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## Maintenance of Cera Tanks and Bucket Elevators to Streamline the Unloading Process on Cement Carrier MV. Oceanic Success

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**Abstract:** Cement is one of the most important building materials in the world of construction today. So that the demand for cement can be used as a benchmark in the implementation of development in a country. Cement ship unloading equipment is very influential on the availability of cement supply both in Indonesia and the world. Damage to the unloading equipment on the cement carrier ship, especially the Cera Tank and Bucket Elevator, has an impact on the delay in the loading and unloading process at the port. So that maintenance is very important in order to avoid the delay in loading and unloading. This research was conducted in MV. Oceanic Success for 12 months. The aim is to find out things that must be considered in terms of maintenance of cement carrier ship unloading equipment. This research method uses a qualitative descriptive method with data analysis techniques, namely Root Cause Analysis with the help of the 5 Why Analysis Method tool. The results of this study indicate that the Cera Tank and Bucket Elevator unloading tools are lacking in terms of maintenance. Thus causing delays in the unloading process on the MV ship. Oceanic Success.

**Keywords:** Cera Tank, Bucket Elevator, Stuck, Pressure, Maintenance, Cement Carrier

### INTRODUCTION

Cement is a strategic product for every country, especially for developing countries because of its very important and vital role as a supporting component in the construction of housing, buildings, transportation facilities, and other physical constructions. This causes the demand for cement to be used as a benchmark in the implementation of development in a country.

Indonesia is one of the largest cement producers in Asean. Last year, the national cement production reached 47.3 million tons, but the domestic absorption capacity was only about 67 percent of the total production or around 31.7 tons. The excess supply of cement is partly due to the lack of port facilities. Last year's cement production in Asean reached 173 million tons of the total installed capacity of 242 million tons per year. Meanwhile, the demand for the Asean market only reaches 140 million tons per year. However, the world

market is still quite prospective because of the total world cement production having an installed capacity of 1.8 billion tons per year, the production allocation reaches 1.5 billion tons per year, while the market absorption is only 1.46 billion tons per year. (Indonesian Cement Association, 2010-2017, Cement Sales Report, Jakarta).

In the world of national and international trade, commercial shipping plays an important role in supporting the process of distributing goods. Almost all exported and imported goods use ships for transportation, although among the places where the transportation is carried out there are other transportation facilities in the form of land transportation such as trucks and trains. The transportation of goods by ship was chosen because the number of goods to be transported would be greater when compared to using trucks, trains and airplanes and the transportation costs were relatively smaller when compared to land transportation and air transportation.

Smooth loading and unloading of ships, unloading equipment is the most important factor for the efficiency of loading and unloading activities at the port. On the MV ship. Oceanic Success is the place where the author carries out prala (sea prakek) and MV research. Oceanic Success is a Cement Carrier type ship that has 4 hatches. Each hold consists of: Chain Conveyor, Bucket Elevator, Cera Tank and Two Way. The experience experienced by the author during the practice on the ship, unloading activities using equipment from the ship. Given the importance of the role of unloading equipment on board, the equipment must be routinely maintained in accordance with the PMS (Planning Maintenance System) that has been made by the INDOBARUNA BULK TRANSPORT company. So that the crew will only follow the PMS if the equipment for unloading maintenance will be carried out. With regular maintenance, it is hoped that the unloading equipment will always be good and ready to use. Based on things this case which occur consequencedelay in unloading due to unpreparedness of unloading equipment or damage during use. Lateness processdemolish whichhappened on the MV ship. Oceanic Success on November 20, 2020 caused by the Ring Nozzle Blow clogged with cement material so that the Main Pressure Cera Tank experienced a delay in decreasing. Under normal circumstances Cera Tank with a capacity of 22.5 tons can deliver cement material for 5.8 minutes. However, when the pressure drop delay occurred, Cera Tank was only able to deliver materials in 7 minutes. As a result, this greatly affects the rate of unloading on the MV ship. Oceanic Success.

In addition to the problems mentioned above, the delay in the unloading process on the MV ship. Oceanic Success also occurs because the Bucket Elevator is stuck. When the Bucket Elevator is jammed, the load from the Chain Conveyor cannot enter the Cera Tank. When the Bucket Elevator is stuck, the crew must open the Bucket and clean the material in the sagar so that it can reduce the Bucket Elevator load so that it can return to operation. Therefore, the stuck Bucket Elevator can slow down the loading and unloading process of the ship. Bucket Elevator Stuck can be prevented by Cleaning Tank after the unloading process, namely by ensuring the Bucket Elevator pressure becomes 7.7 Bar before turning off the unloading system on the ship. If the pressure is still above 7.

## **RESEARCH METHOD**

This research is based on the results of the authors carrying out marine practice for one year on the MV. Oceanic Success belongs to the company PT. Indobaruna Bulk Transport, starting from August 19, 2020 to August 21, 2021. This research was conducted by collecting basic data about the implementation of unloading equipment maintenance that will be studied. This research was carried out aboard the MV Oceanic Success. This ship is one of the Cement carrier types owned by PT. INDOBARUNA BULK TRANSPORT. Based on the previous explanation, according to the author the approach method used in writing this thesis is to use quantitative methods. This quantitative method serves to understand the social context more

broadly and deeply by using descriptive development, This means that the author tries to describe a portrait of the problems that exist in the field and things that can be taken care of to facilitate the unloading process on the cement carrier ship. To get good writing results, the data and information used must be complete, objective and accountable so that this writing can be processed and presented into a correct picture and view. In this case the data collection techniques that the authors choose are: Observation, Interview, and Documentation objective and accountable so that this writing can be processed and presented into a true picture and view. In this case the data collection techniques that the authors choose are: Observation, Interview, and Documentation objective and accountable so that this writing can be processed and presented into a true picture and view. In this case the data collection techniques that the authors choose are: Observation, Interview, and Documentation

According to Sugiyono (2014: 148) population is a generalization area consisting of objects or subjects that have certain quantities and characteristics determined by researchers to be studied and then drawn conclusions. In accordance with this opinion, the population used by researchers in the preparation of this thesis are all employees of PT. Snepac Shipping Batam as many as 30 people. The sample is part of the number and characteristics possessed by the population. If the population is large and it is impossible for researchers to study everything in the population, they can use samples taken from that population (Sugiyono, 2014:149). The sample design used by the researcher is saturated sampling, where all members of the population are used as samples. This is often done when the population is relatively small. Another term for saturated sample is census (Sugiyono, 2014: 156). So that the sample used in the preparation of this thesis are all employees of PT. Snepac Shipping Batam. In this case, the population taken by the author in the preparation of this study is all 30 employees at Snepac Shipping Batam.

## **FINDINGS AND DISCUSSION**

Cement Carrier Ship is a ship that specifically transports bulk materials in the form of cement. This ship is different from bulk carriers in general because cement carrier ships have special loading and unloading equipment. Cement is a powder or flour used to glue bricks, make concrete, or make building walls. Because cement is in powder form, it cannot be loaded and unloaded like other bulk materials. MV ship. Oceanic Success has 4 hatches with different capacities. In loading and unloading activities there are many problems that can interfere with the smooth loading and unloading process, both problems that arise due to lack of maintenance on loading and unloading equipment on board. Maintenance of unloading equipment is one of the most important things that crew members do. So that the unloading process on the ship runs smoothly. Delays in the unloading process can affect supply availability. Loading and unloading equipment has an important role in loading and unloading activities at the port including several incidents of damage and work accidents on loading and unloading equipment experienced by MV. Oceanic Success

This general description of respondents aims to determine the characteristics of the employees who were selected as respondents in relation to the object of research. The classification of employees is based on Age, and education level. From this classification, a conclusion will be obtained regarding the condition of the respondent. These classifications will be presented in the following respective tables:

### **Data analysis**

#### **First Event**

Lack of maintenance on loading and unloading equipment on the ship, in this case the maintenance carried out is very less due to the narrow maintenance time. MV. Oceanic Success is one of the time charter vessels owned by PT. Indobaruna Bulk Transport, the ship

was loading in Lhoknga Aceh and unloading carried out in Lhokseumawe and Medan. MV ship cruise. Oceanic Success only takes 12 hours from Lhoknga – Lhokseumawe, 12 hours from Lhokseumawe – Medan, 24 hours from Medan – Lhoknga. So that the time to carry out maintenance of unloading equipment is very less. The maintenance planning that has been made by the company is not implemented due to the short shipping time of the ship. So that the Cera Tank is not well cared for. The delay in decreasing the pressure of the Cera Tank occurred because there was a blockage in the Ring Nozzle by cement material. And there was an error in the watchman making the Ring and Main Nozzle pressure settings. This setting is very influential in increasing the unloading rate, the greater the pressure applied, the faster the unloading rate will occur. The pressure setting has been regulated by the company so that the duty officer only follows what has been arranged by the company. The mass for each type of cement is different, the mass of OPC cement is heavier than the PCC type. so that when the OPC is dismantled, the duty officer should change the setting again. Factors that cause delays in decreasing the pressure of the Cera Tank, this is caused by: This setting is very influential in increasing the unloading rate, the greater the pressure applied, the faster the unloading rate will occur. The pressure setting has been regulated by the company so that the duty officer only follows what has been arranged by the company. The mass for each type of cement is different, the mass of OPC cement is heavier than the PCC type. so that when the OPC is dismantled, the duty officer should change the setting again. Factors that cause delays in decreasing the pressure of the Cera Tank, this is caused by: The mass for each type of cement is different, the mass of OPC cement is heavier than the PCC type. so that when the OPC is dismantled, the duty officer should change the setting again. Factors that cause delays in decreasing the pressure of the Cera Tank, this is caused by: The mass for each type of cement is different, the mass of OPC cement is heavier than the PCC type. so that when the OPC is dismantled, the duty officer should change the setting again. Factors that cause delays in decreasing the pressure of the Cera Tank, this is caused by:

### **The implementation of Cera Tank maintenance that is not going well**

The implementation of loading and unloading equipment maintenance has been scheduled and made by the company. So that the crew only follow the Planning Maintenance System (PMS). The awareness of the entire crew needs to be changed so that the loading and unloading equipment maintenance runs well. As long as the authors carry out marine practice in MV. Oceanic Success maintenance of unloading equipment is only carried out as a formality or in the sense that the maintenance is only carried out so that the PMS implementation runs.

### **Incorrect pressure setting of the Ring Nozzle and Main Nozzle is carried out by the duty officer**

The pressure setting of the Ring Nozzle and Main Nozzle affects the rate of unloading of the cement carrier. Incorrect settings can cause the onshore silo to be damaged because the rate is too large and cannot be accepted by onshore silos with different bulk cement material storage capacities for each silo. Therefore, when the officer in charge does not change the pressure setting, the ship unloading rate decreases.

## **Second Occurrence**

The problem that occurs in the Bucket Elevator unloading tool is because the Bucket Elevator motor is not able to lift the load at the beginning of the unloading. The Bucket Elevator Stuck can occur due to the cleaning process that is not clean and still leaves cement material at the previous unloading port. When the Bucket is unable to lift the load, the entire crew must remove the remaining material in the Bucket Elevator. This dispensing and cleaning process can take 2-3 days. If the Bucket Elevator is forced to lift the load, what will happen is that the Bucket Elevator Chain Link will break.

Factors that cause Bucket Elevator Stuck, this is caused by:

### **The cleaning process is not clean enough so that the material is still left in the Elevator Bucket**

The cleaning process is one of the important things that must be considered during the unloading process. The cleaning process on cement carrier type ships is carried out automatically on the pneumatic discharge system. However, the habit of rushing the cleaning process and not based on the existing SOPs can have a bad impact or cause problems with loading and unloading equipment at the next loading port, such as a stuck Bucket Elevator. This incident was due to the presence of cement material in the Bucket Elevator so that when the discharge process started at the next loading port, the Bucket Elevator could not run because the motor could not lift the load that was inside when it was first operated.

### **Bucket Elevator maintenance is not going well**

As long as the author carries out marine practice in MV. Oceanic Success Bucket Elevator maintenance is the same as other unloading equipment maintenance, which is only a visual inspection and not a complete one. Such treatment can cause delays in the loading and unloading process. Due to the ignorance of the crew of the ship the damage was carried out before carrying out the unloading process at the port. If the maintenance is really carried out, the delay in the unloading process at the port can be resolved. Because the crew can find out the damage and carry out repairs before the unloading process is carried out.

### **Alternative Troubleshooting**

From the analysis of the problem above, the author can provide alternative solutions for the two problems raised in this thesis.

#### **First Event**

#### **Application of Ring Nozzle maintenance according to the predetermined Planning Mintenance System**

The application of Ring Nozzle maintenance according to the Planning Maintenance System that has been issued by the company must be carried out with full responsibility because the Cera Tank maintenance is not carried out properly by the crew so that changes must be made by carrying out maintenance only at a glance by carrying out comprehensive maintenance, especially on the Ring Nozzle Blow section.

#### **Provide awareness to ship crew about the importance of maintenance of unloading equipment, especially Cera Tank**

*Chief Officer* as an officer who is responsible for handling loading and unloading equipment, he must come down to carry out maintenance for loading and unloading equipment and not just give orders for the work to the crew. In addition to this, the Chief Officer must provide direction on the importance of maintenance so that the unloading process can run smoothly without any obstacles and obstacles. If this has been carried out and the crew continues to carry out maintenance not according to the rules, then a Chief Officer

must act decisively by:

### **Second Occurrence**

#### **The cargo cleaning process must be carried out properly according to Standard Operating Procedures**

The cleaning of the cargo must be carried out according to the exact and not hastily determined by the company. However, sometimes the crew, especially the duty officer, force the cleaning to be completed according to the timesheet determined by the chief officer. The remaining load in the unloading tool which can cause the Bucket Elevator to be stuck can even cause the Bucket Elevator Chain Link to break.

#### **Provide direction to the duty officer before operating the pneumatic discharge system**

An officer in charge of load control must provide direction and coordination to the officer in charge prior to the operation of the pneumatic discharge system. Because at the time of operation of the pneumatic discharge system, the guard officer is not accompanied by other crew members (ABK) so that at the time of operation the system must really master and be familiar with the pneumatic discharge system. The briefing aims to maximize the loading and unloading process so that it can run smoothly and to avoid incidents that can have a negative impact during the loading and unloading process. Like a broken ship unloading tool.

### **Solution To Problem**

#### **First Event**

#### **Application of Ring Nozzle Maintenance according to the predetermined Planning Maintenance System**

The author chooses the most appropriate solution in this problem, namely the maintenance of the Ring Nozzle Cera Tank outside the Planning Maintenance System that has been determined by the company PT. Indobaruna Bulk Transport. The maintenance that has been scheduled in the PMS does not mean that it has failed in its application to maintain all unloading equipment aboard the MV. Oceanic Success, but the Planning Maintenance System must really be carried out properly and thoroughly because the maintenance will have a direct impact on the smooth loading and unloading of the MV ship. Oceanic Success

### **Second Occurrence**

#### **Provide direction to the duty officer before operating the pneumatic discharge system**

Directions to the duty officer before carrying out the unloading process with the pneumatic discharge system must be carried out properly, a Chief Officer must be able to provide direction in the operation of the pneumatic discharge system. In the implementation of cleaning the cargo during the unloading process, it must be in accordance with the Standard Operating Procedure on board the MV. Oceanic Success. Although cleaning is not carried out by going directly to the bottom of the hold to clean the remnants of the cargo, but only using the ship system. The guard officer as the person in charge of the system must properly pay attention to the remaining cargo that is still in the unloading equipment. If the pneumatic discharge system has been turned off and the material is still left in the unloading tool.

### **CONCLUSIONS**

The delay in reducing Cera Tank pressure due to blockage in the Ring Nozzle by cement material within the last 6 months indicates that the Planning Maintenance System issued by the company PT. Indobaruna Bulk Transport is less effective for MV time charter vessels. Oceanic Success so that the solution to the problem proposed is the implementation of Ring Nozzle maintenance outside the planning maintenance system that has been

determined by the company in order to avoid delays in the loading and unloading process.

The malfunctioning of the Bucket Elevator or what is called stuck is due to the cleaning process of the cargo at the previous port being less clean, the remnants of cement material in the Bucket Elevator which is the cause of the Bucket Elevator Motor not being able to operate carrying material to the Cera Tank. So that the solution to the problem proposed is to give directions by the first officer when starting and after operating the pneumatic discharge system to the guard officer in order to avoid similar incidents when the loading and unloading process is carried out.

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