

3. Dirty sea water pump impeller..

Dirty impeller, can cause a decrease in seawater pressure towards Lo cooler.so that heat absorption in lo cooler decreases. The impeller has an important role in the working system of the jet pump. That is why when this impeller component is damaged, it must be repaired immediately or replaced with a new impeller with good condition. One way to find out whether the impeller pump is damaged or not is to recognize it through its characteristics where there are several indications that characterize the impeller pump is damaged. Generally, most often seen when the impeller is damaged, the water discharge produced by the water pump has decreased.

Figure 3. dirty seawater pump impeller.

Efforts to Overcome Heat Absorption Obstacles in Lubricating Oil Main Engine on MT. Annabella.

This cooling system will greatly affect the quality and quantity of lubricating oil which has a broad impact on the ship's main diesel engine. In addition, the lubrication system in machining is very important because this will greatly affect engine performance. To overcome the inhibition of heat absorption in the lubricaring oil of the main engine is to carry out maintenance on the components of the main engine lubrication system, including: Pressure on the tube in sea water pressure due to the presence of impurities that cause the lack of heat absorption in the lubricaring oil so that it becomes hot

1. Lo cooler sea water pipes.
   Seawater pipes lo cooler need to be cleaned by spraying compressed air and bribed using rattan and always maintain the cleanliness of Lo, the cooler For manufacturing Pipe manufacturing is adjusted to the needs and distinguished by the limit of pressure strength, pipe wall thickness, temperature of substances flowing, type of material related to corrosion and strength of the pipe.
2. Dirt filter.
   Filter or filter as a filter for dirt from the flow of seawater that enters the seawater pump. box-shaped or cylindrical which is usually mounted on a pipe to the main engine, a pipe to an auxiliary machine or on a pipe by pass. This tool serves as a manure trap. The dirt if not filtered and deposited on the strainer will enter the seawater system in the engine room and others.

At a certain period of time the strainer must be opened for cleaning along with the filter. The cross section of the filter is approximately 1.5 to 2 times the cross section of the pipe. The filter maintenance is.

1. Check the pressure in the pump
2. Clean regularly
3. Replace the filter if it is not suitable for use due to seawater corrosion,

Figure 4. dirty filter/filter.
Source :MT Ship. Annabella.

3. Dirty pump impeller.

The rotating part of the centrifugal pump that serves to transfer energy from the rotation of the pump drive motor to the pumped fluid by its flow path from the center of the impeller to the outside side of the impeller. The maintenance of *the seawater pump* impeller is:

1) Check the physical condition of the impeller, from dirt
2) Use *grease* on shaf and *bearing parts*
3) Always maintain preparedness on the impeller.pump.

4. CONCLUSION

Based on the results of research, background, and discussion of the problems described above, which causes less heat absorption in the oil cooler and the importance of oil cooler maintenance on the main engine on the MT Ship. AnnaBella is as follows: Cause, lack of *lubrication oil cooler absorption* in the main engine at MT. AnnaBella is caused by lack of maintenance on lubrication system components, including:

1) Dirty water pipes lau Lo cooler.
2) Dirty sea chase filter.resulting in decreased sea water pump suction.
3) Dirty impeller of sea water pump pump so that sea water pump pressure decreases.

Efforts to Overcome Inhibition of Heat Absorption in Lubricating Oil Main Engine on MT ships. AnnaBella is:

1) Pay attention to the availability of seawater pipes on the lo cooler. By spraying compressed air and bribed using rattan.

2) Always pay attention to the cleanliness of the sea chase.sea water filter.
3) Always check the seawater pump impeller for impurities.

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