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Evaluation on Habaring Hurung Pier Pontoon to Improve Service in East Kotawaringin Transport System, Central Kalimantan Province

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Abstraction

East Kotawaringin has a relatively large area, namely 16.796 km^2 or 10.94 percent of the area of Central Kalimantan province. With an area of regional the East Kotawaringin divided into 17 districts, mostly lowlands. Kotawaringin East region which thousands of cities in Sampit City astronomically lies between 112^o 7 '29 "East until 113^o 14' 22" East and 1^o 11'50 "south latitude to 3^o 18 '51" South Latitude. Geographically, in the western part bordering Seruyan District, the north to east by Katingan, and directly adjacent to the southern part of the Java Sea. This district has a topography that varies between 3-85 meters above sea level.

The pier is one of the parts that are used to perform an activity arrival and departure of ships, up and down the passenger and cargo handling. The role of the pier is very important to support these activities. To support these activities, the pier used must be in good condition so that the activities coming and departing ships, up and down the passenger and unloading can proceed smoothly.

But Pier of Habaring Hurung infrastructure conditions in East Kotawaringin need attention, especially from the manager in this case is the Department of Transportation Kotawaringin East Central Kalimantan province as conditions dock floor height fixed type that does not correspond to the freeboard boat at low tide and condition-type floating dock made of wood and many parts have been weathered, the absence of mooring facilities, bridges poorly and docks are flooded due to the tilt of the wooden pier so that the activity of ships berthing and unloading at the docks less safe, smooth and comfortable for service users, Based on the analysis carried out that the need for evaluation and the addition of facilities and planning of facilities to improve existing services at Pier Habaring Hurung.

Keywords: Evaluation; Pier Pontoon; Improve; Service.

1. Introduction

Transportation is an activity that acts as the lifeblood of economic, social, cultural, defense and security, and politics have insight embodiment of the archipelago, to strengthen the resiliency and strengthen relations between nations in order to achieve the same objectives based on Pancasila and the Constitution of 1945. The existence of transportation to work as a driver, driving and supporting the construction as such transport should be planned in such a way so as to produce reliable services in a region.

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East Kotawaringin has a relatively large area, which is 16.796 km2, or 10.94 percent of the area of Central Kalimantan province. With an area of the East Kotawaringin divided into 17 districts, mostly lowlands.

The role of cross very closely in the development and support the development potential of the region, particularly the region's economic growth. Crosswalk Sampit - Terantang, Sampit - Cape Katung, Sampit - Seranau, and Sampit - Katingan has an important role as a link Kotawaringin East region and Katingan.

This is supported by the dock Habaring Hurung form of fixed and floating dock which is managed by the Department of Transportation Kotawaringin East Central Kalimantan province. Pier existence Hurung Habaring very important role in supporting the movement of people, goods and economic activities. Because Habaring Hurung Pier is one of the effective liaison access Sampit - Terantang, Sampit - Cape Katung, Sampit - Seranau, and Sampit - Katingan because there is no landline.

Pier Habaring Hurung infrastructure conditions in East Kotawaringin need attention, especially from the manager in this case is the Department of Transportation Kotawaringin East Central Kalimantan province as conditions dock floor height fixed type that does not correspond to the freeboard boat at low tide and condition-type floating dock made of wood and many parts have been weathered, the absence of mooring facilities, bridges poorly and docks are flooded due to the tilt of the wooden pier so that the activity of ships berthing and unloading at the docks less safe, smooth and comfortable for service users.

2. Research Method

This research method generates the primary data and secondary data, while the methods used are as follows:

a. Methods of Observation

Observations are observations carried out systematically and then do the recording. This method of data collection the author carry out activities in a way:

1) Survey Pier Habaring Hurung
2) Observations water level (STA)
3) Survey Ship Arrival and Departure
4) Up Down Passenger Survey
5) Characteristics Survey Pier
6) Depth Survey Swimming Ports
7) Characteristics Survey Vessel

b. Method of Literature

This method is done by searching the literature or learning from a variety of sources that exist about the theory - the theory as well as data - data related to problem solving in Proceedings of Compulsory (KKW) is.

c. Institutional methods

The data obtained from the various agencies involved. The data generated as follows:

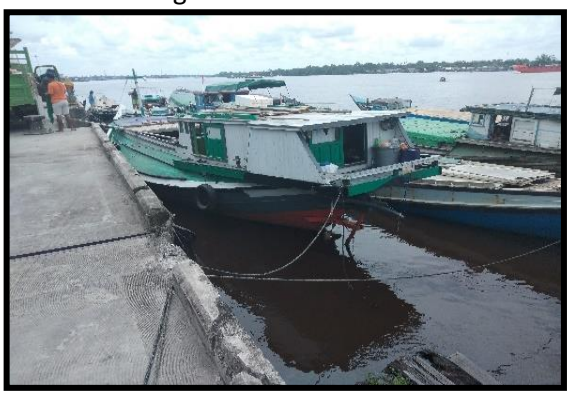
1) Ships operating characteristics of the track.

a) Klotok

Klotok a ship made of wood construction is used as a means of passenger transport. This Klotok has average dimensions, namely the length of 11.16 m, width 1.47 m, 0.45 m and freeboard draft of 0.52 m with a passenger capacity as many as 16-20 people. Conditions klotok ship can be seen in the image below:

b) Boat Motor

Motor vessel operating at Pier Habaring Hurung mostly from Katingan, where the boat is transporting goods - goods of Katingan or City Sampit. Because Katingan not have access land transport to move goods. Dimensions of motor boats with an average length of 14.08 m ie, width of 2.47 m, draft 1 m and 0.7 m freeboard. Payload capacity average is 7.43 tons. Conditions motor boats can be seen in the image below:



2) Arrival and Departure Monthly

Month	Arrival			Departure		
	Ship	Passenger (Person)	Goods (Ton)	Ship	Passenger (Person)	Goods (Ton)
January	671	1,438	109	687	1,842	124
February	652	1,332	87	667	1,842	113

3) Arrival and Departure Annual

Year	Arrival			Departure		
	Ship	Passenger (Person)	Goods (Ton)	Ship	Passenger (Person)	Goods (Ton)
2016	11450	18 856	1207	11508	18970	406
2017	13893	19 980	1202	13893	18 878	909
2018	15627	22 226	2174	15760	25700	1998

3. Results and Discussion

a. Water analysis.

Different High Water Front

HHWL = 6.74 m
MHWL = 5.74 m
MWL = 4.56 m
MLWL = 3.83 m
LLWL = 2.56 m
And Stables Install = MHWL - MLWL
= 5.74 m -3.83 m
= 1.91 m

1) Depth of pool Port

a) The depth of the port pool on the condition HHWL
= (6.74 m - 5.90 m) + 6,50 m
= 7.34 m

b) The depth of the port pool on the condition MHWL
= (5.74 m - 5.90) + 6.50 m
= 6.34 m

c) The depth of the port pool on the condition of MWL
= (4.56 m - 5.90 m) + 6,50 m
= 5.16 m

d) The depth of the port pool on the condition MLWL
= (3.83 m - 5.90 m) + 6.5 m
= 4.43 m

e) The depth of the port pool on the condition LLWL

Then the depth of the port pool at the time of MHWL
= 2,56 m - (5.90 m - 6.5 m)
= 3,16 m

f) Depth Analysis Based Air Ships Loaded

No.	Water level conditions	The depth of the port pool (m)	The required depth (draft + 0,8 m)	Boat type	Information
1	HHWL	7,84	1.3	Klotok	Secure
			1.9	Boat Motor	Secure
2	MHWL	6,84	1.3	klotok	Secure
			1.9	Boat Motor	Secure
3	MWL	5.68	1.3	klotok	Secure
			1.9	Boat Motor	Secure
4	MLWL	4.93	1.3	klotok	Secure
			1.9	Boat Motor	Secure
5	LLWL	3.66	1.3	klotok	Secure
			1.9	Boat Motor	Secure

g) High Pier Based Variable Air Ships Loaded

(1) When the water level is high (HHWL)
height difference = High Floor Pier - (F + HHWL)
= 7.7 m - (0.7 m + 6.74 m)
= 7.7 m - 7.44 m
= 0.26 m

(2) At the time of the lowest water level (LLWL)
height difference = High Floor Pier - (F + LLWL)
= 7.7 m - (0.7 m + 2,56 m)
= 7.7 m - 3.26 m
= 4.44 m

b. Analysis of Pier Plan

1) Selection Based on the dock mode Stables Install

TP = MHWL - MLWL
= 5.74 m - 3.83 m
= 1.91 m

Dock right is the type of pontoons for its plug-riding> 0.75

2) Long Wharf

a. Aft berth

L_p = 2 (15) + (2 + 1) 0,1 (15)
L_p = 30 + 3 (1.5)
L_p = 30 + 4.5
L_p = 34.5 m

3) Width Pontoon

B_p = 2 (2.5) + (2 + 1) 0,1 (2,5)
B_p = 5+ (3) 0.25
B_p = 5 + 0.75
B_p = 5.75 m

4) Amenities Pier

a)bolder

The distance between the bolder = $\frac{1}{3}$ long Ships
= $\frac{1}{3}$ 15 = 5 m
Total bolder = long Wharf / Distance between *bolder*
= 34.5 / 5
= 6.9 → 7 Unit
weight bolder = 19 kg / unit
Total weight bolder = Weight x Number bolder bolder
= 7 x 19
= 133 kg

b) Fender

So the ship time is:
= 15 mx 2.5 mx 0.7 mx 0.643 x 1 t / m^3
= 16878.75 tons

$$C_m = 1 + \frac{3,14}{2\,.0,643}\,\frac{0,7}{2,5}$$

$$C_m = 0,96$$

$$C_e = \frac{(\frac{1}{4}\,.15)^2}{\left((\frac{1}{4}\,.15)^2 + (\frac{1}{4}\,.15)^2\right)}$$

$$C_e = 0,5$$

So the power of the boat bump against the dock by:

$$\boldsymbol{E = \frac{(16,878)(0,1)^2}{2\,.9,8}\,0,96\,.0,5\,.1\,.1}$$

$$\boldsymbol{E = 4,14\ ton\ meter}$$

$$Ef = \frac{0,000108\ ton\ meter}{2} = 2,07\ ton\ meter$$

Dimater tires = 0.50 m
The number in front of the pier = long Wharf / The diameter of the tire

$= \frac{34.5}{0.5}$
= 69 Units

The number next to the pier = $\frac{\text{Width of the dock}}{\text{Diameter}}$
$= \frac{5.75}{0.50}$
= 11.5 x 2
= 23 Units

Total Number of Fender = The number in front of the dock + number next to the pier
= 69 + 23 = 92 units

weight fender = 9 kg

Total weight fender = Total Number fender x Weight fender
= 92 x 9
= 828 kg

5) Freeboard Pontoon

$f = \frac{0.6 + 0.6 + 0.5 + 0.4 + 0.7 + 0.7 + 0.6 + 0.8}{8}$

f = 0.61 m

6) Draft Pontoon

long pontoon	: 34.5 m
The width of the pontoon	: 5.75 m
freeboard	: 0.61 m
draft pontoon plan	: 0.24 m
High pontoon plan	: 0.85 m
heavy Pontoon	: 28378.69763 kg
weight Bolder	: 133 kg
heavy Fender	: 828 kg
Weight of passengers, crew and officers	: 1190 kg
Heavy passenger luggage	: 98 kg
Heavy cargo ship	: 7430 kg
Density of water	: 1000 kg / m^3
gravitation	: 9.8 m / s^2

DL = Weight of pontoon + weight + weight bolder fenders
= 28378.69763 kg + 133 kg + 828 kg
= 29339.697 kg

LL = Weight of passengers, crew and officers + weight passenger luggage + heavy load ship
= 1190 kg + 98 kg + 7430 kg
= 8718 kg

F vertical = (1.2 DL + 1.6 LL) g
= ((1,2x29.339,697 kg) + (1,6x8.718 kg)) x9,8 m / s^2
= 49156.43 kg / m / s2

V Under Water = $\frac{\text{F Vertical}}{\text{Density of water xg}}$

= $\frac{49156.43 \text{ kg / m / s2}}{1000 \text{ kg / m}^3 \text{ x } 9.8 \text{ m / s2}}$

= 49.15 m3

draft pontoon = $\frac{\text{V submerged}}{\text{P x l}}$

= $\frac{49.15 \text{ m}^3}{34.5 \text{ mx } 5.75 \text{ m}}$

= 0.24 m

7) High Pontoon

high Pontoon = *freeboard* + draft

= 0,61m + 0,24 m

= 0.85 m

8) a) Heavy Iron Frame

Then the total number of pontoon order is as follows:

(1) Iron Elbow 25 x 25 x 5 mm) = 132 x height pontoon units

(2) Iron Elbow 25 x 25 x 5 mm = 69 units x width pontoon

(3) UNP iron 125 x 65 x 6mm = 69 units x width pontoon

(4) IVI iron 140 x 66 x 5.7 x 8.6 mm x height = 9 units pontoon

(5) IVI iron 140 x 66 x 6.7 x 8.6 mm = 5 x length units Pontoon

b) heavy Frame

(1) Iron Elbow 25 x 25 x 5 mm = (132 units x height pontoon) x weight iron

(2) Iron Elbow 25 x 25 x 5 mm = (69 units x width pontoons) x weight iron

(3) UNP iron 125 x 65 x 6mm = (69 units x width pontoons) x weight iron

(4) IVI iron 140 x 66 x 5.7 x 8.6 mm = (9 units x height pontoon) x heavy iron

(5) IVI iron 140 x 66 x 5.7 x 8.6 mm = (5 units x length pontoon) x weight of iron

Then weight the framework are:

(1) Iron Elbow 25 x 25 x 5 mm = (132 units x 0.85 m) x (10.6 kg/6m'/ 6m')
= 205.275 kg

(2) Iron Elbow 25 x 25 x 5 mm = (69 units x 5.75 m) x (10.6 kg / 6m '/ 6m')
= 694.3125 kg

(3) UNP iron 125 x 65 x 6 mm = (69 units x 5.75 m) x (81 kg / 6m '/ 6m')
= 5356.125 kg

(4) IVI iron 140 x 66 x 5.7 x 8.6 mm = (9 units x 0.85 m) x (175 kg / 12m '/ 12m')
= 111.5625 kg

(5) IVI iron 140 x 66 x 6.7 x 8.6 mm = (5 units x 34.5 m) x (175 kg / 12m '/ 12m')
= 2515.625 kg

Total weight of order = 205.275 kg + 694,3125+ 5356.125 kg + 111.5625 + 2515.625 kg

= 8882.9 kg

9) The Number And Weight Plate

a) Then the total number of plate pontoon is as follows:

(1) Iron plate thickness x 5 mm = 5 units x (width x height))

(2) Iron plate thickness 5 mm = 2 units x (length x width)

(3) Iron plate thickness 5 mm = 2 units x (length x height))

b) heavy Plate

(1) Iron plate thickness 5 mm = (5 units x (width x height pontoon)) x heavy iron

(2) Iron plate Thickness mm = (2 units x (length x width pontoons)) x weight of iron

(3) Iron plate thickness 5 mm = (2 units x (length x height pontoon)) x weight of iron

Then the total weight of the plate is:

(1) Iron plate thickness 5 mm = (5 units x (5.75 x 0.85) x 40.63 kg
= 1287.939 kg

(2) Iron plate thickness 5 mm = (2 units x (34.5 x 5.75) x 40.63 kg
= 16119.95 kg

(3) Iron plate thickness 5 mm = (2 units x (34.5 x 0.85) x 40.63 kg
= 2467.05 kg

Total iron plate = 1287.939 kg + 1611.95 kg + 2467.05 kg
= 19614.94 kg

10) Heavy Pontoon

= 8882.9 kg + 19614.94 kg
= 28378.69763 kg

11) Passenger Weight

= 70 kg x 14 + 2 + 1 People
= 70 kg x 17
= 1190 kg

12) Heavy Baggage Passengers

= 14 x 7 kg
= 78 kg

13) Exit and Entrance road Passenger Ships (Gangway)

a) width Gangway : 1.2 meters

b) High Fence in Gangway : 1.15 meters

c) Slope of the Gangway : 1 : 3

d) long gangway

$$R = \sqrt{s^2 + h^2}$$

h when LLWL = (Elevation pier remains Dermaga Fixed)-(current water level LLWL + F)
= 7.7 m - (2.56 m + 0.61 m)
= 7.7 m - 3.17 m

= 4.53 m

h when HHWL = (Elevation fixed dock pier Fixed) - (Advance water when HHWL + F)
= 7.7 m - (6.74 m + 0.61 m)
= 7.7 m - 7.35
= 0.35 m

s when LLWL = 3 xh
= 3 x 4.53 m
= 13.59 m

s when HHWL = 3 xh
= 3 x 0.35
= 1.05m

(1) long Gangway

R $= \sqrt{s^2 + h^2}$
$= \sqrt{13{,}59^2 + 4{,}53^2}$
$= \sqrt{184{,}6881 + 20{,}5209}$
$= \sqrt{205{,}209}$
= 14.32 m

(2) Pontoon shift when HHWL

x $= \sqrt{R^2 - s^2}$
$= \sqrt{14{,}32^2 - 1{,}05^2}$
$= \sqrt{205{,}209 - 1{,}1025}$
$= \sqrt{206{,}3115}$
= 14.36 m

(3) Rel long Gangway

Z = y + (Rx)
= 0.5 + (14,36-14,32)
= 0.5 +0.04
= 0.54 m

d. Conclusion Troubleshooting

1) Scenario I (fixed condition)

The following positive impacts and negative impacts on the Pier Habaring Hurung fixed conditions are:

a) Positive impact
Pier can still be used to perform the activity.

b) Negative impact
(1) At low tide conditions the boat will dock can not be docked at Pier Habaring Hurung fixed type.
(2) Will disrupt the activity of the vessel at the time klotok will mooring for mooring facility at Pier floating type Habaring Hurung is currently no.

(3) Access bridge is not good because it is often damaged and can fall at any time which will harm service users and service users.

(4) Construction of wood on the floor floating dock fragile types may at any time collapses when passengers walk.

2) Scenario II (Conditions to be replaced)

The following positive impacts and negative impacts if the dock is replaced by the pier pontoon type is as follows:

a) Positive impact

(1) Ship safely carry out the navigation in the port basin;

(2) Activities unloading boats and ships in the dock klotok will be smooth even in conditions of low water level;

(3) mooring facilities in the dock as bolder and added to the dock fender pontoon type so that the vessel would be safe mooring.

(4) Type of floating dock with iron materials can last quite long compared with wood.

b) Negative impact

The cost is quite expensive.

Of the two scenarios above, to solve the above problem using a scenario writer II for riding tide at Pier Habaring Hurung is 1.91 m, while the requirement when riding tide over 0.75 m pier from which is the pier pontoon. Recommended pontoon dock is made of metal so it can withstand the impact of the ship to be docked, it will not easily corroded due at Pier Habaring Hurung not influenced by the sea water corrosion level is low. Hurung Habaring dock serves various types of vessels where the largest vessel draft of 1.1 m,

No.	Analysis results	Information
1	The pontoon dock a. material b. Long c. Wide d. freeboard e. draft f. High g. heavy Pontoon h. Vessel mooring system	 Iron 34.5 m 5,75m 0.61 m 0.24 m 0.85 m 28378.69763 kg Berth lengthwise
2	gangway a. long gangway b. The width of the gangway c. The length of the rail gangway d. The fence in gangway	 14.32 m 1.2 m 0.54 m 1.15 m
3	bolder a. Total bolder	 7 Unit

	b. The distance between the bolder	5 m
4	Fender a. material b. amount	 Used tires 92 Units

4. Closing

a. Conclusion

1) At low water level conditions (Lowest low water level, LLWL) motor boats can not loading and unloading at Pier Habaring Hurung fixed type because of differences high-deck ship with the dock floor can be up to 4.44 m
2) Currently at Pier Habaring Hurung there are no mooring facilities such as bolder and connecting bridge to the mainland are good for only made of wood so at the time of the lowest water level conditions (Lowest low water level, LLWL) of the ladder very steep.
3) From the analysis of the characteristics and dimensions obtained dock pier, bridge liaison and facilities for mooring boats at the dock.

b. Suggestion

Based on the above conclusion, it can be given suggestions are:

1) There needs to be more attention from the Department of Transportation Kotawaringin East of the physical condition of the pier.
2) Adding to the mooring facility at Pier Habaring Hurung for the ship security be tethered , add fenders to keep the walls of the dock and hull from impact and adds to the gangway as a bridge to follow the tide receding.
3) Replacing the wooden pier to pier pontoon type and mooring facilities and bridge between the mainland by the pier.

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