

Fishermen's Perception on Bilge Pollution Prevention Non-Convention Boats at Bajomulyo Coastal Fisheries Port

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Abstract

Bajomulyo port is located on the estuary of the Silugonggo River with 1.346 m in length at Juwana village. It is considered having decrease on water quality due to the anchoring of fishing boats along the river. This study was done by analyzing the effect of fishing boats anchoring at Bajomulyo Port on fishermen's perception and doing laboratory tests on oil layer and concentration. The samples were taken from 4 stations and analyzed using sea water quality standard index pollution for ports where the sampling was done to 20 fishermen by examining Perception (y) towards Education (x₁) and Experiences (x₂). The results showed (1) There was found Oil Layer Parameter at station 1, 2, and 3 but not at 4. (2) Oil Concentration Parameter at Station 1 was < 0.05, Station 2: 0.54, Station 3: 1.31 and Station 4: < 0.05 meaning it was not more than the standard of 5 mg/l. (3) There was significant correlation between fishermen's Perception (y) with Experiences (x₂) and there was no significant correlation between Perception (y) with Education (x₁).

Keywords: The Coastal Fishing Port Bajomulyo, Pati Regency of Central Java, Non-Convention Boats, Water Quality Status

INTRODUCTION

The protection of the marine environment is a systematic and integrated effort carried out to preserve marine resources and prevent environmental pollution and / or destruction in the sea including marine conservation, marine pollution control, marine disaster management, prevention and treatment of pollution, damage and disasters.^[1] Shipping is one of the activities having impact on sea damage and pollution if not carried out based on established procedures and standards. Fishing boats are one of the non-convention vessels meaning that the operational is not regulated directly by the International Marine Organization (IMO) in which one of them is the issues on treating sea pollution or known with the International Convention for the Prevention of Pollution / Marine Pollution (MARPOL 73/78).^[2]

Indonesia as one of the member countries of the International Marine Organization (IMO) has implemented the convention by issuing Republic of Indonesia's Presidential Decree No. 46 of 1986 on September 9, 1986 concerning Maritime Environmental Pollution Prevention. Article 4 paragraph 3 states that "Oil Tank vessels or vessels that are functioned carry bulk oil with gross tonnage of GT 100 (One Hundred Gross Tonnage) up to GT 149 (one hundred and forty nine Gross Tonnage) and in addition to oil tanker with gross tonnase GT 100 (one hundred Gross Tonnage) up to 399 (three hundred and ninety nine Gross Tonnage) or vessels with gross tonnage of less than 100 GT (one hundred Tonnage) but having a main propulsion engine with more than 200 PK sailing in waters Indonesia and International must comply with the provisions in the Regulation This Minister". The vessels included in the regulation must have oil/ bilge mixed liquid pollution prevention equipment by installing a device called an Oily Water Separator / OWS) and or having a temporary storage tank with liquid mixed with oil / Bilge. The fact is, most of the boats anchoring the Bajomulyoport that meet the requirements do not have OWS and or shelter tanks.

Boats are kinds of structures of objects that can move on the surface of the sea because of dynamic driving force [3] serving as a means of transportation and trade. The success of fishing operations cannot be separated from the role of fishing boats [4]. The more adequate fishing equipment, the more pollution prevention tools should be provided so that the preservation and sustainability of biological ecosystems are maintained. Some studies discuss pollution of oil-containing liquids arising from the operation of sample vessels in Pati-Central Java [5] and Rembang Regency [6]. Each ship anchoring at Semarang Fisheries Development Center disposes 30 liters of liquid of oil / bilge with an oil content of above 15 mg / liter in a day on average [7]. Although the obligation to implement this OWS tool is not comprehensive, it is urged by the government to all owners / fishermen. There should be an effort from owners/ fishermen to prevent and treat the pollution caused by fishing boats. In this study, we need to examine the perceptions of fishermen on the prevention of pollution from fishing vessels. Perception is a process taken by individuals to organize and interpret their sensory impressions to give meaning to their environment ^[8]

RESEARCH AREA

This research was carried out at the Silugonggo River in Bajomulyo District, Pati Regency, where Bajomulyo Port is located. This location was chosen because it is one of the Coastal Fisheries Ports (PPP) in Central Java that are visited by ships with large GT (Gross Tonnage) due to the deep river draft so large tonnage vessels can enter directly to the port. This port is also provided by two units of Fish Auction Place (TPI) which are ready to accommodate the fishing boats. This makes the port of Bajomulyo one of the destination ports that are often in demand by fishing boats.

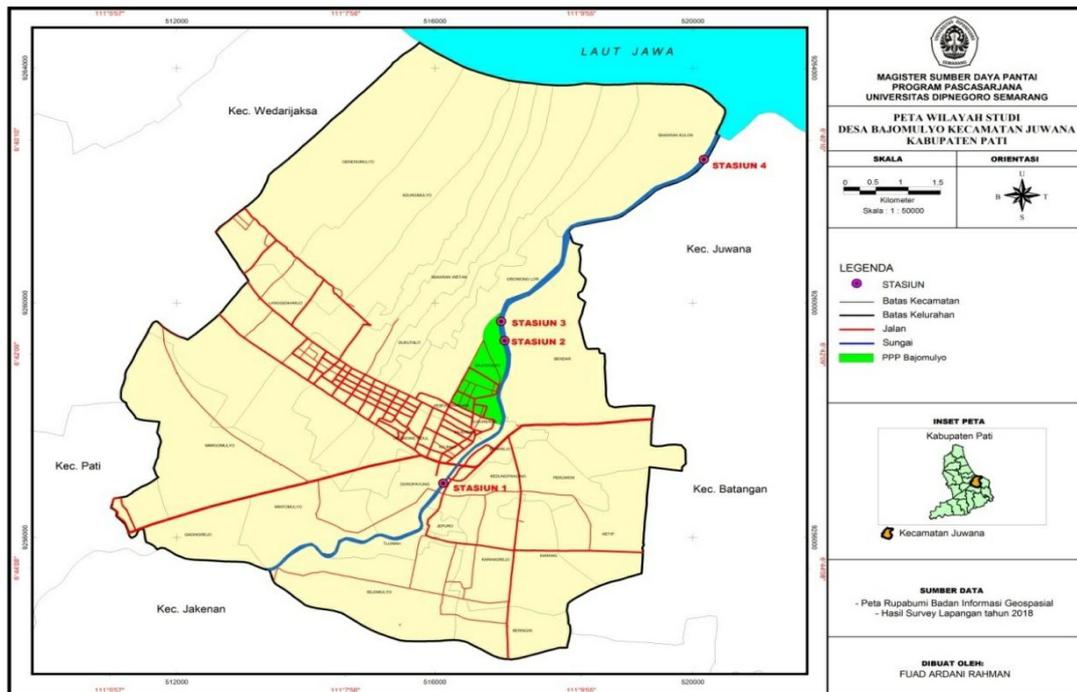


Figure 1. Research Map of Bajomulyo Port



Figure 2. The Condition at the Silugonggo River at Bajomulyo Port

RESEARCH METHOD

This research took place in September 2018. The primary data in this study were taken from sampling at the Silugonggoriver with 4 stations; the first point was in the village before heading to the port, the second point was unit I port, the third point was unit II port and the fourth point was the river estuary to the sea (picture 1 research map). The secondary data in this study were taken from questionnaires distributed to fishermen who met the standards of working on ships that have Gross Tonnage (GT) ≤ 100 or gross tonnase ≥ 100 GT but the ship has a driving force of ≤ 200 HP and those who has worked as fishermen with ≤ 5 -year experience. In addition, there were observations, interviews and documentation.

The results of sampling from the Silugonggo River were analyzed by a laboratory at the Semarang Pollution Prevention Center (BBPPI) and the secondary data questionnaire went through validity and reliability tests first then tested using multiple regression with Perception (Y), Education (X1) and Experience (X2) so that there would be a significant or insignificant correlation between the perceptions of fishermen with education and experiences/ working period.

RESULTS AND DISCUSSION

a. Waters Pollution

The physical observations along the Silugonggo River showed the presence of layers of oil on the surface of the sea water. The sea is black and smells of oil mixed with a pungent odor because rotten fish are dumped directly into the sea by fishermen or TPI employees. These are very dangerous for the life of the ecosystem in the surrounding waters. Oil will stay on the surface of the water blocking sunlight from penetrating to the bottom of the sea. Phytoplankton and zooplankton which are highly dependent on sunlight and oxygen will be disrupted by the presence of oil on the surface of the water. The test results showed:

Table 1. Observation Results of Silugonggo Waters

<i>Retrieval Stations</i>	<i>Oil Layer</i>
<i>I</i>	POSITIVE
<i>II</i>	POSITIVE
<i>III</i>	POSITIVE
<i>IV</i>	NEGATIVE

(Analysis Primer Source 2018)

Based on the results of testing the samples of the waters of Bajomulyo port, it was found that there were layers of oil at stations 1,2 and 3 but were not obtained at station 4 (picture 2, portrait of the state of the Silugonggo River). This is possible because the

Silugonggo River is close to the sea estuary so that various physical factors such as wind direction, tidal currents (tide) and river flow volume cause different phenomena [9]. The discharge of sea water leads to the river when the tide is high but when receding, the discharge from the river towards the sea estuary is very low and causes backflow accumulating around the port [10]. The oil which should have flown to the sea estuary was stopped around the river and caused the river to become black. Tidal current (Range Current) is the movement of currents away from the coast when the water is in low tide and it approaches the coast/ reverses when the tide is high with a frequency following changes in tidal time. This current is often found in rivers near to the Tidal Range Current [11]. The difference is in the movement and speed of flow in the Silugonggo River on the surface, center and riverbed [12]. When the tide is high the flow of currents on the river surface is more likely to lead towards residential and it is when receding, the surface of the waters flows to the sea estuary with a discharge greater than the sea flow so that the backflow stops around the port.

Table 2. Speed of Tidal Flow on the Silugonggo River

Water Column Depth	Minimum Speed (m/s)	Maximum Speed (m/s)
Surface	0,03	0,752
Center	0,016	0,266
Riverbed	0,006	0,389

(Analysis Source: Indriananingrum: 2016)

The velocity of the water flowing from the surface of the river is greater and is classified as heavy compared to the velocity in the middle and the bottom. The sampling was done in September where the rainfall was classified as moderate. The retrieved from these 4 stations was analyzed on the concentration and oil content. The data are presented as follows:

Table 3. Observation of the waters of the Silugonggo River

Retrieval Stations	Oil Concentration
I	< 0.05
II	0.54
III	1.31
IV	< 0.05

(Analysis Primer Source 2018)

Sea water quality standards in accordance with LPM No. KEPMEN. 51 of 2004 states Layer (Visual) & Concentration: 5 mg/l which means that the waters of the Juwana River can still be tolerated but there have been oil content in Unit I and Unit II.

b. Liquid Disposal Procedure mixed with oil from the ship (bilge)

Ships without pollution prevention equipment tend to dispose bilge directly into the waters [14]. Figure 3 is a portrait where the fisherman puts a dipping/ submersible pump on the bottom of the boat. When the bilge tank is full, it is enough to turn on the pump and the liquid will move to the sea. In figure 4 is an illustration of the ship that has been constructed so that the disposal of the bilge is going through the engine coolant pump. If it runs normally, the pump sucks the seawater as a coolant but if you want to remove the bilge, just close the cooling faucet and open the bilge tap so that the bilge in the tank is sucked and wasted into the sea. If pollution from fishing vessels continues to occur, not only are the marine waters polluted but also are the flow to the river[15].



Figure 3. Submersible Pump at the Bottom of Bilge Tank

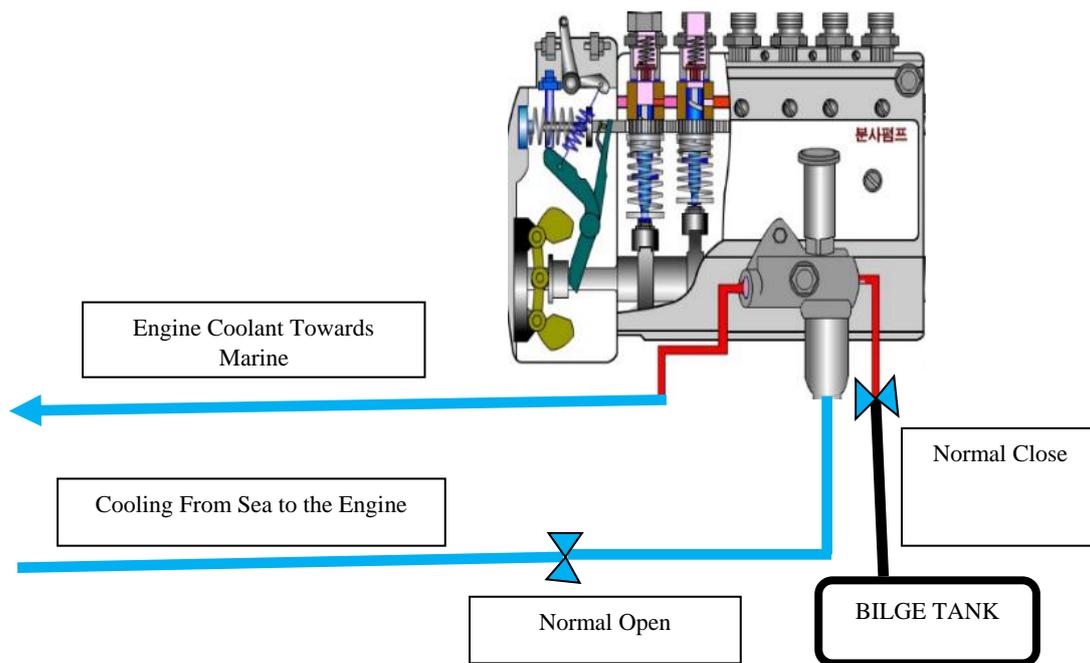


Figure 4. Illustration on Bilge Disposal using Cooling Machine

c. Fishermen's perception on preventing pollution from ships

Research on the Perception (Y) of these fishermen emphasizes educational characteristics (X1) and experience (X2) and a significant correlation among these variables so it can make a picture of the causal impact of the current physical condition at the Bajomulyo Port. The results of the questionnaire were tested using logistic regression binary with the initial model as follows:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n$$

Y = dependent variable

a = constants

b1,b2 = regression coefficient

X1, X2 = independent variable

From the test used SPSS software, the results of logistic regression analysis showed that Education variables (X1) = 0.203 and Experience variables (X2) = 0.010.

H0: $\beta = 0$ (there are no significant variables that affect the variable y)

H1: $\beta \neq 0$ (significant variable influences y variable)

Where it should reject H0 if sig < 0.05.

Decision accept H0 because sig > 0.05.

From conclusions with a confidence level of 95%, it can be concluded that from the Education and Experience, only Experience variable had a significant effect which means that the higher the experience of fishermen the higher the level of concern of fishermen in preventing and overcoming bilge around Bajomulyo port. Education variable did not have significant effect on fishermen's perception of pollution prevention.

CONCLUSION

The physical condition of the port of Bajomulyo is the result of a lack of socialization and information from users of marine services affecting the inability of a clean and comfortable ecosystem for the environment. Although humans do not immediately feel the impact, basically human beings must participate in preserving the environment by not creating a negative impact on biological sustainability to avoid the extinction of ecosystems around the port.

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