



Analysis of Overheating On Auxiliary Engine Cat 18 On AHTS Ship Logindo Stamina

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Abstract

This research aims to identify and analyze the primary causes of overheating in the CAT 18 Auxiliary Engine aboard the AHTS Logindo Stamina vessel and to evaluate its impact on the vessel's operational performance. Overheating has been found to significantly reduce Engine efficiency, increase fuel consumption, and potentially cause blackouts that endanger navigational safety. The investigation identified three main causes: cracking of the seawater pump cover, failure of the thermostat due to prolonged use, and clogging of the sea chest strainer by marine debris. A qualitative descriptive method was applied, involving direct observation and interviews with the ship's Engine crew. The mitigation efforts included repairing the seawater pump cover using high-temperature-resistant Devcon adhesive, replacing the damaged thermostat, and implementing a regular Plan Maintenance System (PMS). The findings underscore the critical importance of proper cooling system management and routine maintenance discipline in preventing overheating and maintaining the reliable operation of auxiliary Engines aboard ships.

Keywords: Overheating, Auxiliary Engine, Colling System

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INTRODUCTION

Ships have a lot of equipment that requires electrical power, which is sourced from *Auxiliary Engine (A/E)*. [1] emphasized that the electrical system is a crucial part of ship operations, because almost all equipment on boardsuch as lighting, navigation, pumps, air conditioning, and even freezers depends on an electrical power supply. *Auxiliary Engine*is one of the auxiliary engines found on ships. This engine functions by converting kinetic energy generated from the combustion process into electrical energy. This electrical energy is then used to meet the overall operational electrical power needs of the ship, ensuring that all systems on the ship are functioning properly. ([2])

Diesel engines are known as diesel combustion engines, are a type of internal combustion engine that uses fuel from within the earth. The ignition process in a diesel engine occurs through heat generated from compressed air, not from spark plugs like in a gasoline engine. The transformation of energy from heat to mechanical energy occurs in the engine itself, so this engine is categorized

as an internal combustion engine [3]. The role of the diesel generator engine above is very important in supporting the operational performance of the ship because the function of the diesel generator itself is to produce power or electrical energy on board. The high temperature of the cooling system on the generator can causing less than optimal performance produced by the diesel generator engine. There are several causes of high temperatures in the diesel generator engine cooling system such as problems with leaking pipes, dirty seawater filters in the sea chest and clogged coolers. If this is allowed to continue, it will interfere with the performance of the diesel generator engine and can even cause more severe material damage [4]. According to ([5]) the problems that cause *overheat* or excessive heat on *Auxiliary Engine* caused by the accumulation of dirt on the intercooler tube which causes a decrease in sea water pressure, this causes the temperature of the fresh water cooled by the cooler to be suboptimal, so that the temperature *Auxiliary Engine* increased and the cooling water system on the ship was less than optimal due to lack of maintenance.

According to [6] *Overheat* is a phenomenon of rising temperatures in the engine. Heat causes damage to circuit components and can lead to fires, explosions, and injuries. Usually the damage is caused by *overheat* or excessive heat in the engine will cause changes in the shape of the engine itself and efforts to repair such damage must be made by replacing it with new material so that the engine can operate normally again.

According to [7] By using qualitative methods to overcome disturbances in the diesel engine cooling system. The main problems include dirt deposits in the fresh water cooler, decreased seawater pressure due to dirty filters or weak pumps, and thermostat damage, all of which contribute to overheating.

According to [8], according to him, this study examines how the choice of coolant affects the risk of overheating in the Mitsubishi Colt L300 diesel engine, when operated at two engine speed levels: 2,500 rpm and 3,100 rpm. [9] highlights the importance of maintaining the performance of the diesel generator engine cooling system on the MV HI03 ship. Overheating is caused by an increase in temperature at the cooling water outlet, which is driven by technical problems in the cooling system. Preventive actions such as valve maintenance, circulation cleaning, and regular monitoring of coolant conditions are highly recommended

Overheat on the engine is also often caused by a lack of attention to the cooling system, although there are other factors that also contribute to this problem. A poorly managed cooling system can affect the smooth operation of the engine, reduce its performance, and can even cause very serious damage. Engine maintenance must be seen as something that cannot be ignored, because if the main engine does not get adequate maintenance during its operation, its performance will gradually decline [10] On the MT. GAS MALUKU ship, when the ship was preparing to depart from Cilacap (Indonesia) to Kaoshiung (Taiwan), an increase in the temperature of the cooling water was detected. Usually, the temperature of the cooling water ranges from 60°C to 70°C, but at that time, the temperature of the cooling water in the main engine, especially in cylinder number 2, reached 90°C, which far exceeded the normal value [11].

Although the freshwater cooling system on the ship's main engine is functioning well, allowing the ship to operate for a long period of time,

problems like this show the importance of handling disturbances that can occur in the cooling system while the ship is operating. Therefore, it is important for the entire ship's crew to understand the causes of these problems and how to overcome them. With this understanding, the crew can be more alert in handling situations if there is overheating in the auxiliary engine which causes the engine temperature to exceed the operating limit (Grussa et al., 2019; [12]).

One of the vital components in supporting the performance of the main engine is the cooling system [13] Damage to the cooling system can have a direct impact on the decline in the performance of the main engine, which ultimately causes losses both technically and financially for the ship owner. Damage to the ship is inevitable during its operational period [14] The cooling system works by distributing coolant throughout the engine to absorb heat generated by the combustion and friction processes, utilizing the principle of heat transfer. If the engine overheats, this will affect engine performance, cause moving components to wear out, reduce engine power, shorten engine life, and increase fresh water consumption for cooling, which becomes more wasteful [14] On February 22, 2023, on the LOGINDO STAMINA ship, when the ship was anchored in the Matak Islands, the temperature of the cooling water for *Auxiliary Engine* which is usually in the range of 77°C, suddenly rises to 83°C and continues to increase until it reaches 93°C. This condition causes the engine to overheat and has the potential to cause serious damage to the engine. Based on this incident, the author is interested in raising this research topic with the title: "Analysis of the Causes of Overheating in *Auxiliary Engine* on the LOGINDO STAMINA ship." and the purpose of this study is to identify and analyze the main causes of the occurrence of *overheating* on *Auxiliary Engine* CAT 18 on the AHTS Logindo Stamina vessel, and evaluate its impact on the vessel's operational performance

METHOD

The type of research used in this study is descriptive qualitative research, which aims to obtain information, data and real facts regarding the causes of overheating in *Auxiliary Engine* on the LOGINDO STAMINA ship. The definition of qualitative descriptive method according to [15] is an important research method and is very suitable for answering questions about who, what, and where events or experiences occur, as well as for obtaining direct data from informants regarding poorly understood phenomena. [16] emphasizes that in qualitative interviews especially with sensitive participants an empathetic and ethical approach is essential. Researchers do not just ask questions, but must be emotionally and methodologically prepared to deal with responses that touch on psychological aspects.

The results of qualitative descriptive research are empirical and factual information. Data collection in qualitative descriptive research focuses on the discovery of the nature of certain events being studied. [17] concluded that qualitative analysis is an iterative and reflective process, including data reduction, interpretation of meaning, and verification of the consistency of findings.

[18] emphasizes that in qualitative interviews especially with sensitive participants an empathetic and ethical approach is essential. Researchers do not just ask questions, but must be emotionally and methodologically prepared to deal with responses that touch on psychological aspects. The author collects data by means of observation, documentation, and interviews to obtain a clearer picture of the Analysis of the Occurrence *Overheating on Auxiliary Engine Cat 18 On Ahts Logindo Stamina Ship*.

1. Observation

[19] argue that observation is an important and effective method for collecting air temperature data directly and in real time. Observation is a person's skill in using his/her observations on the subject and object of research, allowing researchers to understand the actual situation. [20], S This observation is related to auxiliary *Enginer* diesel generator engine on board AHTS ship. Logindo Stamina.

2. Documentation

Documentation is a method of data collection carried out by the author through reading the archives available in the engine room. According to [19]), emphasizing that structured and information technology-based documentation of PKL data is very important to support effective arrangement and supervision. All issues or problems faced by the author related to the diesel generator cooling system are then analyzed to reach a conclusion. Documentation is carried out during a one-year sea practice on the AHTS ship *Login to Stamina*, the author collects data through documentation by directly reviewing the archives available in the engine room. These documents are the main materials in reviewing various problems in the diesel generator cooling system which are then analyzed to obtain conclusions based on real conditions in the field.

3. Interview

According to Berger [21] defines an interview as a verbal interaction between researchers (who are trying to obtain information) and informants (who are considered to have relevant information related to an object). Using the interview method has proven to be very efficient in obtaining in-depth explanations of questions or aspects that may be less understood in the context of problems related to the topic to be discussed.

RESULT AND DISCUSSION



Figure 1. Logindo Stamina Ship
Source: Research Document (2024)

This research was conducted on the AHTS (Anchor Handling Tug Supply) ship Logindo Stamina, owned by PT Logindo Samudramakmur, Tbk, which operates in the offshore oil and gas sector in the Natuna Sea. This ship is equipped with two engine units *Auxiliary Engine* Caterpillar brand type C-18 which functions as the main power generator for the ship's operational system. Technical specifications of the CAT C-18 engine:

| Parameter | Mark |
|-------------------------------|---------------------------------|
| <i>Engine Model</i> | <i>Caterpillar C-18</i> |
| <i>Engine Type</i> | <i>4 Stroke (4-stroke)</i> |
| <i>Daya Output</i> | <i>550–715 Kva</i> |
| <i>Cylinder Configuration</i> | <i>6 In-Line</i> |
| <i>Bore x Stroke</i> | <i>145 mm x 183 mm</i> |
| <i>Compression Ratio</i> | <i>16.5:1</i> |
| <i>Turbo System</i> | <i>Turbocharged Aftercooled</i> |
| <i>Frequency Generator</i> | <i>50 Hz</i> |
| <i>Direction of Rotation</i> | <i>Counterclockwise</i> |
| <i>Capacity Displacement</i> | <i>18 Liter</i> |

This machine is designed for high performance, but in practice technical problems were found in the form of *overheating* which has the potential to disrupt ship operations. To obtain further information regarding the cooling system problems, the author conducted direct interviews with *Second Engineer* ship. Here are the results of the interview:

| Interviewer (Cadet) | Respondent (2nd Engineer) |
|--|---|
| Good afternoon, sir. I would like to ask for a moment of your time. Is that allowed? | Good afternoon dear, may I ask what's up? |

| | |
|--|---|
| <p>So, this is it, sir, I want to ask about the cooling system for the generator engine on the AHTS Logindo Stamina ship, sir?</p> | <p>The generator engine cooling system on this ship uses a closed cooling system, namely by utilizing fresh water that is circulated to cool all components of the diesel generator engine. Sea water functions as a secondary cooling medium that absorbs heat from fresh water through a heat exchanger, then flows out of the ship through the overboard channel without being recirculated.</p> |
| <p>Bas, yesterday there was an alarm indicating that the temperature of the fresh water used as a coolant had increased. <i>overheat</i>, what's the cause of that, bro?</p> | <p>After we did the identification yesterday, there were three main causes that we found. First, <i>Cover pump sea water</i> has cracks. This can cause disruption of the coolant flow. Second, <i>strainer Of sea chest</i> the right side is very dirty, as can be seen from the amount of dirt that has accumulated in it. This is due to lack of routine cleaning. The last, <i>Thermostat</i> installed is no longer suitable for use. It is physically damaged and if it is still used it can endanger other cooling systems.</p> |
| <p>What things can cause such a crack? <i>Cover sea water pump</i>, then the sea chest is dirty and then it breaks <i>The rmostat</i> the bus?</p> | <p>The cause is the lack of routine maintenance which can cause this problem, then because of the lack of maintenance it causes cracking. <i>Cover sea water pump</i>, this happens because the temperature of the cooling system rises excessively so that it affects the engine material itself, this is also compounded by the presence of rust due to the salt content of the sea water itself.</p> |

| | |
|--|--|
| <p>What impacts can occur when the generator engine experiences <i>overheat</i> down?</p> | <p>The impacts are many, such as the generator engine will decrease in performance, the spare parts of the generator engine will wear out quickly, and the engine will often "jam" like the engine is stuck or difficult to operate again because the temperature is still high so you have to wait for the temperature to drop, even in the case of overheating this can cause the engine to experience blackout it</p> |
| <p>Then what efforts will be made to overcome the problem?</p> | <p>That is, you must always check the temperature of the fresh water coolant and carry out routine and periodic maintenance. according to the guide book manual</p> |
| <p>Anyway, that's how it is, bus. Thank you very much for the knowledge just now, bro.</p> | <p>Yeah that</p> |

Source: Processed Research Data (2024)

In this interview, the observation findings were confirmed and the root cause analysis of the problem was strengthened. So after conducting the research, the author identified the main cause of the problem *overheating* on *Auxiliary Engine* CAT 18 on AHTS vessels *Login to Stamina*. Based on the results of direct observation in the engine room, interviews with *Second Engineer*, and technical documentation obtained during sea practice, a number of technical factors were found that significantly affect the performance of the diesel generator engine cooling system.

A. Key Findings



Figure 2 Cracked Sea Water Pump Cover
Source: Processed Research Data (2024)

1. Cracked Sea Water Pump Cover

Cracks in the seawater pump cover caused seawater seepage, which resulted in a decrease in pressure in the Open cooling system. This decrease in pressure caused the seawater circulation to be less than optimal so that the system's ability to absorb and remove heat from fresh water was disrupted. This was one of the initial triggers for the increase in coolant temperature above the normal operating limit of the engine (75–85°C), which was recorded at 93°C.



Figure 3 *Thermostat*
Source: Research Document (2024)

2. The damage *Thermostat*

Thermostat components experience malfunction due to long-term use and continuous exposure to high temperatures. A thermostat that is not working optimally cannot regulate the flow of coolant properly, which causes the fresh water temperature to increase drastically and the cooling system to become unstable. This study is in line with the findings [7] of thermostat damage, all of which contribute to overheating.



Figure 4 *Strainer Sea Chest Dirty*
Source: Research Document (2024)

3. The blockage *Strainer Sea Chest*

Dirt in the form of mud, shells, and organic marine waste was found to have accumulated in the sea chest strainer, which functions to filter seawater before it enters the cooling system. As a result, the flow of seawater is hampered and the cooling process for fresh water becomes inefficient. This is exacerbated by the lack of routine cleaning activities as regulated in the Plan Maintenance System (PMS).

This finding is in line with the research results of [5] which identified a decrease in seawater pressure due to dirt in the intercooler tube as the cause of overheating. *Auxiliary Engine the MT Woolim Dragon*. Also supported by a study by [4] who found that dirt in the sea chest and pipe leaks were triggers for increasing the temperature of the cooling system in the KM generator engine *Layang Island*.

B. Impact of Overheating

Technical impacts caused by *overheating* among others:

1. Decreased efficiency and engine power output, resulting in unstable operational loads. Based on the results of observations and analysis during the study, it was found that overheating in the engine directly impacts the decrease in thermal efficiency. When the engine temperature exceeds the ideal operational threshold, the cooling system is unable to work optimally, so that the combustion process does not take place perfectly. As a result, the resulting power output is lower than normal conditions. This decrease causes fluctuations in

operational loads which have an impact on the instability of the power distribution system, especially during peak loads. This is also supported by [22] who argues that decreased efficiency and engine power output are direct impacts of overheating conditions that are not handled properly. When the engine working temperature exceeds the optimal limit, the turbocharger system cannot work optimally in channeling compressed air to the combustion chamber

2. The engine restart process becomes difficult, because high temperatures interfere with the electronic and combustion systems. Another significant finding shows that excessively high engine temperatures cause interference with electronic components, such as temperature sensors, fuel injection control systems, and ECU (Electronic Control Unit). This interference makes the engine restart process more difficult or even fails. In addition, high temperatures also cause a non-ideal pressure difference in the combustion chamber, so that the fuel and air mixture does not burn efficiently when the engine is restarted. This finding is supported by research according to [23] which concluded that high temperatures due to a non-optimal combustion process can interfere with the stability of the electronic system and re-combustion performance. When the engine overheats, the resistance of the electronic components increases and the combustion timing is disrupted, making the engine restart process more difficult.
3. Potential blackout, due to machine failure to meet electricity needs. This is reinforced by the findings of Yuristiawan et al. (2018) that decreased engine performance due to high temperatures can accelerate component degradation and disrupt the overall operational stability of the ship. This study also found that in extreme overheating conditions, the generating machine is unable to maintain a stable power supply. When the temperature exceeds the safe limit and the protection system does not immediately turn off the unit in a controlled manner, a sudden operational failure occurs. This failure can result in a sudden power outage (blackout), especially if the backup system is not ready to take over the load in a short time. This shows the importance of engine temperature management to prevent large-scale electrical disturbances. This is in accordance with [24] who stated that the potential for blackouts is closely related to the unpreparedness of the machine in responding to sudden surges in electrical loads, especially during ship maneuvers. The failure of the machine to maintain a stable power supply is caused by delays in the distribution system and suboptimal generator performance. This causes the electricity supply to be unable to meet operational needs consistently, which ultimately triggers a blackout.

C. Handling Steps Taken

The corrective steps taken by the engineering team to address the issues include:



Figure 5 Patched Seawater Cooling Pump Cover

Source: Research Document (2024)

1. Patching of cracks in sea water pump covers using Devcon A10110, a metal epoxy adhesive that is resistant to high temperatures and marine environments. Cracks in the seawater pump cover caused a decrease in circulation pressure, disrupting the efficiency of heat exchange in the heat exchanger. To address this, Devcon A10110, a type of high temperature and corrosion resistant metal epoxy, was used. This method is in line with recommendations [14] which emphasize the importance of rapid repair using marine-resistant materials. The application process includes cleaning the area, drying, and applying the epoxy material according to the technical guidelines. This approach has proven effective in restoring the pressure of the cooling system without having to replace the entire pump unit, reducing operational downtime.

The crack found on the seawater pump cover is one of the root causes of the cooling system disruption. This crack causes a leak in the seawater flow, which results in a decrease in pressure in the secondary cooling water circulation. This unstable pressure has a direct impact on the inefficiency of the heat exchange process between seawater and fresh water through the heat exchanger. As a result, the system's capacity to stabilize the engine temperature is disrupted, and the fresh water temperature increases significantly, reaching a critical temperature of 93°C. This incident proves that mechanical components such as pumps have a crucial role in maintaining the integrity of the ship's cooling system. This is in accordance with [25], which states that cracks in the seawater pump cover are one of the main factors causing disruption to the cooling system. This crack causes a decrease in pressure and flow of seawater which should function as a cooling medium, so that cooling efficiency

decreases drastically. This condition can trigger overheating in the engine and disrupt the overall performance of the system, including the potential for further damage to other components that depend on the stability of the engine's working temperature.



Figure 6 Substitution *Thermostat*

Source: Research Document (2024)

2. Replacing the thermostat with an original spare unit that meets engine specifications *Caterpillar C-18*.

The thermostat that was no longer functioning properly was found to be unable to regulate the flow of coolant optimally. The damage occurred due to long service life and continuous exposure to high temperatures. For this reason, the thermostat was replaced with a new unit according to the specifications of the Caterpillar C-18 engine. The replacement process was carried out carefully so as not to damage the housing and water lines. After the installation was complete, a test was carried out on the engine's operating temperature to ensure that the system was working normally. This action reinforces the importance of regular inspection of the temperature control components, as explained by [7] Thermostats that have exceeded their service life show physical and functional damage, which causes the failure of fresh water temperature regulation in a closed cooling system. A damaged thermostat cannot open and close properly according to temperature changes, so that fresh water is unable to circulate optimally through the heat exchanger. This causes an increase in the internal temperature of the engine, accelerates the wear process of other components, and leads to operational disturbances such as the engine "ngejam" or stalling. This condition highlights the importance of component life management and routine inspection of the temperature control system. This is supported by [26] explaining that components such as thermostats that have exceeded their service life are susceptible to damage both physically and functionally. This damage causes the thermostat to fail to regulate the flow of fresh water in a closed cooling system, so that the engine temperature cannot be maintained

within optimal limits. As a result, the engine is at risk of overheating which can have an impact on decreased performance and potential further damage to other engine components.



Figure 7 Strainer sea chest pump strainer sea water CAT 18 diesel engine
Source: Research Document (2024)

3. Strainer Blockage on Sea Chest

logging of the sea chest strainer due to the accumulation of mud, sea shells, and organic waste is a very common but often overlooked factor. The strainer functions as an initial filter for sea water entering the cooling system, and if it is clogged, the sea water discharge is drastically reduced, so that the system does not get enough coolant to absorb heat from the fresh water. This blockage generally occurs because periodic cleaning is not carried out according to the Plan Maintenance System (PMS) standards. This finding underlines the importance of monitoring the cleanliness of the sea water inlet, especially when the ship is docked at a port with low water quality. This is in line with [27] which emphasizes that clogging of the sea chest strainer due to the accumulation of mud, sea shells, and organic waste is a common problem that often occurs in the operational environment of ships.

Re-implementation of Plan Maintenance System (PMS) consistently for periodic inspection and cleaning of strainers, sea chests, and all cooling system components. The thermostat that was no longer functioning properly was found to be unable to regulate the flow of coolant optimally. The damage occurred due to long service life and continuous exposure to high temperatures. For this reason, the thermostat was replaced with a new unit according to the specifications of the Caterpillar C-18 engine. The replacement process was carried out carefully so as not to damage the housing and water lines. After the installation was complete, a test was carried out on the engine's operating temperature to ensure that the system was working normally. This action reinforces the importance of regular inspection of the temperature control components, as explained by [7]. After the implementation of these actions, the engine operating temperature returned to the normal operating range (78–82°C), indicating that the cooling system had returned to optimal functioning. These steps have proven effective in lowering the engine operating temperature to the normal range.

This is emphasized by [7] that the success of restoring the cooling system performance is highly dependent on periodic maintenance and timely replacement of worn components. In addition, [14] recommend that periodic inspection-based maintenance and PMS digitalization be carried out to prevent repeated engine system failures.

According to [5] The problems that are the cause of *overheat* or excessive heat on *auxiliary engine* caused by the accumulation of dirt on the intercooler tube which causes a decrease in sea water pressure, this causes the temperature of the fresh water cooled by the cooler to be suboptimal, so that the temperature *auxiliary engine* increased and the cooling water system on the ship was less than optimal due to the lack of regular maintenance so that the power generated by *auxiliary engine* is not optimal.

This research is certainly different from previous research. When the author carried out the practice on the ship, the author experienced various obstacles related to the increase in the temperature of the cooling water at *auxiliary engine* thus causing *overheating* or excessive heat. After carrying out the identification, it turned out that the cause of the problem arose because *strainer* or auxiliary sea water cooling pump filter *engine* dirty, next *strainer* or screening *sea chest* The right side after being opened turned out to be very dirty. There was a lot of dirt piled up and even fish were stuck in it. *strainer* or screening *sea chest* said, and there was a crack in the *cover* seawater cooling pump so that seawater can seep out.

According to [4] The role of the diesel generator engine above is very important in supporting the operational performance of the ship because the function of the diesel generator itself is to generate power or electrical energy on board. The high temperature of the cooling system in the generator can cause less than optimal performance produced by the diesel generator engine. There are several causes of high temperatures in the cooling system of the diesel generator engine, such as problems with leaking pipes, dirty seawater filters in the sea chest and clogged coolers. If this is allowed to continue, it will interfere with the performance of the diesel generator engine and can even cause more severe material damage.

The difference between my research and previous research because there is a cause of the problem namely in the previous study there was a problem with a leaking pipe, while in the problem in the author's study there was a crack in the cover of the seawater cooling pump on the diesel generator engine, causing seawater seepage to come out. The impact caused by the high temperature on the diesel generator engine, efforts made by carrying out routine maintenance so as not to cause the same problem again.

According to [7] This study uses a qualitative method to overcome disturbances in the diesel engine cooling system. The

main problems include dirt deposits in the fresh water cooler, decreased seawater pressure due to dirty filters or weak pumps, and thermostat damage, all of which contribute to overheating.

Meanwhile, the difference in this research is that it discusses the increase in coolant temperature and its impact on the auxiliary engine, while the author's research focuses on damage to the thermostat as a result of the increase in temperature.

CONCLUSION

This research factor concludes that the occurrence of *overheating* on *Auxiliary Engine* CAT 18 is caused by the accumulation of several technical and operational factors: Cracked seawater cooling pump cover, which disrupts seawater circulation pressure. [28] The author states that cracking of the seawater cooling pump cover is a serious problem that can disrupt the pressure and smooth circulation of seawater in the cooling system. The thermostat is damaged, so the fresh water circulation is not properly controlled. [29], stated that damage to the thermostat caused the fresh water circulation to become uncontrolled, making it difficult to maintain the engine temperature within normal limits. A clogged sea chest strainer reduces the supply of seawater to the cooling system. [30] stated that a clogged sea chest strainer is one of the main causes of disruption of seawater supply to the cooling system. Accumulation of dirt such as mud, shells, and organic waste inhibits the flow of water, so that the pump is unable to work optimally. Lack of regular maintenance, which causes components to degrade faster than their service life. Dirty port environment, accelerates the accumulation of dirt in the strainer. This problem has a serious impact on engine efficiency, the safety of the ship's electrical system, and the risk of operational disruption in the form of blackouts. Through appropriate and rapid corrective actions, the cooling system was successfully restored to normal conditions. However, this success must be accompanied by stricter and more systematic maintenance management.

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