

The Study of Changing Anchor From Launching Model to Hanging Model on Barge Ship Owned by P.T. X

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Abstract—Anchor is a device for tethering a ship to the bottom of the water, in the sea, river, or lake, so that it does not move from place to place due to gusts of wind, current, or waves. Anchors are heavy equipment that is dropped to the seabed from a ship or boat to maintain its position so that it does not drift. PT X has several tug boats, small vessels whose function is to pull or push large ships in port. In addition, this ship also functions to pull barges filled with coal from the coal processing plant to be brought to the port, where the coal is unloaded to be carried by transport trucks. On these barges, damage to the anchor machine often occurs, especially the teeth on the gear-box, axle pulleys (pulleys), the main shaft of the main-gear (main gear), the gear-box casing, the teeth on the main-gear and others which have been sufficient so far. Interfere with operations, and the ship becomes idle. For this reason, this research was conducted to study the change in the anchor system from the glide model to a new system in the hanging model, in order to reduce the use of anchor winch power and avoid damage to the gear-box and anchor engine.

Keywords—anchor, barge, glide system, hanging system.

I. INTRODUCTION

Anchor is a device for tethering a ship to the bottom of the water, in the sea, river, or lake, so that it does not move from place to place due to gusts of wind, current, or waves. Anchors are heavy equipment that is dropped to the seabed from a ship or boat to maintain its position so that it does not drift. Perhaps the ancients used a large stone tied to a rope, but nowadays, it has changed anchors connected by chains made of iron to ships and with ropes on small ships, boats. The anchor is designed so that it can be caught on the bottom of the water. Anchors are usually made of cast iron [2].

This anchor is a device that is a symbol of almost all activities related to maritime or seafarer. To raise or lower the anchor, use a crane. When lowered, the anchor will hook or catch the mud at the bottom of a river or sea. The anchor resistance is caused by the weight of the body and the attachment of the hook. Generally, large ships carry two anchors and one small ship. The choice of type depends on various factors, especially the type of ship, size and weight of the ship, and also depends on the type of seabed, wind conditions, and weather conditions at the time of sailing [3].

Anchor is part of the mooring system, including chain (anchor chain), rope, chain locker (chain box), and windlass (anchor pulling machine). Anchors and their

fittings are a complex arrangement of parts and mechanisms.

Its parts and mechanisms include [1]:

- Anchor;
- Anchor chains;
- Anchor chain pipe (hawse-pipe);
- Anchor chain storage tank (chain locker);
- Machines for lifting/lowering anchor chains (windlass).

The use of the anchor and its equipment is to limit the movement of the ship when anchored outside the port, so that the ship remains in its position even though it is under pressure by ocean currents, wind, waves, and so on. Besides that, it is also useful to help mooring ships when needed.

Judging from its use, the anchor and its equipment must meet the following requirements [3]:

1. Must meet the requirements regarding its weight, number, and strength;
2. The length, weight, and strength of the anchor chain must be sufficient;
3. The anchor chain must be securely fastened and placed in such a way that it can be released from the outside of the chain body;
4. Anchor equipment, including its shape, placement, and strength, must be such that the anchor is quickly and easily serviced;
5. There must be a guarantee, so that when removing the chain, it can withstand the tensions and jerks that arise.

PT X has several tug boats, small vessels whose function is to pull or push large ships in port. In addition, this ship also functions to pull barges filled with coal from the coal processing plant to be brought to the port, where the coal is unloaded to be carried by transport trucks. On these barges, damage to the anchor machine often occurs, especially the teeth on the gear-box, axle pulleys (pulleys), the main shaft of the main-gear (main

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gear), the gear-box casing, the teeth on the main-gear and others which have been sufficient so far. Disrupt operations and the ship becomes idle.

The damage is caused by an angle formed when the anchor starts to rise closer to the main-deck and to its resting position on the anchor slide, so that it can cause the power of the anchor engine to kick in so that the anchor can rise in its lying position.

The angle formation causes more burden to be borne on the anchor winch system and its gear-box. With these defects, the use of anchors is inefficient, so they must be replaced frequently and can cause damage to other systems such as the anchor machine, winch, and gear box. For this reason, it is necessary to change the type of anchor from a sliding system to a hanging system so that there is no wastage.

II. METHODS

This paper uses a descriptive analysis method with data collection techniques in library research and field research. Research in the field by conducting a direct survey of the ship to see the ship's anchor in order to see first-hand the process of changing the anchor.

The research stages are carried out by searching for data through anchor literature studies and direct observation of the ship that will be the research object.

The ships that will be used as research objects belonging to PT X are in Pelabuhan Ratu, and the location of the PT X company office is in Tangerang.

III. RESULTS AND DISCUSSION

Initial conditions:

- There is often damage to the anchor engine, especially the teeth on the gear-box, pulley axle, main shaft of the main-gear, casing of the gear-box, teeth on the main-gear and others, which have been quite disruptive to operations, and the ship has become idle.
- The damage is caused by an angle formed when the anchor starts to rise closer to the main-deck and to its resting position on the anchor slide, so that it can cause the power of the anchor engine to kick in so that the anchor can rise in its lying position.
- The angle formation causes more load to be borne on the system anchor winch and its gear-box.

In Figure. 1. When the anchor starts to rise to its resting position, there is always an overload due to the angular formation of the average Main-deck with its rest-position. In Figure. 2. the rest-position of the anchor must be changed, not lying down again, but in a hanging position like on a dredger, Working-barge or Jack-up



Figure 1. Initial condition of anchor

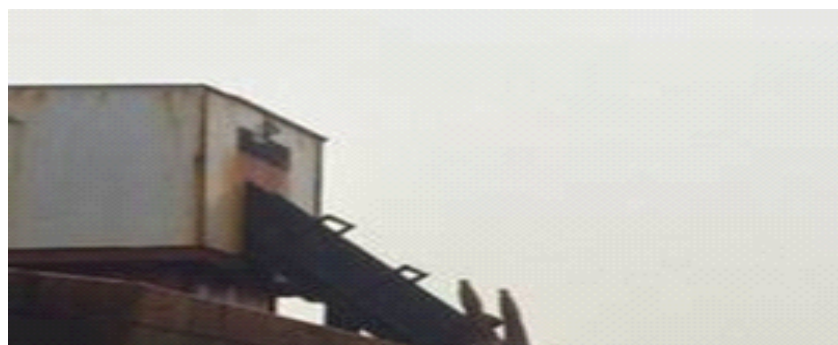


Figure 2. Anchor begins to rise to a lying position



Figure 3. Changes in anchor position from lying down to hanging

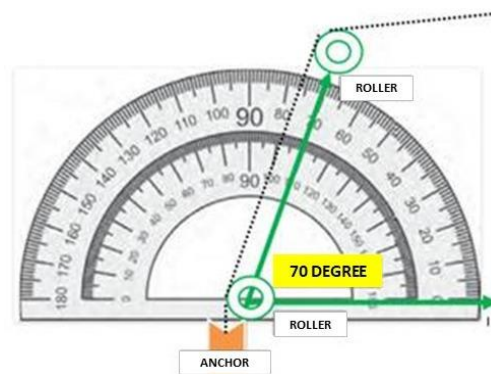


Figure 4. Angle of anchor position



Figure 5. The position of the anchor stands upright

Barge. In Figure 3. Angle formation when the anchor begins to rise to the rest-position position, causing shock and overload. In Figure 4. Angle of anchor position and in Figure 5. The position of the anchor stands upright.

Condition after modification in Figure 5.:

- The shape of the anchor glide is changed to a hanging system as in the Working-barge or jack-up Barge anchor system.
- After trying to go up and down, the engine load is not heavy, as evidenced by moderate RPM, the anchor has been able to go up, while previously it had to be at high

RPM, and there was a jolt when the anchor started to rise to its resting position.

The anchor rest-position condition is changed to a hanging system. So that the anchor goes up to the rest position, it just goes straight up, there is no angle formation, so there is no extra load.

IV. CONCLUSION

1. The shape of the anchor glide is changed to a hanging system, as in the Working-barge or jack-up Barge anchor system, which is a work barge system that has legs at each angle, and the legs can move up and down using hydraulics. After trying to go up and down, the engine load is not heavy, as evidenced by moderate RPM, the anchor has been able to go up, while previously, it had to be at high RPM, and there was a jolt when the anchor started to rise to its lying position.
2. The anchor angle is made 70° to make the friction lighter. No detailed calculations were made, but with an angle of 70° , the anchor position was better, and there was no friction. In addition, there is no

pounding when the anchor bends for a lying position at the location of the rest.

3. It can minimize damage caused by the inefficient use of anchors, which were previously sliding models, so that they must be replaced frequently and can reduce damage to other systems such as anchor machines, winches and gear boxes.

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