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Research Paper

The Analysis of Barge Misha's Anchor Loss Incident Off the Coast of Pagerungan Island from The Perspective of Quality Health Safety Environment (QHSE)

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Abstract
A Quality Health Safety Environment (QHSE) is a safety management enforced by a company to control safety at work by identifying the hazards and risks that cause working activity. The use of QHSE is needed in the resolving process of an accident that happened on the Barge Misha. This research aims to find the factors of wire breaks of Barge Misha and the efforts of handling the incident according to the QHSE function in PT. Transcoal Pacific. This research used a qualitative method by describing an aspect obtained from observing, interviewing, and documenting through a series of sentences. The researcher involved four resource persons in the interview sessions: the Operation Manager, HSE Staff, Technical Staff, and Master of TB ETI 307-BG. Misha. Then, the researcher used data reduction techniques, presented data, and concluded to analyze the data. The research results show that the factors causing the incident loss of Barge Misha Anchor are human factors, method factors, machine and equipment factors, and environmental factors. PT. Transcoal Pacific has carried out the QHSE function in handling the incident by making efforts to prevent such incidents from recurring. Therefore, efforts can be made when the company supervises the control of the implementation of safety meetings carried out regularly by HSE, technical, operation division, and ship's crew. The company increases the crew's knowledge of the anchoring procedure through the HSE and technical division, especially in emergencies. The company needs to control ship maintenance according to schedule and monitored by the technical division. The company needs to regularly improve machines and equipment that are worn or rusted and replace the machines or equipment that do not conform with the standards of Badan Klasifikasi Indonesia (BKI).

Keywords *Quality Health Safety Environment, Wire, Barge, Safety*

INTRODUCTION

A barge is a type of ship with unique models because several barges do not have a propulsion engine and a flat hull like a large box that can float in the water. On December 8, 2021, one case in Barge (BG) Misha was towing by Tugboat (TB) ETI 307. At the time, Barge Misha, which has a capacity of 10,000 MT, was sailing from KPC Tanjung Bara Sangatta to Celukan Bawang with no cargo. However, due to bad weather, the ship maneuvered to dock on the nearest island, Pagerungan Island. The presence of bad weather and high tide waves caused the crew to be less responsive in paying attention to the condition of the area and the strength of the tidal waves, causing the breaking of the Barge anchor chain.

The area used for anchored anchors is sandy, so the anchor needs more to hold the barge when there is a pounding tide. It repeatedly happened, so there was an incident of breaking the wire and anchor chain from the drum wire box, so the wire fell into the sea with the anchor of Barge Misha. This problem certainly affects the loading and unloading coal process on ships; although it does not cause casualties, the company bears significant losses.

Quality Health Safety Environment (QHSE) is management that regulates safety and health in the work environment in a company to avoid risks when doing a job or can be a safety control where, in its implementation, there are provisions adjusted to the ISM Code and ISO 4500: 2018 (Milania, 2022).

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Accidents resulting from work also determine the success of safety management functions implemented within a company. It has been carried out internationally by implementing the concept of zero accidents in a work environment. To learn more about the research content, the researcher compares two previous studies that are related or have similar topics. The researcher compares two studies conducted by different researchers.

The first study was conducted by Facely (2017), titled "Analysis of QHSE (Quality Health Safety Environment) Functions in Unloading Activities to Reduce Work Accidents at PT. Maritim Batubara Pertama Paiton." This study employed a qualitative descriptive method focused on QHSE functions in unloading activities. The researcher used interview, observation, and documentation techniques in data collection.

The second study was conducted by Puryastuti (2022) with the title "Implementation of Partner Quality Health Safety Environment in the Operational of Floating Crane at PT. Mitrabahtera Segara Sejati Tbk." which focused on the implementation of QHSE in the operational activities of a floating crane. In this study, the researcher used interview, observation, and documentation techniques to collect relevant data for the research.

Both have similarities in discussing the functions and implementation of QHSE in a company. The difference between these two studies lies in each study's different focus and objectives. The first study focused on the QHSE functions during unloading activities, while the second focused on the implementation of QHSE during the operation of a floating crane. Meanwhile, this current study focuses on the QHSE functions in handling the incident of the loss of the anchor chain of the Barge Misha.

Based on this background, the researcher chose "The Analysis of Barge Misha's Anchor Loss Incident Off the Coast of Pagerungan Island from the Perspective of Quality Health Safety Environment (QHSE)". According to the previously outlined background, the main issues that the researcher will discuss in this study are:

1. What factors are causing the Barge Misha's Anchor Loss in the Waters of Pagerungan Island from the perspective of QHSE functions?
2. How does QHSE function in the efforts to handle the incident of the breakage of the anchor of Barge Misha in the Waters of Pagerungan Island?

LITERATURE REVIEW

QHSE

QHSE stands for a safety management system, translated in Indonesian as Occupational Health, Safety, and Environment (K3). It cannot be separated from the environmental aspect in its development, as any form or type of work will interact with the environment (Subkhan, 2021).

The following are guidelines for the implementation of the QHSE function and become a benchmark in the application of QHSE in shipping companies:

1. The International Safety Management Code contains the safety of operating ships and the prevention of marine pollution.
2. ISO 45001:2018 establishes requirements for Occupational Health and Safety Management Systems (SMK3) to prevent workplace accidents.
3. OHSAS 18001:2007 is a management system that assists an organization in controlling health and safety risks at work (Nurliana, 2018).

The following are the objectives and functions of QHSE:

1. Safety management in a company will create a healthy, comfortable, and safe working atmosphere for employees on land and at sea and stakeholders who work with the company.

2. Protect the safety and control of the welfare of life for workers.
3. Implement accident prevention measures on a low to high-risk scale.

Barge

A barge or "*tongkang*" is a vessel that lacks propulsion systems like other ships. This ship has a flat hull, like a large box that can float in the waters (Prayoga, 2018). It is typically used for transporting goods and is pulled by a tugboat. Barges are commonly used to carry nickel, wood, sand, coal, etc.

Figure 1. Barge

Tug

Tug or Tugboat is a type of ship specifically designed to pull or push ships in the port area, guide the passage of ships in dangerous paths, carry out ship repairs at sea, and carry out rescue actions such as extinguishing fires on board (Damanik, 2016). In addition, a tugboat is a ship used to pull or push other types of ships, such as barges.

Figure 2. Tug

Deck Equipment

Deck Equipment on the ship's deck is all equipment that assists in ship movement at the port when it docks, loads, and unloads (Adoc, 2021).

a. Wire

A wire is a tool made of a combination of wire lengthwise and in layers that bind heavy materials in lifting and moving loads. The function of the wire in Barge Misha is as an anchor strap and serves as a means of anchoring.

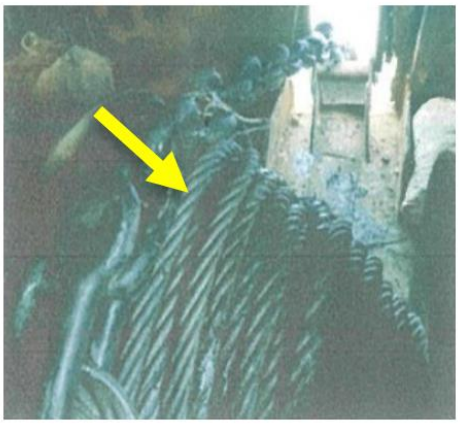

Figure 3. Wire Anchored

b. Anchored

Anchor is ballast equipment made on a ship or boat made of iron and how. It is lowered into the water when the ship is about to stop, so the ships cannot move. Especially in Barge Misha, a tool used in raising and lowering anchors using wire and short chain anchors. Anchor components in Barge Misha are:

1. Drum Wire Anchor
2. Break Anchor
3. Windlass
4. Stopper
5. Wire Seal
6. Tiger Hoof
7. Wire Rope
8. Short Chain Anchor
9. Anchor Barge

Crew

Crew or crew is a workforce selected and recruited to work on board the ship by the owner or operator of the ship by performing duties according to the position stated in the certificate book. (Law No. 17 of 2008 on Shipping). Several positions are not on the tugboat crew list. Crewmember positions on tugboats include:

1. Ship Officer
   a. Deck (Deck) consists of the Master, First, and Second Officer.
   b. Engine (Engine Room) consists of the Head of the Engine Room (KKM), the First Engineer, and the Second Engineer.
2. The crew consists of Able-Bodied Seaman and a cook.

RESEARCH METHOD

The research method employed in this study is qualitative, with the specific research design being a case study. A case study is an approach used to investigate a particular case or social condition to understand its process by describing the event or occurrence in a systematically organized sequence of sentences (Hodgetts & Stolte, 2012).

During the researcher's internship, the research was conducted at a private shipping company in Jakarta from December 6, 2021, to February 25, 2022. The methods utilized to gather data in this study included interviews, observations, and documentation. The data sources were

obtained through interviews with four informants: the Operation Manager, Staff, Staff Technical, and Master Barge Misha. Additionally, direct observations were conducted within relevant divisions, observing behaviors and phenomena among employees, particularly in the Operation, HSE, and technical divisions. Furthermore, documentation such as incident reports, event-related photographs, ship particulars, investigative reports, and supporting data from the company were observed and studied.

The data analysis techniques employed by the researcher included data reduction, presenting the data, and concluding the previous steps of data. To ensure the validity of the research, the researcher used the credibility test through the triangulation technique. The researcher applied two triangulation methods: methodological triangulation and source triangulation.

FINDINGS AND DISCUSSION

Findings

On December 8, 2021, at 02:15 LT, the vessel TB. ETI 307-BG Misha experienced equipment damage, resulting in Barge Misha is anchor chain breaking off in the waters around Pagerungan Island. At that time, high tide waves, strong winds, and poor weather conditions caused the wire on Barge Misha to be unable to withstand the heavy load of the barge's anchor. The wire disconnected from the anchor wire drum seal, resulting in an incident where the wire fell into the sea along with the Misha Barge's anchor. Due to the emergency, the ship's crew anchored the anchor around Pagerungan Island, which turned out to have a sandy seabed, causing the anchor not to grip the seabed properly.

The impact of the anchor chain breaking incident on Barge Misha is a financial loss estimated at Rp. 685,000,000, which was used to replace the anchor set of TB. ETI 307-BG. Misha also involved divers in searching for the whereabouts of the wire and anchor, which ultimately were not found due to the deep-sea conditions. Furthermore, there is a non-financial loss in terms of the loss of time to carry out the loading process at the destination port, resulting in a delay of the loading process by two days.

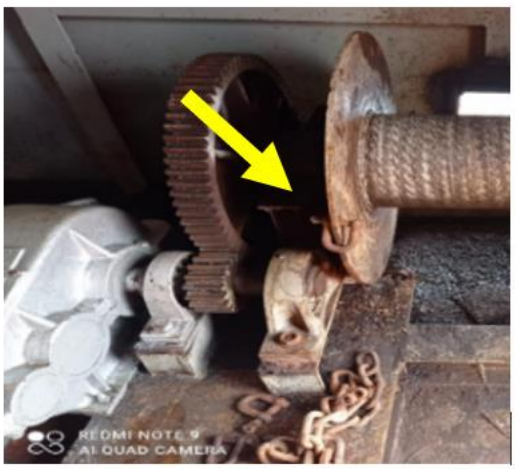

Figure 4. Wire Seal on Drum Detached from Wire

Discussion

Through data processing during research, researchers use interview, observation, and documentation techniques. The researcher will describe and answer the questions from the problem formulation as follows:

Causative factors of breaking the Barge Misha's anchor chain in the waters of Pegerungan Island seen from the function of QHSE

1. Human factor

   Based on the results of interviews with the ship's Master said that there were several factors of human error from the ship's crew, namely:

   a. The crew does not pay attention to the conditions around the ship during the anchoring process because the emergency makes the ship crew panic and try to anchor as much as possible so that the barge and tugboat do not run far.
   b. The duty crew does not periodically report the condition of sea currents and tides, so no reports of sea currents and tides can be found.

2. Method Factor

   The results of interviews related to the explanation of the lack of experience and detailed understanding of the ship crew during the anchoring process are that the crew did not check the condition and equipment of the ship before the ship sailed, so no report was found (Pre-Departure Checklist Report), especially checking the condition of anchor and wire equipment during the investigation process.

3. Machine and Equipment Factor

   From the study's results, it was found that the condition of the drum wire and anchored anchor equipment that rusted caused the anchoring process to be not optimal. Then, the crew did not immediately carry out the reporting process to the company, so there has been no corrective action or replacement of the tool.

Figure 5. Rusty Drum Wire Conditions

4. Environment Factor

   The lack of crew ability to place the ship in the berth is also one of the factors causing the anchor chain breaking incident of Barge Misha. Moreover, the need for increased crew experience in determining where to shelter also affects the crew's safety, along with tugboats and barges.

The function of QHSE in efforts to handle Barge Misha anchor chain breaking incidents Misha in the waters of Pagerungan Island

Here are the efforts to handle the incident of the Barge Misha anchor chain breaking in the waters around Pagerungan Island in order to prevent a recurrence of the same incident:

1. The company supervises regular safety meetings with the crew facilitated by the relevant divisions, namely HSE, Operations, and Technical. These meetings emphasize the importance of prioritizing safety while working on the ship. Implementing these safety

meetings also aims to refresh the crew's understanding of safety procedures on board the ship, introduce safety equipment, educate them about the risk of danger while working on the ship, and guide them on responding during emergencies. It is expected to reduce work-related accidents on the ship caused by human factors.

2. The company enhances the crew's knowledge of the anchor handling processes anchoring, particularly during emergencies, through the HSE, Technical, and Operations divisions. This knowledge improvement provides the crew with insights to carry out their duties and responsibilities effectively for each position, minimizing unwanted incidents.
3. The company periodically controls the ship's maintenance or docking processes according to predetermined schedules. The crew carries out ship maintenance and is overseen by the HSE, Technical, Operations, and Purchasing divisions, with daily, monthly, and yearly routines. Periodic maintenance schedules can be set daily, quarterly, or semi-annually, and annual maintenance can also be performed.
4. The company regularly repairs corroded or worn-out equipment on the ship and replaces tools and machinery that no longer meet the Badan Klasifikasi Indonesia (BKI) standards.

Additionally, the company has effectively implemented various QHSE functions, including:

1. Routine inspections as scheduled by the Operations, Technical, and HSE divisions to examine and check ship components according to established procedures and guidelines, ensuring the ship's seaworthiness.
2. The company informs all crew by attaching "SAFETY FIRST" signs on the ship, reminding the crew to prioritize safety while working.
3. The HSE staff and relevant divisions such as crewing, operations, technical, and DPA provide pre-training before crew members join the ship. This training informs them about their duties and responsibilities when working on the ship and enhances their understanding of safety procedures.
4. The company conducts a safety induction session on the ship by the crewing, operations, technical, and DPA divisions to remind new crew members to promptly familiarize themselves with the ship's equipment.
5. The company holds weekly meetings involving all divisions, both at branch offices and the headquarters. These meetings cover challenges, risk management, routine improvements (docking), etc.

CONCLUSIONS

Based on the research findings previously, the researcher can draw several conclusions regarding the factors leading to the incident of the Barge Misha anchor chain loss in the waters of Pagerungan Island, as observed from the QHSE functions. These factors include Human Factors, Method Factors, Machine and Equipment Factors, and Environmental Factors. The company's efforts in handling incidents aligned with QHSE functions include the following: The company closely supervises the routine implementation of safety meetings involving the HSE, Technical, Operations, and ship's crew divisions. They must ensure that the crew understands safety equipment and what actions should be taken during emergency conditions on the ship. The company increases crew knowledge of the anchor handling process, particularly during emergency conditions, through the HSE and Technical divisions. It will minimize the occurrence of undesired incidents. The company regularly monitors ship maintenance activities according to schedules overseen and monitored directly by the technical division. The company conducts periodic repairs on worn-out or corroded equipment on the ship if they need to replace tools and machinery, which must do the same with the Badan Klasifikasi Indonesia (BKI) standard.

The researcher also provides suggestions for the company and readers. These suggestions include strengthening the implementation of QHSE functions within the company, particularly regarding safety awareness through safety meetings, especially during emergencies. These meetings should involve the HSE, Technical, Operations, and ship's crew divisions. Companies need to ensure that the crew fully understands their responsibilities on board. The company should instruct the ship's crew to promptly report any ship conditions or equipment damage, whether minor or significant. So, the technical division quickly responds and repairs to avoid equipment failure. Crew members need to optimize QHSE functions on the ship by enhancing supervision related to the pre-departure checklist report. This report is a lightweight inspection that the ship's crew should conduct before departure from the port or when the ship is ending route to its destination.

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