

Analysis of common ship machinery failures and treatment methods in ship inspection

Shaopeng Wei

(Wuhan Technical College of Communications, Wuhan Hubei 430065)

Abstract: ships are the means of transportation for water transportation. According to the actual use requirements of water operations, they are divided into different structures and ship types. For ships, the mechanical failure inspection is to ensure that the ship can reduce the risk of accidents during the shipping process. At the same time, it is also conducive to ensuring the economic benefits of relevant enterprises, and more importantly, it is responsible for the life safety of personnel on board. Based on the analysis of common ship machinery faults and treatment methods in ship inspection, this paper analyzes the common ship machinery faults in ship inspection, and puts forward relevant measures to solve the problems.

Key words: ship inspection; Ship mechanical failure; processing method

With the continuous development of China's science and technology, the related technologies in the field of marine shipping are also constantly innovated, and the scope of shipping, safety maintenance, technical inspection and other related industries is expanded. In the process of shipping transportation, the situation of surface transportation and surface cargo transportation has a wide range of development. These developments have also greatly promoted China's marine transportation construction and marine economic development. Therefore, the safety of ships in the process of shipping is very important, and ship mechanical fault inspection is one of the important parts to ensure the safety of ship transportation. Through the inspection of the ship, the mechanical failure can be eliminated, so as to ensure that the transportation and navigation of the ship in China's inland rivers and all kinds of oceans are safer.

1. The importance of ship technical fault inspection

In the process of shipping, ships generally carry a large number of goods, as well as many related shipping and transportation staff. If the ship breaks down on the sea, it will inevitably delay the cargo transportation time, reduce the efficiency of shipping cargo transportation, and bring huge property losses to relevant enterprises. If a serious safety accident occurs during the normal operation of the ship, it will pose a serious threat to the life safety of the personnel on board, and sometimes even really endanger the lives of the crew. Therefore, the inspection of ship equipment is particularly important. It is not only to protect the ship and improve the economic profits of relevant enterprises, but also for the safety of people on board. Ship equipment inspection is to carry out technical inspection of ship equipment. In the inspection process, it is necessary to inspect whether the ship structure is safe and whether the anti pollution work of the ship is in place. Relevant staff should timely find out potential problems and repair them, so as to reduce the wind direction caused by mechanical failure of the ship in the process of transportation, as well as the impact on the river environment. The marine environment plays a protective role and reduces pollution. Through the inspection of ship technical faults, the risk factor of the ship in the shipping process is reduced, and the economic benefits of relevant transportation enterprises are improved, and the safety factor is increased for the personnel on board.

2. Failure types of mechanical equipment during ship inspection

2.1 Propeller mechanical failure

The thrust generated by the propeller of the ship is transmitted to the ship itself to convert the torque generated by the engine into kinetic energy. If the propeller fails, the normal operation of the ship will be affected to varying degrees. The common mechanical faults of ship propeller include: friction between propeller and accessory parts, casting defects of propeller, etc.

2.2 The ship lacks spare oil pump set

In order to reduce navigation costs, some shipping enterprises do not set up standby oil pump sets on ships. The reason why the ship can navigate is that the motor is used to pull the oil pump group. However, in case of emergency during the navigation of the ship, it will be difficult for the ship to turn the rudder rapidly because a motor is pulling an oil pump group.

2.3 Continuous alarm of oil-water separator

The bilge water pipeline system of the ship is mainly composed of bilge pumps, bilge water pipes, bilge water suction ports, valves and relevant accessories. During the special inspection of the ship, the oil-water separator gave a continuous alarm during the experiment. Generally, the bilge water treatment of ships mainly adopts separation method. The separation methods include physical separation, chemical separation and biological treatment. Most ships in China use oil-water separation device with physical separation method. But at present, the common marine oil-water separator generally has the following problems: first, the long-term high responsibility leads to high failure rate; Second, maintenance is cumbersome, and illegal emissions cannot be monitored. In addition, some cabins of ships are lack of bilge water pipelines. Although some cabins are installed with water pipelines, they can not play their due role in case of emergencies.

2.4 Failure of watertight wall function of ship

Watertight walls are essentially impermeable bulkheads of ships. During the normal shipping process, the watertight wall protects the ship from water. Watertight walls often have functional failures because the quality of the materials used to make watertight walls is not up

to standard, or the relevant staff did not handle the watertight walls well when making the bottom tank of the ship. In addition, there is a great test for the professional skills of the production personnel in the process of making watertight wall bilge. If the fabricator fails to find the right position when drilling, the hole cannot meet the quality requirements of watertight wall fabrication. If the ship is suddenly affected by strong winds and waves in the process of normal navigation, it will easily cause water accidents during navigation.

2.5 Failure of water cut-off holding cylinder

During the normal shipping process, the ship stopped suddenly after sailing for more than ten minutes, and the temperature was extremely high at this time. After the inspection of other mechanical equipment, the inspection was normal, and the propeller was found to be in normal operation. And there is no overload caused by using the ship for a long time. At this time, it is necessary to consider whether it is due to the failure of the water cut-off holding cylinder. If the conditions of the fuel injection pump, intake pipe or oil circuit are normal, it is necessary to consider whether it is due to the dirt inside the diesel engine. Therefore, when there is a large amount of sediment in the water, it is likely to cause the phenomenon of breaking water and holding the cylinder.

2.6 Cylinder pulling of diesel engine

During the normal shipping process, the ship heard the “clatter” sound from the diesel engine. At this time, the speed of the diesel engine began to drop, and smoke appeared after the diesel engine stopped running. At this time, the temperature of the diesel engine is too high.

3. Solutions to mechanical equipment failures during ship inspection

3.1 Solution of propeller mechanical failure

Propeller belongs to the more precise machinery in ship machinery manufacturing. Therefore, when the propeller fails, the experienced staff generally adopt the method of direct replacement. Of course, if the propeller itself only has some minor defects, such as the slight damage caused by the propeller entangled by seaweed when the ship is in navigation, the relevant staff can be invited to repair the propeller in time. After repairing the propeller, it can not be directly used in the actual work of the ship, but should be checked first. The propeller quality can be ensured by measuring the relevant data of the repaired propeller. In this way, the propeller can be safely used in the actual shipping work.

For example, when the ship is in the process of trial voyage, the hull suddenly vibrates violently. The crew immediately took measures to slow down. At this time, the hull vibration became lighter. After inspection, it was found that one of the propeller blades was broken, causing the propeller to lose balance, which led to hull vibration. The treatment method suggested by the author is to replace the propeller with a new one, or let professionals deal with the broken blades in time, repair the defects, correct the deformed propeller, and make the propeller meet the requirements of safety and quality inspection specifications.

3.2 Solution to the lack of standby oil pump set on ships

The relevant ship manufacturing enterprises shall install the standby oil pump group in time to ensure that the ship has a standby oil pump group. When a ship equipped with a standby oil pump unit has an accident during navigation, isolate the faulty oil pump unit, so as to convert the power required by the ship to the oil pump unit with working capacity. In this way, when the ship's oil pump is damaged in an emergency and cannot give sufficient power to the ship, the standby oil pump group can be used to maintain the normal navigation of the ship.

3.3 Solutions to problems in bilge water system of ships

After the oil-water separator was disassembled, it was found that there was no oil stain inside the oil-water separator, and some mechanical parts were mildewed, which was caused by the long-term failure to use the oil-water separator. According to the author's experience, we can choose to replace the new oil-water separator, or according to the correct operation requirements, the ship staff can carry out maintenance. The oil-water separator equipment is equipped with suction pipeline, so the installation position of the oil-water separator is also set for the convenience of daily use. According to the power of the diesel engine, the manual pump can be selected as the matching pump, and the pipeline discharge work can be carried out at the same time. Here I need to emphasize that the discharge pipeline can not be applied to other functions at the same time.

Secondly, the suction strainer of sewage well of some ships is small, and when large solid waste enters, the suction will be blocked, resulting in inability to absorb water. In this paper, it is suggested to expand the existing suction filter of ship sewage well, and then install a grinding cutter head inside the filter, which is spiral and needs strong stiffness. In addition, the crushing motor shall also use an insulated waterproof motor, which shall be installed on the upper end of the filter. The operator on duty shall judge when to use the crusher to clean the filter based on the actual outlet pressure of the bilge pump.

3.4 Solutions to the failure of watertight wall function of ships

If there are holes in the watertight wall of the ship, the ship staff should timely repair and handle them. Then, after passing the inspection, the ship can be put into normal use. In addition, the relevant supervision and management departments should also play their supervision and management functions and increase the supervision of the watertight bulkhead during the manufacturing process. During the production of watertight wall, the operation process of relevant construction personnel shall be strictly inspected to prevent the watertight wall from having holes due to work problems. When it is necessary to carry out the hole drilling work, the relevant staff should be careful. In addition, the watertight wall of the ship shall also be inspected regularly during the shipping process. Once any problem is found, it shall be repaired in time.

3.5 Solution to the failure of water cut-off and cylinder holding

If the marine diesel engine is not cleaned regularly for a long time, it is easy to cause impurities inside. The water circulation system of the diesel engine sucks in a large amount of sediment, which causes the cylinder lock phenomenon. Or the excessive use of the ship will also cause the phenomenon of water cut-off and cylinder holding. For example, when the ship is conducting navigation experiments, the ship suddenly stops running, and the temperature of the ship is extremely high at this time. According to the author's experience, after excluding other mechanical problems, the diesel engine should be disassembled for inspection to see that it is covered with sediment. Therefore, the treatment method is that the mechanical parts damaged by sediment should be replaced in time, and after replacement, the sediment should be completely removed, and the ship staff should also check the remaining mechanical equipment. When the remaining mechanical equipment is also in good operation, the ship can start working normally at this time

3.6 Solution to cylinder pulling of diesel engine

The speed of the diesel engine will automatically drop until smoke is emitted from the shutdown box, and the temperature of the lubricating oil and cooling water of the diesel engine will rise. According to experience, it can be concluded that this is the diesel engine cylinder pulling phenomenon. The situation leading to this kind of phenomenon is actually more complex and related to many factors. According to the author's experience, the treatment method is to select the appropriate lubricating oil according to the working environment and technical state of the diesel engine, and then regularly replace the new lubricating oil, so as to avoid the pollution of the lubricating oil. In addition, the internal pressure oil of the diesel engine should be checked before the subsequent ship is started. And in order to ensure that the ship does not sail under overload conditions, it is necessary to timely understand the cooling water, oil, exhaust temperature and other related conditions, so as to prevent the diesel engine from overheating.

4. Conclusion

To sum up, this article mainly analyzes the common ship mechanical faults and treatment methods in ship inspection. The ship propeller faults should be inspected regularly. When problems are found, they should be repaired or replaced in time; The ship must have a standby oil pump to provide power support for the ship during navigation; Jet pump is used to replace reciprocating pump at the bottom of ship cabin to reduce the problems of ship cabin bottom system during navigation; The watertight walls of ships shall be strictly inspected by the relevant supervision departments before leaving the factory. In the process of navigation, the watertight walls of ships shall also be regularly inspected, so as to reduce the problem of ships entering the water; For the failure of water cut-off and cylinder holding of the ship, the sundries inside the diesel engine should be cleaned up in time, and the lubricating fluid should be added appropriately according to the specific conditions of the ship navigation

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About the author: weishaopeng (March, 1989 -), male, Han nationality, Guoyang County, Anhui Province, graduate student, junior, research direction: Marine Power Engineering Technology (Marine Engineering Technology),