Evaluation Of The Main Deck Maintenance System To Prevent Corrosion In KM. Tanto Aman

Brenhard M Tampubolon¹, Miko Priambudi² and Ony Triaji³

¹Politeknik Transportasi Sungai Danau dan Penyeberangan Palembang
*email : brenhard_mt@dephub.go.id

Abstract

Corrosion that occurs on a ship is essentially a natural enemy for all sailors because the emergence of a corrosion on a ship can cause the loss of an iron so that it can endanger the crew of the ship itself and other people on the ship. Therefore the author would like to convey how to effectively eradicate the corrosion that occurs. Corrosion can be caused by two factors that greatly affect the rate at which corrosion occurs. These two factors are caused by human activity factors, such as lack of maintenance and cleaning on the ship. And the second factor is the influence of nature, such as high rainfall intensity, air temperature, and humidity.

Keywords: Corrosion, main deck

1. Introduction

The main deck is a deck that is most often used by ship crews or loading and unloading workers (TKBM). In general, the lowest deck is called the base deck and the deck that is between the upper deck and the base deck is called the intermediate deck.

The main deck is a separate part of the ship because it is generally used as crew accommodation from bow to Stern and is usually used as a place of Transportation on cargo ships. Therefore, maintenance on the main deck is very important to do if the Main deck is not maintained until the Main deck is on a job then the efficiency and permanence of the ship will also be disturbed until it can do the job. In addition, if corrosion is still given continuously, the iron plate on the main deck will continue to be damaged and can cause irreparable damage to the hatch or void tank. stagnant water in the area can increase the stability of the ship so that it can revive when the ship sails.

Therefore, maintenance on the main deck is very important to do so that the iron plates on the main deck can be maintained and protected from corrosion. Maintenance on the ship or maintenance is actually arranged and carried out by the commander through PMS (Plan Maintenance System) which has been arranged also in the setting of SOLAS (safety of life at sea).
Consolidated edition 2004 Chapter II-1 on construction, sub - division of stability, machinery and electrical installations that carry out government duties and Hull certification, repairs and maintenance carried out for the maintenance and safety of the ship and Chapter IX on the management and operation of ships that carry out the purposes under which safety standards are applied on board ships and ship maintenance standards in order to operate more efficiently and optimally.

Based on these data, the authors are interested in developing a research entitled "Evaluation Of The Main Deck Maintenance System To Prevent Corrosion In KM. Tanto Aman". In the method this study examines the performance evaluation of the main deck in order to prevent corrosion on a ship.

2. Research Method
The author uses qualitative methods, by compiling the data obtained through observation and documentation by compiling and making patterns about the object under study in order to make a conclusion. This qualitative method was chosen by the author as a research method because it includes methods that are easy to do and produce research that is easy to understand both for the author and for the reader.

3. Results and Discussion

- Data Analysis
After observations obtained the results of research surveys on the ship KM. Tanto Aman is as follows:
1. Factors Causing Corrosion
At the time the author did the practice of sailing on the ship it was found that the main deck of the ship has had a lot of corrosion that occurs so that it can interfere with the operation of the ship one of the most visible parts of the ship is on the main deck KM. Tanto Aman looks very thick corrosion both on the floor, hatch coaming and station. From the problems that occur on the ship in connection with the amount of corrosion that has occurred, the author can see that generally the process of corrosion or corrosion is a process of metal destruction by certain circumstances such as humid air, chemicals and seawater.

The process of corrosion that occurs on board the ship KM. Tanto safe in general caused by several factors such as:

a) Environmental factors
This factor is one of the causes of corrosion of ships where corrosion can be easily formed on ships that often sail from different areas of environmental conditions, especially concerning the problem of climate and temperature differences from these areas. This is related to the state of humidity from those areas, namely in areas that get a lot of sunlight, especially tropical areas, the air temperature is high enough so that the air humidity due to condensation will be smaller, where the water vapor that condenses and remains on the plates of the ship will quickly evaporate, because as the author knows that the water vapor contains very high levels of salt with acidity or low pH. So that it can quickly affect the formation of corrosion. And if on the contrary if the ship is in the sub tropical area where the intensity of the irradiation is less then the condensation process that occurs more and more and the rest of the water vapor...
formed will be long to evaporate due to lack of sunlight so that the more water vapor containing the remaining salt then the process will be formed more quickly perkaratan. In addition to the level of condensation that occurs corrosion can also be caused by seawater that is left behind or accommodated on the deck of the ship due to exposure to large waves as well as what happens on the ship writer and also ships that often sail in shipping areas that always occur large waves. If the rest of the sea water is not immediately cleaned when there are waves, Rust will form a new layer underneath and so on so that over time the steel will become thin and hollow while if it is in the form of bars, the rods will break as in the case of ship rails.

b) The Human Factor
The way of working in the maintenance of the ship from each crew, especially the crew deck is one of the factors that affect the resistance of the skin of the ship from the corrosion process, because whether or not a job done will give good results also if the way of work of each personnel who are in it well and regularly, as well as in cleaning the parts of the ship affected by corrosion they often do not pay attention to things about how to clean a good and right even though they already know it so that not infrequently the results obtained are not good. This often involves the use of work tools such as when less clean and when giving less neat paint there are often parts that are thin and thick, where corrosion can easily form on a thin layer of paint especially when the area is an area that experiences direct contact with free air and also if the painting process is not completed and will be - salt is left behind when evaporation and when directly coated with paint, the process of corrosion can also occur quickly.

Provision of demand for ship needs (Amprahan) in order to facilitate the course of a treatment is very necessary by the ship, therefore people from the office should meet these needs in accordance with the request that has been made and reported by the mualim I to the office. Because the demand has been adjusted to the tools and needs needed to carry out ship maintenance whether it is a chipping hammer, demolition hammer, or primary paint and secondary paint for finishing.
From the above factors if not overcome, the corrosion process can quickly form and damage the parts of the ship so that the condition of the ship will be bad and also ultimately can threaten the safety of the ship when sailing.

2. Implementation Of Plan Maintenance System

Plan Maintenance System or ship maintenance plan system is a ship maintenance plan made by mualim 1 or Chief Officer as responsible for all maintenance parts of the ship. System Maintenance Plan is made every month and should be done and reported to the Office of the company that owns the ship. But when the author does this practice is not applied usually Plan Maintenance System is only used as a complement to the monthly report but on a daily basis when doing work it is not embraced or not applied. Daily work still follows the direction of what the Chief Officer wants at that time.

Ship KM. Tanto Aman is a ship owned by PT. The Tanto Intim Line is old, so extra care is needed. But when the author did paraktek sea on the ship the fact that the ship is very less visible maintenance of its main deck that has been exposed to corrosion all. And when doing daily work is the way the treatment or maintenance for the section can be said to be less and therefore the author wants to convey how maintenance or maintenance is correct and effective so that the main deck can be really maintained and corrosion is also not easy to appear. Here are the ways of treatment:

a. Prepare The Tools

1) Personal Protective Equipment

Equipment tools to protect themselves when doing maintenance to prevent things that do not cool. Equipment these tools are commonly referred to as PPE (Personal Protective Equipment) is equipment that is dedicated to protecting themselves individually (individual). Here are the equipment tools of PPE:

a) Safety Helmet
Head protection from impact, teruntuk, the fall of something or hit by a hard or sharp object that may occur while working on board, as well as other additional functions, namely protecting the hair, as well as the scalp from heat and erratic temperatures.

b) Safety Goggles

The function of Safety Goggles is to protect the eyes from splashing small particles, hot steam, and chemicals that are harmful to the eyes.

c) Ear Protection or ear plug

That is to protect the ears from noise and pressure.

d) Wearpack
The function of protective clothing is to protect the body from various harmful substances so as not to be directly exposed to the body/skin.

e) Safety Shoes

The function of Safety Shoes is to protect the crew's feet from various events such as tripping, falling, and other things and keep the feet from getting injured.

f) Gloves
The function of gloves is to protect hands from various types of work on board.

g) Mask

The function of the mask is to protect the body from harm due to inhalation of vapors from certain chemicals or liquids that are harmful to the health of the body.

h) Safety Harness

The function of the Safety Harness is as a safety medium for the crew who do the work by reaching the area - high area, where the way it is used by tying one rope to the body of the crew and tying the other rope to the strong part of the ship.

i) Welding Shield
The function of the Welding Shield, which is a protective shield for the crew that serves to protect the face from Sparks in welding activities on board.

2) Tools for performing maintenance

The tools that need to be used for the treatment of main decks that have been exposed to corrosion and prevent corrosion for the future are:

a) Chipping Hammer

Chipping hammer is a hammer that is made specifically for knocking rusty parts so that the tip of the hammer is indeed made taper so that rusty iron can be easily peeled off.

b) Skilling/Demolition Hammer
Figure 13. Demolition Hammer
Demolition Hammer is a corrosion (rust) Thresher tool by using Iron Eyes as needed, the work can be faster. The way this machine works is similar to a chipping hammer, namely the Iron eye connected to the demolition hammer will continuously hit the iron that is affected by corrosion according to the switch and the iron that is the target.

c) Wire Brush

Figure 14. Wire Brush
Wire Brush is a tool used to clean iron parts affected by corrosion. This tool is usually used after the process of tapping with a chipping or Skilling hammer so that the iron that will later be painted will be cleaner than the dust that sticks and the remnants of corrosion iron that sticks to the iron plate so that when the paint painting process is carried out, the paint will be able to stick well and be covered with all the iron plates that are the target of the treatment. This tool is a multifunctional tool because only by replacing his eyes only he can clean in
addition to also be able to flatten, even cut an iron.

d) Roll Cat

![Image of Roll Cat](image1)

**Figure 15. Roll cat**
Roll paint is a roll-shaped brush with a certain diameter that is used to paint both primary paint and secondary paint.

e) Cat and thinner

![Image of Cat and Thinner](image2)

**Figure 16. Roll cat**
The paint itself consists of 2 parts, namely primary paint or basic paint used for the base or prefix of this paint is very important because if the mixture is wrong or the painting is less flat or thin, it can cause corrosion again in the near future. The second or secondary paint is paint for the second layer or paint that is in accordance with the color to be used (finishing).

4. Closing

a. Conclusion

Based on the description in the previous chapters by analyzing the existing problems, the selection of the best solution with regard to the problem is:

1) Corrosion process on the main deck of the ship caused by:
   a) Air humidity.
   b) Presence of oxygen concentration.
   c) Acidity of the solution.
   d) The speed with which the solution flows is directly related to the metal surface.
   e) There is a potential difference between metals.
   f) The presence of organisms attached to the metal.
Evaluation of the Main Deck...(Brenhard et al.)

Volume 5 No.1, April 2023, 40-51
ISSN 2723-3294

2) The importance of implementing the existing system maintenance plan for daily maintenance so that ship maintenance can be appropriate and planned. If the system maintenance plan can be applied then the treatment of the ship will also be better and structured so that the existing corrosion can be cleaned and can be prevented, especially on the main deck of the ship which is a part that is often skipped by both the crew and TKBM (loading and unloading workforce). If the main deck is protected from corrosion, the ship will be guaranteed safety during sailing because the main deck is exposed to corrosion and eventually holes can cause leaks both into the hold and into the void tank under the main deck. This can cause the stability of the ship to be disturbed so that it can cause risks that can threaten the safety of the crew when the ship sails.

b. Suggestion

1) Maintenance of the main deck must often be done because the main deck includes parts of the ship that are vital and are often passed by the ship's crew or TKBM (loading and unloading workforce) when loading and unloading at the port or when the ship sails.

2) Maintenance on the ship should be adjusted to the existing system maintenance plan and made by the mualim one thing is because the results of the treatment obtained are appropriate and optimal in accordance with the existing system maintenance plan.

3) At the time of the tapping process must be done with a really clean either it is done with a chipping hammer or demolition hammer. It must be ensured that on the iron plate there is no rust attached again so that later there will be no corrosion that will arise again in the near future after painting. In the painting process must also pay attention to the mixture in the manufacture of the paint so that the resulting paint can stick well and not dilute so that it can cause too thin a layer of paint to corrosion can arise again quickly.

5. References


