Fishing Vessel Safety: Mapping of Location for Safety Dock in Dingalan Aurora

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Abstract: - During typhoon Ulysses and typhoon Karding that hit the town of Dingalan Aurora, they caused great damage not only to the beautiful view of the ocean but also affect the people around it. The destruction of fishing vessels has become a problem for most of the people wherein it used for their main source of basic needs and income as for the residents who live near in the coastal areas. In this problem faced by the residents there, the researchers conducted a study related to the response of their problems caused by the recent typhoon. In terms of addressing the issue and implementing solution, this study aims to map a location that will serve as safety dock for the fishing vessels in Dingalan Aurora.The safety dock is one of the researchers' selections as a location whereabout offers a harbor for every fishing vessels as well as protection from storm surge that may create by numbers of typhoons. The researchers conducted an in-person interview for every 200 meters from one place to another that covered the selected barangays in Dingalan Aurora. The in-person interview consisting of specific questions regarding to resident's experiences about the recent typhoon; the Typhoon Ulysses and Typhoon Karding. This was limited only to the people living near the coastal area of Dingalan Aurora. The researchers used a mixed method research strategy, combining quantitative and qualitative data to specifically gather relevant information from interview and coherent interpretation of results. The study revealed that storm surge traveled far enough to the coastal communities. The study determines the parameters to provide the optimum location for the safety dock. And lastly, the study determined the best location to serve as safety dock which was in Brgy. Aplaya Dingalan, Aurora.

Key Words: — ***Fishing vessels, safety dock, location, storm surge, coastal communities, mapping.***

I. INTRODUCTION

Dingalan is a town in Aurora known as the Batanes of the East. It has landscapes that mimic the rolling hills and blue waters of the islands of Batanes. Located in the Eastern part of the country, it showcases a view of the majestic Pacific Ocean. Dingalan is also known as a frequent path of the typhoon. On November 11, 2020, typhoon Ulysses destroyed all fishing boats, almost 100 percent of the fishing boats in the coastal town of Dingalan in Aurora province were destroyed during the onslaught of the typhoon (Tecson, 2020).

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Dingalan Mayor Sherwin Taay called on his constituents to help out the fisher folk in Dingalan, especially those whose boats were destroyed, leaving them with virtually nothing to earn a living. And on September 21, 2022, typhoon Karding also damaged 473 fishing boats with an estimated cost of P33.96 million. According to BFAR Regional Director Wilfredo Cruz, some P340,000 worth of materials for the repair of fishing boats damaged by Karding was provided to fishers in Barangay Paltic, just about the same time other government agencies like the DPWH, DSWD, OCD, and DILG started rehabilitation efforts in areas affected by Karding (De Leon, 2022).

As were Dingalan also marked as frequent path of typhoons, the researchers thought of having a fishing dock as a safety measure for fishing vessels that protects the boat from storm surge cause by typhoons that also prevent destruction and damages of the fishing vessels because most of the residents in Dingalan work as fishermen.

The word dock refers to one or a group of human-made structures that are involved in the handling of boats or ships.

Docks serve several functions, the most essential of which is to dock or berth large sea or ocean-going boats and cargo ships. They provide a secure parking spot for vessels because they are built in an enclosed water environment. Docks are also used for maintenance, repair and even construction of ships (Bhattacharjee, 2022).

The majority of the world's fishing fleet is comprised of small vessels that operate from beaches and small harbors that are normally beyond the jurisdiction of the competent authorities. The disparities in responsibilities for the safety of these small vessels have resulted in gaps in the implementation of adequate safety measures that apply to the vast majority of small-scale fishing vessels (Lestang, 2007). In 1991 research conducted by the National Research Council, they identified the problem of fishing vessel safety in relation to commercial fishing accidents and some other factors like strong wind and waves. This article also stressed the need of enhancing fishing vessel safety by defining and implementing international standards for fishing vessel design and construction (NRC, 1991). As public awareness about safety grows, more and more emphasis is being paid to fishing vessel safety. It is concluded that the fishing sector lacks a safety culture and that more failure data must be gathered on an industry-wide basis in order to reduce risks (Loughran et.al, 2011).

The safety of fishing vessels has been a concern of the (International Marine Organization) IMO since its inception, but differences in design and operation between fishing vessels and other types of ships have proven to be an impediment to their inclusion in the SOLAS and Load Lines Conventions. As there are no international safety standards in place for small fishing vessels, many countries national regulations, guidelines or standards are either non-existent or inappropriate (IMO, 2019).

Seawall constructed at a particular location along the shoreline alters the hydrodynamic conditions on interaction with the predominant waves. Such interactions influence the beach sediment transport that leads to change in morphology (Griggs and Tait, 1988). Beach response is majorly divided into two: (1) frontal effects and (2) end effects. Wave reflection and intensification of lateral longshore currents causes removal of beach causing frontal effects (CERC, US Army, 1984). Furthermore, by preventing erosion, seawalls cut off the local sediment supply while waves that hit the wall are reflected downward, scouring the toe of the wall (Pilkey and Cooper, 2012) which is referred to as end effects.

In the study of Zhang et al. (2019), Some of the damage to fishery ports from typhoons may be preventable. It described a systematic and quantitative method for assessing the resilience of fishery ports to typhoons, and a case study was carried out on the Dongsha fishery port in Zhejiang Province, China. The Dongsha fishery port was found to have a resistance level of 12, and several points of weakness were identified where improvements in elevation could lessen impacts from future typhoons.

Zhao, H., Niu, C., Bai, X., & Wang, H. (2016) says that A fishing vessel at sea must return to a harbor to escape a typhoon. In an emergency response, the administrative authority requires unified control of all fishing vessels because there is relatively limited sheltered water in harbors. Thus, an optimization model is useful for ensuring effective and safe harbor management.

According to the Philippine Statistics Authority, Dingalan has a land area of 304.55 square kilometers constituting 9.68% of the 3,147.32-square-kilometre total area of Aurora. Dingalan's total land area comprises of 24,706 hectares of forestland and 15,972.15 hectares of alienable and disposable land which includes 2,981 hectares of farmland and 315.44 hectares of built-up areas. The 25% or 7,714.51 hectares of the municipality is considered as agricultural land.

According to Zulkifli M. (2021), the seawall that has been developed in Pambusuang village is curved seawall with concrete structure. It's found that, the fishermen in Pambusuang Village have a difficulty to dock their ship. Most of the respondent from every type of job support this statement. Furthermore, this problem has led to some cost to the fishermen such as travel cost and docking fee cost.

II. Conceptual Framework

2.1 Objectives of the Study

The study has the following specific objectives:

- To provide a data about the storm surge during the Typhoon Ulysses and Typhoon Karding.
- To determine the parameters that provide the optimum placement of safety dock.
- To provide a location that will serve as the safety dock for fishing vessels during the typhoon.

Fishing Vessel Safety: Design of Safety Dock for Fishing Vessels

INPUT

- How far from the coastline does storm surge affect coastal communities during the Typhoon Ulysses and Karding?
- What parameters must be considered in selecting a location for safety dock?
- What location may be provided to serve as safety dock based on the parameters?

PROCESS

- Collection of data through interview
- Analysis and interpretation of data
- Plotting of collected data in the google map.

OUTPUT

- Line map of storm surge during Typhoon Ulysses and Typhoon Karding in selected barangays of Dingalan Aurora
- Parameters in selecting the location were determined
- Location that will serve as safety dock are provided.

III. Methods And Procedure

3.1 Research Design

This study used a mixed method research strategy, combining quantitative and qualitative data. Researchers measured and observed this investigation while also doing field surveys. Additionally, it employed a descriptive design to illustrate the problem of fishing vessel safety, in which the data collected is reviewed and analyzed.

3.2 Research Instrument

The instrument used included in-person interviews with residents near the coast, and line mapping on Google Earth Pro software that included information on the storm surge from the two most recent typhoons (Typhoon Ulysses and Typhoon Karding).

IV. Results And Discussion

4.1 How far from the coastline does storm surge affect coastal communities during the Typhoon Ulysses and Karding?

The figures show the result of the interview to the coastal communities wherein the yellow line represent the storm surge during the Typhoon Ulysses and the blue line represent the storm surge during the Typhoon Karding

Fig.1. Line map of storm surge in Brgy Umiray

Fig.2. Line map of storm surge in Brgy Ibona

Fig.3. Line map of storm surge in Brgy Matawe

Fig.4. Line map of storm surge in Brgy Butas na Bato

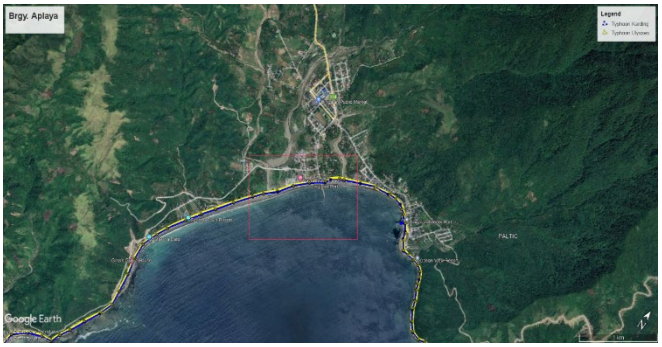

Fig.5. Line map of storm surge in Brgy Aplaya

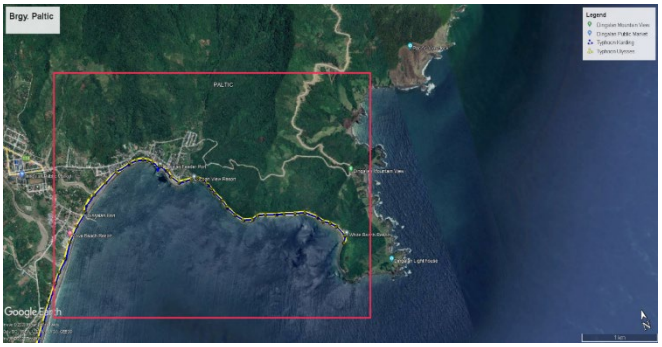

Fig.6. Line map of storm surge in Brgy Paltic

4.2 What parameters must be considered in selecting a location for safety dock?

4.2.1. Land Use

Since 25% hectares of the municipality is considered as agricultural land some of the open spaces in Dingalan, Aurora where reserved for farming, residential building and resorts therefor considering the land use in providing a location that the fishing vessels will freely use as their proper docking.

4.2.2. Can accommodate at least 1000 fishing boats with a standard dimension of 4 by 5 meters

During the Typhoon Ulysses a total of 941 boats were damaged while during the Typhoon Karding it was down to 473 boats therefor the selected location must be spacious enough to accommodate at least 1000 boats to prevent further damaged during typhoons.

4.2.3. Has access to the main road

One of the common ways' fishermen save their fishing vessels was docking their boats on the road since most of the main road are far enough to the sea this help them to ensure the safety of their fishing vessels. Having a location near a main road can increase the probability of the fishing vessels being saved during typhoons.

4.2.4. Far enough for the storm surge to reached

Since the longest traveled distance by the storm surge was 80 meters (during the Typhoon Ulysses) a location that are completely open perpendicular to the line map of storm surge will serve as the best location since fisherman can freely go farther form the shore for the safety of their fishing vessels.

4.3. What location may be provided to serve as safety dock based on the parameters?

Fig.7. Location of the Safety Dock

The Figure 10 present the location determined to serve as the safety dock for fishing vessels was in Brgy. Aplaya Dingalan, Aurora with a coordinate of 15°22'43.29"N 121°23'32.22"E

4.3.1. Land Use

The location was a space which are not use for agricultural. It also an empty space with no structure or any residential building and even resorts.

4.3.2. Accommodating at least 1000 fishing boats in the standard size of 4 by 3 meters.

The location selected by the researchers has a total area of 35,419 m². By takin the area of the standard size of fishing vessels which was 4 multiplied by 5 equals 20 m² dividing it to the total area of the location. The location can accommodate a total of 1770 fishing vessels.

4.3.3. Accessible from the main road

The location to serve as safety dock was located near the main road of Brgy. Aplaya to Brgy. Butas na Bato it was near the bridge that connect the two barangays and serve as passage to the southern part of Dingalan, Aurora.

4.3.4. Far enough for the storm surge to reached.

The location determine by the researchers has distance of 282 meters perpendicular to the shoreline. Since the farthest distance traveled by the storm surge was 80 meters therefor the location has an overall 200 meters length to ensure that all fishing vessels from there were safe.

V. CONCLUSION

- The researchers found out that storm surge during the Typhoon Ulysses and Typhoon Karding traveled far enough to reach the coastal communities. Wherein based on the finding the longest distance traveled by the storm surge of typhoon Ulysses was in Brgy. Matawe which was 80 meter and for Typhoon Karding come from Brgy Umiray, Butas na Bato and Poblacion which has 60 meters.

- The researcher where able to determine the parameters that provide the optimum location to serve as the safety dock which are the land use, accommodation of at least 1000 fishing boats, near the main road, and lastly far from the shoreline.

- The researchers found a location that fit on the determined parameters which is in Brgy Aplaya Dingalan, Aurora with a coordinate of 15°22'43.29"N 121°23'32.22"E.

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