Effect Of Magnetic Guidance Error with The Movement Of The MV Chandra Kirana

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Abstract. Effect of Magnetic Guidance Error On Location Of The Magnetic Guidance On The Ship And Its Relationship With The Movement Of The MV Chandra Kirana on Ship Movement (supervised by Eva Susanti P., S.Si.T., M.T., and Agriani Pongkessu, S.Si., M.Pd.). Variations and variances in magnetic guidelines cause errors in vessel motion. The duty officer must be able to identify inaccuracies in magnetic guidelines to reduce the chance of collisions. Similar to what happened to MV Chandra Kirana, whose duty officers were still incompetent in identifying magnetic guidance problems that threatened the security of vessels when at sea. The purpose of this study was to ascertain how magnetic guideline errors affect MV motion. Kirana Chandra. This research was conducted on top of MV. Chandra Kirana. The author uses a qualitative descriptive research design that involves data collection through interviews, documentation, and a literature review. In this case, the researcher made direct observations. This approach explains how to calculate the origin of the effects of magnetic guideline defects on ships and how they relate to ship motion. Deck officers, crew, written observations, existing documents, and library resources are data sources. The extent to which guideline weaknesses can be effectively detected on board, as well as vessel movements, will determine how much the value of deviations varies. The first step in understanding the rule's turnaround is learning how to get deviations and ship variations to prevent mistakes that might pose a navigational hazard.

Keywords: First Keyword, Second Keyword, Third Keyword.

1 Introduction

According to the Indonesian Dictionary (Suyono, 2010; 115), a ship is a vehicle used for transporting passengers and cargo at sea (as well as on rivers, etc.). Compared to the costs of utilizing other transportation facilities, using a ship is a relatively inexpensive choice, making it a wise option for transportation. Certain regulations and guidelines must be followed to ensure that equipment can be placed on the ship. These guidelines and standards relate to how the equipment will function and operate while in use.

Because guiding equipment is very sensitive to external forces, it must be placed correctly to be in the right location. Errors in identification and poor operation of the

R. Mahmud et al. (eds.), *Proceedings of the 3rd International Conference and Maritime Development (ICMaD 2024)*, Advances in Engineering Research 255,
https://doi.org/10.2991/978-94-6463-628-4_35

equipment are caused by improper placement (guideline errors). Navigational aids known as guidelines are used to establish direction when at sea. This indicates the direction the ship must travel and the course that external objects must take so that we can periodically determine the ship's position. Examples of such objects include buoys, headlands, islands, and so forth.

"IMO (International Maritime Organization) through the SOLAS Convention (Safety of Life at Sea) requires all commercial ships to be equipped with magnetic compasses, detailing construction requirements and the number needed on board. The only type of recommendation that can continue to function even if the ship loses power is the magnetic compass. Each ship must have compass errors. For example, magnetic compass errors cause the ship to move forward and rotate with the Earth, resulting in movement that is not aligned with the Earth's rotation plane but instead forms an angle. This means that the upper axis will move outside the supervision plane. It turns out that the accuracy depends on latitude, heading, and the ship's speed. A semi-automatic 180-degree correction should be installed from the display ring line to fix this issue. Another example is when a ship carrying iron goods and containers experiences compass errors as a result of the cargo it carries."

2 Research Method

The presentation of this thesis report uses a qualitative research method, which focuses more on in-depth observation. This method is used to generate studies on an event or phenomenon. This refers to the angles previously created by True North and Magnetic North, or the results of deviations plus variations. Therefore, this research method is essential for analyzing a problem. Here's the translation of your text into English: This approach explains how the placement of the magnetic compass on the ship and its relationship with the ship's movement is affected by compass errors and how these errors are calculated. Deck officers and crew provide data, which is then recorded in writing as study data.

3 Research Finding

The magnetic direction designation from such structures, produced by the Earth's magnetic action, originates from the installation of magnetic compasses on ships made of iron or steel. When using magnetic recommendations, the effects become apparent when reading the compass and accounting for deviation error factors.

The angle between the magnetic degree and the magnetic north axis on a compass creates a deviation, which is measured in degrees. This deviation can either be east (+) or west (-), depending on the position of the compass rose relative to magnetic north. The ship's structure significantly influences this deviation. When a ship acts as a moving magnetic bar within the magnetic field, the alignment of the magnetic field lines can alter how the ship's metal structure interacts with and distorts the compass reading. The interaction of the ship’s metallic components with the Earth’s magnetic field is a key factor in generating compass deviation.

The ship's heading while sailing is the reason for the variation in deviation that occurs on board. Periodically, deviation can occur with steel items moving from one location on the ship to another. There is no fixed amount of deviation; instead, it can vary depending on a number of circumstances, such as:

1. The amount of time spent in one location and the ship's position on the Earth's surface both change. This means that if a ship operating in one location is moved to another location, the deviation may change because the magnetic meridian at the new location will clearly vary based on the ship's position.
2. Course adjustment occurs when a ship, sailing towards a certain destination, shifts the location of its course due to external factors, changing the deviation from the old course position to the new course position
3. Thunder and lightning are natural phenomena that occur due to variations in temperature, pressure, and the influence of water vapor in the Earth's atmosphere. These factors can cause electrons, or electric charges, to jump between particles in the water vapor, creating electricity that can impact the Earth's magnetic field. As a result, the magnetic north reference of the compass can experience disturbances, known as direction deviation. This deviation signifies the occurrence of a new magnetic shift, influenced by the ongoing interaction between the Earth's magnetic field and atmospheric electrical events. Since the Earth's magnetic field is constantly affecting the ship, it is impossible to fully eliminate the deviation.

The authors found a number of errors in magnetic recommendations, including:

1. Incorrect Collimation, namely when the magnetic needles are oriented at an angle facing the north-south direction of the Manual rose scale, or when they are not aligned with that direction.
2. Sail Line Error, namely an error that occurs when the sail line is not parallel to the ship's keel line. The position of the ship on the surface of the earth determines a number of adjustments in addition to the previously determined items. where the real north-south determinant is then used after this modification.

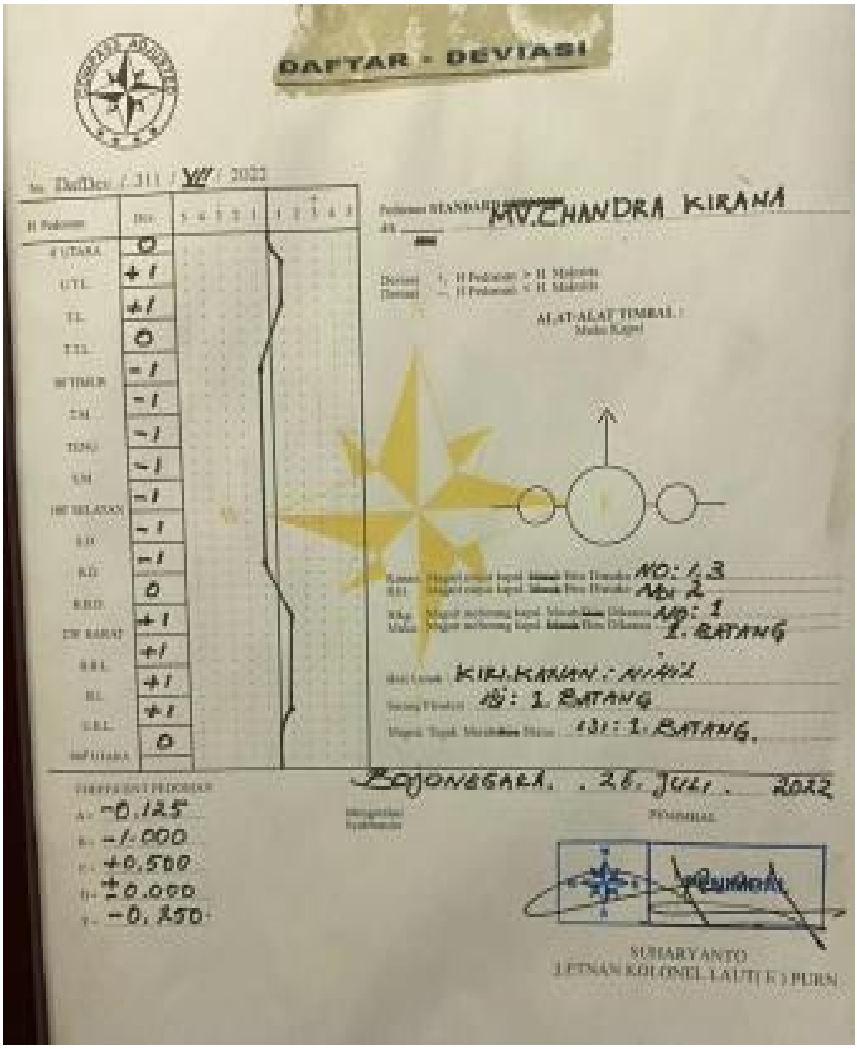

Fig. 1. Deviation Table MV Chandra Kirana

Variation Is the angle produced by true north and magnetic north measured at a particular location. See the accompanying graphic for more details:

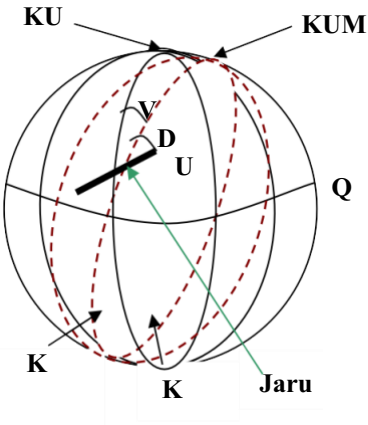

Fig. 2.

Location or position on the earth. When the UM is to the right of the AS, this variant is called (+) or east, and when the UM is to the left of the AS, it is called (-) or west.

Description :
MN = Magnetic North
V = Variation

Fig. 3.

Variation maps show the magnetic variation at different locations on Earth's surface. These maps typically use a compass rose, which displays variation values that reflect the annual change in magnetic declination for a specific year, often measured in minutes. The ship's structure, particularly if made of iron or steel, can influence its magnetic field, affecting the accuracy of the compass. This is similar to magnetic variations, but the deviation caused by the ship's materials, also known as geomagnetic deviation, is quantified in the same way, with values expressed as either positive (+) or negative (-). It's essential to account for these deviations (miss-pointing errors) to ensure accurate navigation.

The magnetism of the ship's structure will have an impact on identifying the direction of a guide if it is made of iron or steel.

Similar to variations, deviations created geomagnetically during shipbuilding also have the same unit value (+/-). The following is a miss-pointing (Error) that needs to be considered as part of the deviation.

1. Gausing Error

Due to machine vibrations and waves, some types of iron or steel that are too soft or hard and always point to a fixed geomagnetic point over a long period of time can

also acquire a magnetic charge. Changing course will not help the ship avoid this effect.

2. Heeling Error
   Namely, the variation in deviation between the inclined and perpendicular positions of the ship. Magnetic recommendations are influenced at this time when a fresh, flat magnetic field is formed. It would be very challenging to stay on course if the error worsened and the ship began to shake, as in a storm.

Increase Knowledge and Understanding Of How To Fix Magnetic Guides. When a ship docks or undergoes repairs, the magnetic guidance deviation value changes and becomes greater. This makes it necessary to reduce the deviation value to the lowest possible level. Replacing the guide, or moving the parameter bar in the guide housing, is a way of reducing or increasing the deviation value of the magnetic guide.

1. Nathaniel Bowditch defines leading as the process of periodically comparing corrector locations with benchmark criteria to ensure that benchmark standards are not misinterpreted.
2. Leading, in the words of H. R. Soebekti, is an action taken to minimize deviant values
3. Hadi Supriyono defines leading as spinning 3600 several times and shifting the position corrector away from the benchmark guideline in a certain direction to minimize the deviation value.

4 Conclusion

The conclusions drawn from the previous findings regarding the impact of magnetic guidance inaccuracies on ship movements highlight several key factors. First, the degree of deviation or inaccuracy in magnetic guidance is influenced by modifications or movements of the ship, with changes in the vessel's structure or positioning affecting the accuracy of the compass and gyro instruments. Additionally, negligence or failure by ship officers to regularly check for variations in magnetic deviation or gyro errors can result in significant navigational issues, leading to dangerous situations such as running aground or colliding with a buoy during maneuvers. It is therefore crucial for officers on board to remain vigilant and adhere to proper procedures for monitoring and correcting deviations to ensure the ship remains under control. Based on these findings, the author recommends that ship officers increase their diligence in regularly checking and correcting navigational instruments, conducting routine checks for deviation variations, and enhancing training and awareness to mitigate the impact of magnetic errors on ship movement.

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