

## EFFORTS TO OPTIMIZE LOADING AND UNLOADING EQUIPMENT

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### ABSTRACT

*The purpose of this study is to determine the efforts made to optimize loading and unloading equipment to facilitate loading and unloading in MV. Isa Golden. The method used in this study is qualitative descriptive. The results of the study include efforts made to optimize the maintenance of loading and unloading equipment by planning loading and unloading maintenance on a scheduled basis by following the maintenance checklist that has been determined by the ship management, evaluating at safety meetings or deck meetings to provide solutions to problems if found and provide answers or solutions to each problem, Make coordination in parts of the organization in dividing 2 (two) groups in loading and unloading equipment maintenance activities or other maintenance so that it can run well following the job description. Mualim I is obliged to compile crane spare parts to make it easier to supervise spare parts that are not available. View lists of equipment and spare parts that expire and make replacements if there is equipment that expires or is used by making and submitting a list of spare parts requests to the company.*

**Keywords:** *Equipment, Loading, Optimization, Unloading, Ships*

### INTRODUCTION

Geographically, Indonesia is located between two oceans, namely the Pacific Ocean and the Indian Ocean, and connects the Asian continent and the Australian continent (Salamah, 2021). Indonesia is an archipelagic country based on the 1982 UNCLOS convention (Sunaryo, 2019). Indonesia has 17,504 islands, with a coastline of more than 99,000 km, making Indonesia the country with the second longest coastline in the world after Canada. Indonesia has a very large sea area, where 2/3 of the country's territory is sea (Chamdareno et al., 2019). Most of Indonesia's territory is in the form of sea, making Indonesia one of the countries that has great potential in the marine sector in exports and imports (Wiranto, 2020; Supartini et al., 2022).

In the era of globalization and world industry, the role of sea transportation is no less important than land and air transportation in general (Astriawati et al., 2022). Therefore, it is necessary to optimize good supporting facilities in the loading and unloading process optimally as the main principle of shipping, that is, it can carry cargo from port to port safely, smoothly, quickly and efficiently. To ensure smooth loading and unloading on board, optimization is needed to ensure a smooth loading and unloading process to avoid some problems with damage to loading and unloading equipment (Kurniawan, 2017). Thus the costs borne by the shipping company do not become large. If loading and unloading equipment is damaged, an outside technician is needed to repair damaged to loading and unloading equipment and does not rule out the possibility of purchasing new loading and unloading equipment, so this will get additional costs that are not small for shipping companies (Wahyuni, 2022). Another loss is that with damage to loading and unloading equipment, the loading and unloading process becomes disrupted and causes the ship's arrival schedule at the next port to experience delays. The impact of the delay will make the ship or the owner of the goods give complaints so that the trust of the owner of the goods will decrease.

Maintenance of loading and unloading equipment is often neglected due to short voyage distances, as well as the lack of availability of spare parts for loading and unloading equipment needed (Sihombing et al., 2023). So that loading and unloading equipment becomes less functional and damaged. As a result, the loading and unloading process becomes disrupted and causes delays in the loading and unloading process. To ensure a smooth loading and unloading process, proper maintenance of loading and unloading equipment is optimized. The purpose of this study is to determine the efforts made to optimize loading and unloading equipment to facilitate loading and unloading in MV. Isa Golden.

## **METHOD**

The method used in this study is qualitative descriptive. The data obtained to fulfil this study are as follows: ship particular MV. Isa Golden, crew list MV. Isa Golden, document certificate MV. Isa Golden, how to maintain loading and unloading equipment on the MV ship. Isa Golden, the influence of unmaintained loading and unloading equipment on the MV ship. Isa Golden. The data collection method researchers use several methods including observation, interview, and documentation.

The observation method is an effort to collect data by directly observing an object while recording everything that has been observed as clearly as actively and attentively to realize the existence of certain stimuli that are desired, about the state and symptoms - psychic symptoms by observing and recording (Rukin, 2019). By making observations, the author can take advantage of direct observation of data about the object that is the problem by being recorded immediately and not relying on data from someone besides that, the data is more objective, reliable and accountable. This observation technique can be done because researchers at that time were conducting research with direct experience while on the MV ship. Isa Golden.

The interview method is a way to get information or opinions by asking directly to respondents (invited to interview) orally and face to face (Wibowo & Astriawati, 2021). In conducting interviews, researchers have conducted interviews with respondents who have been interviewed, including Chief Officer, Aldi Nidjo, in February 2023, as the person in charge of maintaining loading and unloading support equipment on board ships including cranes such as Nolvi Manvel Lengelo, in February 2023, as a work foreman for deck crew and as an experienced person when facing problems that occur when operating the crane. The interview method chosen is a free interview because this method researchers think is very easy does not look like they are interviewing and is not rigid.

Documentation method is an effort to collect data obtained from related agencies/institutions and related mass media and data collection in internet media related to the title above (Nilamsari, 2014). This method is carried out by taking pictures with mobile phones when researchers check the unloading equipment on the MV ship. Isa Golden and also data from various other parties. The way to analyze data in this research activity uses descriptive analysis methods that aim to describe what is currently applicable. It contains efforts to describe, record, analyze and interpret conditions that currently occur or exist (Koyan, 2014). In other words, descriptive analysis aims to obtain information about the current situation and see the relationship between existing variables.

This analysis does not test hypotheses but only describes information as it is according to the variables studied. As for how to analyze, where researchers conduct interviews with the parties concerned during research on ships. In addition, researchers conducted a study to make a picture of some of the data sets that researchers obtained during research on the MV ship. Isa Golden. The form of data that researchers have obtained and have developed can be presented in the form of tables, and graphs and can be through other depictions.

## **RESULTS AND DISCUSSION**

MV. Isa Golden is one of the Bulk Carrier ships owned by PT Isa Lines with a type of Bulk Carrier ship. MV. Isa Golden has 5 Cargo Hold (hatches) divided into capacities: No 1 Cargo Hold:

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4372 M<sup>3</sup>, No 2 Cargo Hold: 8146 M<sup>3</sup>, No 3 Cargo Hold: 8125 M<sup>3</sup>, No 4 Cargo Hold: 8197 M<sup>3</sup>, No 5 Cargo Hold: 7865 M<sup>3</sup>. At the time the researcher made observations on board the MV. Isa Golden regarding the ship's crane, various problems have been found regarding loading and unloading equipment. The problem arising from ship cranes is the less than optimal performance of loading and unloading equipment caused by lack of maintenance of loading and unloading equipment, resulting in disrupted loading and unloading operations.

The findings that researchers obtained from direct observations on ship cranes were that the hoisting wire had broken and another finding was that the cargo block on the crane was damaged. Before that incident, researchers had greased the wire crane accompanied by the bosun. When the wire crane, there is a crackdown in the wire hoisting. Because at that time it was still in loading and unloading activities and also only 1 wire on the wire broke, so no new wire was replaced. For wire crane egression, it is best to do it every 2 weeks according to the maintenance of the ship crane. In September 2023, his place on the platform, Bosun as the head of deck work told Mualim I that wires crane no. 3 needs to be replaced because it is damaged and needs to be replaced after completion of loading and unloading activities. Mualim I also responded to the proposal, because if the wire is not replaced it will be dangerous for users and people around them. The second finding is that the cargo block, precisely on the bearing block, has been damaged, and there is an unusual sound. This was stated by the crane operator who happened to be on the crane. Because of this incident, loading and unloading activities became disrupted and inefficient, from the original estimated loading and unloading of 5 (five) days, but because of this incident the loading and unloading activities became 7 (seven) days. This is certainly very detrimental for all parties, from the Company, ship crew and cargo owners are also affected.

Another factor is the lack of maintenance of loading and unloading equipment on MV ships. Isa Golden is a relatively short voyage distance. Please note that the voyage distance that researchers observe from the place of loading to unloading only takes 1 day and 13 hours. The ship loaded clinker in Tarjun (Indo Semen), South Kalimantan and unloaded it in Banyuwangi (Bosowa), East Java. As a result of the relatively short voyage distance, the maintenance of loading and unloading equipment is less considered. Furthermore, the vital factor in the equipment/machine is spare parts. If the spare parts on board are not met and available as stipulated, it will interfere with loading and unloading operations if the ship's crane is damaged.

In carrying out maintenance and supervision of loading and unloading equipment, there are still many obstacles that are often faced, because there are still ship owners who find it difficult if asked to replace old equipment because it can still be used and for the sake of the company financial savings, so often the ship has difficulty obtaining spare parts for the equipment, especially if the need is urgent. With difficulties in the demand for spare parts for loading and unloading equipment, in its implementation, the ship continues to use existing equipment and of course, requires optimization in proper maintenance and maintenance of loading and unloading equipment. Spare parts are still easy to get a replacement, but if the damage occurs at a remote port, obtaining a replacement for damaged loading and unloading equipment will have difficulties and will take time, also, of course, it will hamper the smooth implementation of loading and unloading which is an element supporting the smooth operation of the ship in meeting the cruise schedule determined by the shipping company (Khamdilah & Erliyana, 2021). If routine loading and unloading maintenance is carried out with a relatively short distance and adequate spare parts, loading and unloading equipment can be minimized so that loading and unloading operations are not disrupted. If loading and unloading operations are not disrupted, loading and unloading operations on board the ship become smooth and on time.

How to optimize the maintenance of loading and unloading equipment to facilitate loading and unloading activities on the ship by carrying out scheduled loading and unloading equipment maintenance by the planned maintenance system. Some things that can be done to optimize loading and unloading equipment, among others:

**Create a continuous wire crane maintenance strategy (continues).**

The smooth operation of the ship depends on the good and bad condition of the loading and unloading equipment, namely the wire crane. Maintenance and replacement of wire cranes on ships can

be interpreted as efforts or activities carried out on wire cranes that focus on the provisions of physical damage that technically require maintenance and replacement to restore to good physical condition is a maintenance system that is carried out from the beginning, planned and systematic. In operation, planned maintenance is needed, but what we face on board the maintenance and replacement of wire cranes is often late or even forgotten because there is no work plan to carry out maintenance activities on wire cranes. It is necessary to have a wire maintenance plan or schedule with the division of duties of each crew so that maintenance activities can run smoothly and continuously so that it is unlikely that there will be any more broken wires on board. In a job, maintenance must be planned as far as possible taking into account operating limitations regarding the availability of spare parts, shipping, time and so on. Things that need to be planned in terms of wire maintenance are:

Grease on the wire crane. Applying grease to certain places such as nipples, wires, and so on. Grease has a function as a lubricant between components that rub against each other. The goal is that the level of wear between components resulting from friction can be minimized. The application of grease is carried out by the work of the wire used in loading and unloading operations. The grease used for wire is Multifak EP2 Grease for inaccessible parts such as nipples and Starplex 2 Grease for wire cranes.

### **Implementation of maintenance work**

Maintenance work should be carried out by routine maintenance that has been carried out. Before the maintenance work is carried out, it first collects the tools or materials needed after which the maintenance work can be carried out. The following is the equipment and materials needed in wire crane maintenance, namely: (1) Grease often referred to as grease is the main material for wire lubrication and prevents the wire from rusting and drying; (2) Wire brush, a tool-shaped like a brush but made of steel wire, serves to clean around the crane from old grease and shrinking; (3) Brush, a tool used to grease all the wire in the ship's crane; (4) Ember, is a tool used as a container for grease to be used; (5) Grease gun, is a device used to pump grease with wind thrust, connected through hoses and pistol-shaped controllers; (6) Majun, which is a tool used to insulate if the grease contaminates around cranes, decks and grabs.

The most important factor than treatment is knowledge. With the knowledge possessed by the ship crew, it will make it easier to carry out maintenance. To obtain maximum knowledge about treatment, an introduction to treatment is carried out. This is shown in the crew deck, especially the new crew. So that in the process of treatment do not experience obstacles and accidents. In order not to make mistakes, Mualim I provided direction and input per the experience gained while working on other ships (Hermawan et al., 2020), guidebooks and also during Mualim I received education at school. With the aim that the treatment goes well.

The objectives of maintenance are: a) Ensuring loading and unloading equipment in an optimally ready-to-use state; b) Guaranteeing longer service life of machine/tool; c) Ensuring the safety of persons using loading and unloading equipment; d) Maintaining and increasing the usability of the machine, while lowering the direct cost per unit of output required at least to be able to purchase the required maintenance equipment; e) Minimize unemployment time from machinery and maintenance equipment due to damage; f) Inspection of poor conditions, which not only lowers repair costs but also maintains the efficiency of machining both quality and quantity; g) Planning operations - operations from maintenance. All completed activities must be recorded and reported. Special observations and records related to work will be useful as future input data to evaluate where deficiencies and errors lie. The following are some of the things recorded by Mualim I after the ship's wire crane maintenance work was carried out, namely: a) Time and place of maintenance work; b) The condition of the entire wire crane; c) The condition of the lights - lighting lamps on the crane; d) Cleanliness around the ship crane. Given the importance of a smooth loading and unloading process and the importance of safety during the loading and unloading process, loading and unloading tools must require more serious wire maintenance. Due to time constraints in terms of maintenance, the ship must make a schedule of maintenance activities that will be carried out when the ship sails, especially related to loading and unloading equipment and paying attention to spare parts that are still available on board. So that there will be no more accidents

during the maintenance and loading and unloading process.

Smooth operation is certainly the expectation of all shipping companies, and to achieve that goal there must be good cooperation between the crew and the company and the implementation of other loading and unloading. When carrying out loading and unloading activities, each party should carry out their duties and responsibilities properly and always avoid things that slow down the operation of the ship. In the implementation of loading and unloading activities, the ship must always hold communication with various parties directly related to the implementation of loading and unloading. This is so that all problems encountered that will interfere with the course of loading and unloading activities can be overcome properly. Every day when the loading and unloading activities are in progress, Mualim I must get a report from the owner of the goods regarding the amount of cargo loaded or unloaded and the results of the report are forwarded to the Skipper to be submitted to the company. To maintain unwanted things in the implementation of loading and unloading, especially regarding the lifting capacity of the ship crane, the owner of the goods should be informed of the maximum lifting ability. In addition, it is expected that each party that plays a role can cooperate in maintaining the discipline of the rules so as not to exceed the lifting capabilities that have been set so that there is no obstacle in loading and unloading equipment activities on the ship. Loading and unloading equipment must be prepared early before the ship arrives at the port so that it can be used properly without experiencing obstacles - obstacles where it is not necessary when carrying out loading and unloading activities to be checked and if there are parts that doubt the feasibility must be repaired and if necessary a change, the wire is checked and greased.

Before the ship carries out loading and unloading activities, the things that must be considered first are: a) Confirm with the engine room whether the AE (Auxiliary Engine) is parallel, so that it is safe when operating the crane simultaneously; b) Before operating the crane, first check the light indicator for low oil crane, if the light is on, confirm with the duty officer to be forwarded to the engine room for crane oil filling; c) Also pay attention to whether the hook crane or ganco is properly connected to the grab; d) Wire Crane should be inspected together with the deck crew, if the condition is doubtful it must be replaced with a new one, so that in its replacement it will not interfere during loading and unloading activities; e) In making wire changes should be done jointly by the converts and deck crew, so that it can run well and according to plan with due regard to safety in doing the work so that no accidents occur; f) Conduct good supervision during loading and unloading activities. No less important factor in supporting the smooth operation of the ship, namely conducting good supervision of loading and unloading equipment during activities is organizing work and tasks for every guard assisted by the crew so that they always carry out their duties and responsibilities properly, especially for parts of equipment that have begun to look damaged and old. In loading and unloading activities, Mualim I as an officer who is directly responsible for the cargo, should always be present every day and always control the course of loading and unloading and report the results to the company through the skipper. 1. Carry out organizational divisions in carrying out maintenance.

The shipping route traversed is relatively short, so the maintenance of loading and unloading equipment is neglected and less attention. To facilitate the process of implementing treatment, an organizational division was carried out. With the organization, 1 (one) a day can do 2 (two) treatments at once. By dividing deck work into 2 groups. Mualim I need to divide into 2 (two) groups so that all care needs run as expected. An organization is a system of cooperation between two or more people. In the process of carrying out treatment, at least 2 (two) people should not be less than that. So that if there is a dangerous problem. Then one of them can give help and watch over each other. Because the cruise time is short with a short distance, there is a division of duties between maintenance work on deck and cranes. The following is the deck department organization on board MV. Isa Golden as in the following figure 1.



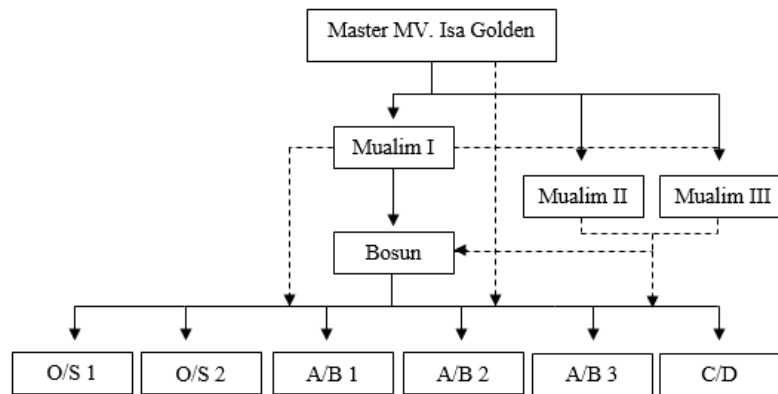


Figure 1. Deck department organization on board MV. Isa Golden

The Master MV. Isa Golden is fully responsible for the ship, the crew, and the cargo on board. The Mualim I was responsible for the maintenance of the ship. Give orders to bosun, A/B, O/S, and C/D in doing daily work. Monitoring the crew from 08.00-12.00 LT when the ship sails and at 16.00-20.00 LT conducting guard service on the platform. The Mualim II monitors the crew in carrying out ship maintenance activities from 09.00-12.00 LT and is on guard duty at the platform from 12.00-16.00 LT. The Mualim III conducts guard service at 08.00-12.00 LT and at 13.00-15.00 LT monitors the crew in carrying out ship maintenance activities. The Bosun received the work (order) from Mualim I and forwarded it to O/S, A/B and C/D. Bosun was the chief foreman of deck work and was responsible for the work done by O/S, A/B and C/D.

After the organization, it can facilitate the distribution of tasks in maintaining and maintaining loading and unloading equipment. For the tasks given to run well, the movement is carried out. Mobilization is an effort to move group members in such a way that they desire and strive to achieve improvement goals that are by those goals. The improvement movement in question is to maintain good communication with all parties related to loading and unloading activities. The efforts of the crew of the MV. Isa Golden in optimizing the maintenance of loading and unloading equipment to facilitate loading and unloading activities, namely;

1. Carry out scheduled loading and unloading maintenance planning by following the maintenance checklist that has been determined by the ship management. Maintenance needs to be done on an ongoing basis to extend the life of machines and tools. In addition, good planning needs to be done by doing management that is neatly arranged, directed and precise. So that what will be done can be by the purpose. Inspection of loading and unloading equipment before and after loading needs to be carried out to avoid greater damage. When checked, the equipment that will be damaged can be known by seeing bad physical sight, abnormal movements and unnatural sounds. If so, then Mualim 1, Mualim Jaga and ABK Oblige to stop operating the crane and make repairs. This is done to prevent a greater degree of damage. Evaluate at safety meetings or deck meetings to provide solutions to problems when found and provide answers or solutions to each problem.
2. Coordination in parts of the organization in dividing 2 (two) groups in loading and unloading equipment maintenance activities or other maintenance so that it can run well by the job description. This is done because the cruise distance is relatively short, it is necessary to do 2 (two) groups. With the division of 2 (two) working groups, it is expected that 1 (one) day can work on 2 (two) treatments. As well as paying attention to work safety equipment standards and work supervision. Provide more in-depth knowledge to crews, so that the maintenance process of loading and unloading equipment and others runs more effectively, quickly and safely. Conduct questions and answers and provide input so that one day a problem can be resolved appropriately and quickly.
3. Mualim I is obliged to compile crane spare parts to make it easier to supervise spare parts that are not available. View lists of equipment and spare parts that expire (expired) and make replacements

if there is equipment that expires or is used by making and submitting a list of spare parts requests to the company. Prepare a list of important spare parts to anticipate damage. With the spare parts on board, the replacement process can be done immediately without waiting for spare parts from the company. Thus the time needed in making repairs becomes faster

Based on what researchers have observed on board, researchers found several things that cause the maintenance of loading and unloading equipment to be not good, including the following: Delay in replacing wire crane, Delay in supply of wire crane spare parts (crane loader rod parts) and poor quality of spare parts, delay in lubrication of wire and lack of maintenance of block cranes (loading and windlass). The delay in replacing the wire crane occurs because the company asks the ship to maximize the wire crane or see the condition of the wire, and if there is a mess the crew is on guard to continuously monitor the wire that has a breakdown and if it is not possible to continue loading and unloading activities it can only be replaced with a new wire. Delays in the supply of crane spare parts often occur so that if the wire is damaged it cannot be replaced immediately and must wait for the company to send the required wire spare parts, resulting in a waste of time. The selection of wire spare parts also cannot be arbitrary and must be by type and size. But in fact, what researchers examined while on board, wire crane spare parts sent by companies to ships often bring wires that do not match the requests (requests) that have been made by the Chief Officer. The following is a Table 1 for wire sizes on MV ships. Isa Golden

Table 1. The size of the wire on the MV ship. Isa Golden

No.	Wire Name	Size
1	Crane Hoist	30mm*225m
2	Crane Luff	32mm*130m
3	Life Boat Fall	16mm*79m
4	Provision	12mm*79m

The delay in lubrication of the wire causes the wire to easily rant and the wire becomes dry and stiff, because the wire often friction with the block wire or friction with the wire because it is entangled, the wire that is less greased will easily experience eradication. During the research, the researcher carried out research on the MV. Isa Golden, the lubrication of the wire is almost irregular. Because the Chief Officer often tells the crew of the deck ship to check the condition of the wire. So if there is a wire that starts to dry, the wire will be immediately greased. A block crane is an important component for operating a ship crane because a block crane is a wire-walking tool that can facilitate the process of wire rotation. Things that can reduce the performance of block cranes include delays in greasing the block crane. Grease the block crane can avoid damage to the block crane bearing. Grease has a function as a lubricant between components that rub against each other. The goal is that the level of wear between components caused by friction between bearings and block cranes can be minimized. Grease on the block crane is done by inserting grease into the block crane through the nipple contained in the block crane and by using a special tool, namely a grease gun.

## CONCLUSION

Based on the analysis and discussion of efforts made to optimize the maintenance of loading and unloading equipment are as follows: Planning loading and unloading maintenance on a scheduled basis by following the maintenance checklist determined by the ship management. Maintenance needs to be done on an ongoing basis to extend the life of machines and tools. In addition, good planning needs to be done by doing management that is neatly arranged, directed and precise. Evaluate at safety meetings or deck meetings to provide solutions to problems when found and provide answers or solutions to each problem. Make coordination in parts of the organization in dividing 2 (two) groups in loading and unloading equipment maintenance activities or other maintenance so that it can run well following the job description. Mualim I is obliged to compile crane spare parts to make it easier to supervise spare parts that are not available. View lists of equipment and spare parts that expire (expired) and make

replacements if there is equipment that expires or is used by making and submitting a list of spare parts requests to the company. Prepare a list of important spare parts to anticipate damage. With the spare parts on board, the replacement process can be done immediately without waiting for spare parts from the company. Thus the time needed to make repairs becomes faster.

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