






Analysis Of The Effect Of Wind And Current On The Motion Of Mt. Gas Natuna When Berthing at Jetty IBL III Pelindo Gresik

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Abstract. It is important for every voyager to pay attention to the wind and currents when docking at the harbor. One way to overcome this is to read books on tidal stream tables, wind direction indicators, and wind speed indicators. The aim of this research is to find out how to prevent dangers that can occur when docking at a port. This research was carried out on the MT ship. Natuna Gas, owned by PT. BULL, which is an Indonesian company. as long as the author carries out sea practices from 25 November 2022 to 15 December 2023. The method used is descriptive qualitative. Data collection in this research was obtained directly from the research site using a survey method, namely by observing and recording directly at the location the influence of wind and currents on ship movements. The results of this research show that the direction and speed of the wind and current influence the movement of the ship when it is about to dock, and a good berthing process is when the ship goes against the water current in the area so that it is not easily swept away and the ship is easy to control.

Keywords: Wind, Current, and Movement

1 Introduction

The motion of the ship is greatly influenced by external factors. These factors include two important aspects of the state of the sea and the waters. Given the importance and strategic importance of sea transportation services, it is necessary to take measures for prevention and learning related to ship incidents, this is so that the factors and causes of these incidents are not repeated in the future. For this reason, a ship when carrying out the docking process is required to pay attention to the state of the sea, both wind and current. Wind and currents greatly affect the motion of the vessel, especially in narrow areas and when the vessel is empty. However, in certain situations the wind can be utilized to speed up the boat's motion. The breasting doIphin at Pier IV of Merak Port, Banten was hit by the ferry KMP Rishel. On the forward and breasting doIphin suffered damage. According to information from the captain, the incident was caused by currents and winds in opposite directions, from the current moving from south to north at a speed of 20, while the wind blew from north to south at a speed of 20 to 24 knots. This condition caused the ship to have difficulty berthing and eventually hit the breasting doIphin at Pier IV. After fighting with the current and wind, the ferry finally docked at Pier V, Merak Port. The officers in charge of the port and the harbormaster checked all parts of the ship. with the results of the inspection of the damage on the face of the ship due to hitting the doph. And there is also damage to the ship section precisely in the steering control room.

Knowledge of motion is very important in order to maintain the safety of the voyage. Because of this, every crew must be given the basis to protect their ship from external influences such as currents and winds so that shipping safety can be achieved, from the case study of motion, the author is interested in taking a thesis entitled "Analysis of the Effect of Wind and Current on the Motion of MT. Gas Natuna When Berhting at JETTY IBL III PELINDO Gresik".

2 Literature Review

Rozari W (1982: 2) suggests that in the field of ship motion there is a definition of a kapal's ability to change position from one place to another as desired. This ability is based on 3 factors: The force that occurs on the ship, External and internal factors that can cause changes in the force on the ship, Characteristics and position of the force acting on the ship.

Widarbowo, D. (2011: 83) defines or defines wind as air that moves because it is caused by different air pressures with the direction of flow from a place of high pressure to a place of low pressure or from a region with low temperature or temperature to a region with high temperature. Wind is horizontally moving air that has direction and speed. The wind direction is named based on the position of the wind, such as the wind coming from the west is called the West Wind, and the wind coming from the Southeast is called the Southeast Wind and so on. In general, wind speed is referred to in units of KNOTS (nautical miles per hour) or in units of meters per second. Wind direction is measured with a device called an anemometer.

According to Gross (1972), currents are mass movements of sea water that cause horizontal and vertical displacements that occur continuously. Meanwhile, Hutabarat and Evans (1984) define currents as water movements that occur in all oceans in the world. Factors that cause the occurrence of currents are internal and external factors. Internal factors include the density of seawater and external factors, namely the force of attraction of the sun and the moon. The factors that affect the ship's motion are first there are external factors which include sea state, wind influence, and current influence while internal factors are fixed internal influences (ship shape), non-fixed internal influences (ship laden) and shipping lanes.

Ship that is docked at the dock is moored with mooring lines so that the ship cannot move again when carrying out the loading and unloading process. The dock here is where the boat is docked. To prevent the ship from moving back and forth while at the dock, various ropes are used that are attached from the ship to the dock such as the head/bow line and stern line.

The head line is attached to the bow of the ship and points forward, while the stern line is attached to the stern of the ship and points backward. Breast line is a transverse tiller that keeps the boat from moving away from the dock. The spring line, which is mounted on the haluan pointing forward, is called the rear spring. These spring lines serve to prevent the ship from moving back and forth, with higher efficiency than head and stern lines. Breast and spring lines are installed in various places on the ship, depending on the size of the ship, such as in the bow, center of the ship (waist), and are named according to their position.

3 Methodology

The research method used to analyze the data contained in this thesis writing is a descriptive quantitative method. Where this method is an analysis technique with the aim of describing an event or event that occurred on the MT. GAS NATUNA regarding the analysis of the effect of wind and current on the motion of the boat when berthing at JETTY IBL III PELINDO, GRESIK from observations made by the author from looking at existing data while carrying out 12 months of practice.

1. Data Collection Technique

Data Collection Technique Accuracy of the methods used to obtain data. There are three types of data collection technique, namely as follow :

a. Observation Method (direct observation)

The observation method involves direct observation of the object under study, with this technique, data is collected by getting closer to the existing period, allowing research to carry out activities in the field directly. Observation also a direct data collection tool and is very crucial in descriptive research.

b. Literature Review

This research was conducted by studying and completing reference books that are relevant to the issues discussed. The aim is to get a theoretical foundation that will be used in discussing the object of research.

c. Documentation Study

Documentation studies involve documenting ongoing activities as evidence that these activities are actually carried out. This technique is very important in data collection to strengthen the researcher's foundation in research.

2. Research instruments

a. Observation Guide

Instruments used in observation can be in the form of observation guidelines. Observation instruments in quantitative research serve as a complement to the interview techniques that have been carried out. This observation is used to see and observe the research object directly, so that the researcher can record and collect the data needed to achieve optimal results.

b. Interview guide

In its implementation, interviews are conducted in a structured or unstructured manner and in this research the researcher uses unstructured interviews. It is not standardized, informational, or only focuses on general questions within the broad area of the research so that the researcher is able to form complete and comprehensive information.

4 Result and Discussion

The research results obtained by the researcher when carrying out sea practice for 12 months and 23 days at MT. Gas Natuna, namely, on December 11, 2023 at that time MT. Gas Natuna entered the Surabaya shipping channel about to dock at JETTY IBL III PELINDO Gresik, Indonesia.

At the time of entering the Surabaya shipping channel, the current on December 11, 2023 was 12 knots at 10:00 LT and the wind speed at that time was 10 knots and the wind direction was from the East or 60° left of the port bow where the true port bow at that time was 099° heading to JETTY IBL III PELINDO Gresik, Indonesia.

The authors analyzed the effect of wind and current on the motion of the ship when it was about to berth at the port of Gresik, Indonesia. MT. Gas Natuna will perform a starboard berth against the current in Surabaya waters, MT. Gas Natuna which is fully loaded with a draft of 5 M with a ship length of 96.80 M can berth at JETTY IBL III PELINDO whose jetty length is 130 M which is exercising motion to the Jetty approximately 5.0 NM by using 2 tugboats that have been tied up, 1 at the bow and 1 at the stern with the speed of the ship which has decreased (3-5.0knts) dead slow ahead. When MT. Gas Natuna had started to enter the Jetty, the steward instructed the chief engineer to stop the engine, the tugboats that were delaying on the bow and stern of the vessel only followed the instructions of the pilot, which for this starboard berthing process against strong currents and winds is done slowly to enter the stern of the ship first into the jetty, when the stern has entered the jetty the pilot instructs the tugboat on the stern to push the ship in slowly as well as the tugboat on the stern.

When the bow-bound tugboat pushed into the jetty, there was an incident in which the tugboat pushed so hard that the bow MT. Gas Natuna hit the vender at the JETTY IBL III PELINDO Gresik, Indonesia. Instantly the atmosphere on the platform was tense due to the incident caused by negligence in reading the current speed and wind direction.

The scout and captain who were on the platform immediately went out to the right wing bridge to see the situation and condition of the forward that hit the pier, not long outside the right wing bridge the steward immediately ordered the tugboat on the bow to pull back the ship bow, but it took a long time for the tug boat to pull the bow because the wind and current were so strong and fortunately the affected vender was not removed from the pier. When the bow has been pulled out the bosun immediately throws the discharge rope and sends 1 tros and 1 spring as well as those at the stern. When the rope was installed at the dock the rope on the tugboat was released. After the tugboat's rope is released the bow and stern send 1 spring and 1 tros. Because for the next process, it will use rope to be able to dock to the jetty.

When adjusting the loading arm of the jetty with the ship's manifold the steward and captain are not too difficult because we only need to follow the currents and winds as well as the hibob or rope area that has been in the dock by resistance,

until the loading arm and ship manifold are aligned and the ship has met at JETTY IBL III PELINDO Gresik, Indonesia.

5 Conclusion

From the results of the analysis conducted by the author on the MT. Gas Natuna, the author concludes that the direction and speed of the wind and current have an influence on the movement of the ship when it will lean on the Jetty. From the results of the analysis and study in chapter IV, the authors provide several suggestions in the form of: This research can be used as a benchmark for ship officers and crew when the ship will dock at the port. It is hoped that officers can pay more attention to several situations, especially wind direction, current and ship conditions as important preparations before docking at the port.

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