Hangkara Majaya
ISSN :2721-818X (Cetak), 2723-6722(Elektronik)
Vol. 2, No. 2, 2021, Hal. 40-45
DOI: https:Poltekpelbarombong.ac.id

Case Study Of Abration Of The Musi River Bad Due To Water Waves In Coastal Prajin Village, Banyuasin I District, South Sumatera Province

Surnata[1],Irwan[2], Bambang Setiawan[3],Purboyo[4], Febriansyah[5], Sri Kelana[6]
[1] Inland Water and Ferries Transport Polytechnic of Palembang, Palembang City1
[2] Inland Water and Ferries Transport Polytechnic of Palembang, Palembang City2
[3] Inland Water and Ferries Transport Polytechnic of Palembang, Palembang City3
[4] Inland Water and Ferries Transport Polytechnic of Palembang, Palembang City4
[5] Inland Water and Ferries Transport Polytechnic of Palembang, Palembang City5

Info Artikel :
Diterima 12 Juni, 2021
Direvisi 20 Oktober 2021
Dipublikasikan 13 Desember 2021

Keyword:
Abration,
Water Waves
Kata Kunci:
Abrasi
Gelombang Air

ABSTRACT

Abstract— Banyuasin Regency apart from geographically has a strategic location, which is located on a cross-province route, also has abundant natural resources. Geographical Location of Banyuasin Regency is located between 1.30 ° - 4.0 ° South Latitude and 104 ° 00 '- 105 ° 35' East Longitude which stretches from the central part of South Sumatra Province to the eastern part.

Banyuasin Regency has an area of 12,431 km² and is divided into 19 sub-districts, one of which is Banyuasin I District. Banyuasin Regency has an area of 12,431 km² and is divided into 19 sub-districts, one of which is Banyuasin I sub-district, Banyuasin I district consists of several villages and sub-districts, Prajin village has almost the majority of its inhabitants on the banks of the Musi river, the existence of this village originated from a small population to Now it is increasing, but based on the current condition of the village, the population on the river bank is almost on average eroded up to ± 20 m2 by water waves caused by wind waves, waves caused by the speed of passing ships, and the occurrence of tidal waves. . We need to know that together.

The Musi River is a river located in the province of South Sumatra, Indonesia. [1] With a length of 750 km, while the village is opposite the edge of the village prajin.

The Musi River is 750 km long and is the longest river on the island of Sumatra. Since the time of the Sriwijaya Kingdom, this river has been known as the main means of transportation for the community. On the banks of the Musi River is the Boom Baru Harbor. The Musi River divides Palembang City into two areas: opposite Ilir in the north and across from the ulu in the south. The springs are sourced in the Kepahiang area, Bengkulu. This river is the mouth of nine major tributaries, namely the Komering, Rawas, Batanghari, Leko, Lakit, Kelingi, Lematang, Semangus, and Ogan rivers.

ABSTRAK

Koresponden:
Surnata,Irwan, Bambang Setiawan, Purboyo, Febriansyah, Sri Kelana
Email: Surnata@gmail.com, Irwan@gmail.com, Bambang Setiawan@gmail.com, Purboyo@gmail.com, Febriansyah@gmail.com, Sri Kelana@gmail.com

Pendahuluan

Banyuasin Regency besides geographically has a strategic location, which is located on a cross-road between provinces, it also has abundant natural resources. Geographical Location Banyuasin Regency is located at a position between 1.30° - 4.0° South Latitude and 104° 00' - 105° 35' East Longitude which stretches from the central part of South Sumatra Province to the eastern part.

Banyuasin Regency has an area of 12,431 km² and is divided into 19 sub-districts, one of which is Banyuasin I sub-district, Banyasin I sub-district consists of several villages and sub-districts, Prajin village almost the majority of its population is on the banks of the Musi river, the existence of this village started from a small population to now it is increasing, but based on the current condition of the village, the population on the banks of the river is almost eroded to an average of ± 20 m2 by water waves caused by wind waves, waves caused by the speed of passing ships, and the occurrence of tidal wave fluctuations. . We need to know together that. The Musi River is a river located in the province of South Sumatra, Indonesia.[1] With a length of 750 km, while the village is adjacent to the edge of the craft village.

The Musi River has a length of 750 km and is the longest river on the island of Sumatra. Since the time of the Srivijaya Kingdom, this river has

been known as the main means of public transportation. On the banks of the Musi River is the New Boom Harbor. The Musi River divides Palembang City into two parts: across the ilir in the north and across the ulu in the south. The springs are sourced in the Kepahiang area, Bengkulu. This river is the estuary of nine major tributaries, namely the Komering, Rawas, Batanghari, Leko, Lakitan, Kelingi, Lematang, Semangus, and Ogan rivers.

In addition to the coastal river is also part of the complement of the river, the beach is land that is on the border between the ocean and the island. The beach is synonymous with many things, such as sand, rocks and coral, tourist attractions, coconut trees, to the residences of fishermen who depend on the sea for their lives. Indonesia itself is one of the countries that has the longest coastline, which is due to the many islands in Indonesia, both large and small islands. Of the thousands of islands in Indonesia, there are also thousands of beaches, both unspoiled beaches, and beaches that have become one of the popular tourist sites.

The Musi River is ± 750 km long, one of which passes through Prajin Village, which currently has eroded the shores of the Musi River as far as 30 meters from the shores of the mainland, considering the chronology of the village has a population of 30 families. The land that has been eroded by the river flow, until now the government apparatus has never taken action to prevent it. From the description above, the author takes the title:
"Case Study Of Abration Of The Musi River Bad Due To Water Waves In The Coastal Of Prajin Village, Banyuasin I District, South Sumatera Province.

Metode

This research was carried out based on field research. The data obtained were analyzed for the occurrence of coastal erosion processes. The data in this study include secondary data and primary data. Secondary data is basically data that already exists, both from research, secondary data used both directly related to research and research supporting data.

A. *Secondary Data*

Secondary data is data obtained directly from related agencies and the author has obtained data from BPS regarding the map of the research location, data on population and area data affected by soil erosion caused by water waves.

B. *Primary data*

Primary data is obtained from the results of field surveys, including: tidal data, wave speed measurement data. the results of the measurement data of wave pressure against the river bank.

C. *Observation Interview*

This Observation Interview is a question and answer technique to communities affected by erosion of cliff walls, about the origin of areas affected by erosion of cliff walls due to water waves, and several complaints from the community that have not been handled by the government.

Hasil dan Pembahasan

1. Land Condition Check

The area along the outskirts of the Musi River in Prajin Village which is used as a residential area with a population of about 300 families (3RT) the length of the river bank is about + 700 meters. Most of these communities are domiciled on average on the shores of the Musi River, Prajin Village, which has a number of quite severe and complex problems. The problem is related to the decline in land function caused by coastal abrasion. The result has been felt by the people living around the coast.

This can be seen from the loss of several meters of land up to 20 meters from the river bank and until the houses of residents are flooded by the tide so that they can no longer be used properly. The following is a description of the conditions in the Village of Craftsmen on the outskirts of the Musi River.

Picture 5 Residential Houses Affected by Abrasion

This picture shows the abrasion that started several years ago which resulted in several houses being flooded by the Musi River, under normal conditions. According to one resident, at high tide the sea water can reach a height of +50 cm accompanied by waves that directly hit the walls of the house. The picture shows the area of people's houses that have been submerged by the water of the Musit River, so they can no longer be used. In the coastal area, there are 4 villages that are threatened with abrasion, namely Prajin Pesisir Village on the Musi River coast. is a beach that

stretches from southwest to northeast with the sea to the west. The direction of the wind is influenced by the wind from the northwest, so that the current flowing in the waters along the coast to the northeast or in other words along from this direction causes abrasion. Efforts to overcome abrasion have been carried out by the Government, but have not achieved maximum concrete results compared to the level of problems that occur. Therefore, it is necessary to plan for coastal protection in the context of preventing coastal abrasion in the coastal village of Prajin. So that it can prevent even greater losses and protect residential areas so that they can work quietly without worrying about their settlements being slowly eroded by abrasion.

Tidal Conditions

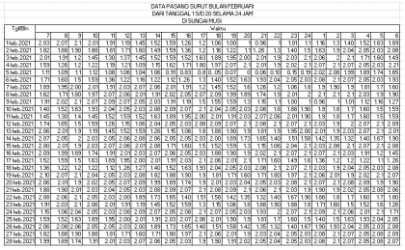
To carry out the research, we conducted a survey in the field to find the actual pact with the location as described above. location is a determinant of data retrieval, precisely on the outskirts of the Musi River, Prajin village.

To find out the tidal conditions, we conducted an observation of the water level of the Musi River which was carried out for 1 (one) month, from 1 (one) February to 28 (twenty-eight) February 2021. From the results of observations, we collected data as shown below tidal data:
From tidal data obtained from BMG Palembang, in 2018, the following data were obtained:

MHWL = ∑ MHWL tiap bulan /12 bulan
= 0,9514 m 95,14 cm
MLWL =∑ MLWL tiap bulan / 12 bulan
= 0,2978 m 29,78 cm
MSL = ∑ MSL tiap bulan / 12 bulan
= 0,6246 m 62,46 cm
HHWL = 1,1 m = 110 cm
LLWL = 0,1 m = 10 cm
Tidal elevation is assumed to be +0.00 from LLWL, so we get
LLWL = + 0,00 cm
MSL = 62,46 – 10 = +52,46 cm
HHWL = 110 – 10 = +100 cm

$$F = \frac{AO1 + AK1}{AM2 + AS2}$$

F =1,50 < F ≤ 3,0 = pasang surut tipe campuran hariantunggal (mixed mainly tides)



Waves Caused By Ship Traffic

From the implementation of the survey in the field, this type of ship causes very large waves and with, especially if the high speed of the ship is coupled with the swift flowing water coupled with the presence of wind pressure resulting in high waves so what if it reaches the shore. waves will hit as high as 1.5 meters. Of the many ships that pass this type of ship. The ship that caused the biggest waves was the tanker PT. Pusri, PT Pertamina Tanker Ship, Tanker Ship and Speed Boat.

To analyze abrasion, we must first know the cause, here we can see the types of ships crossing the Musi River, including:

- PT Pusri ship
- PT SAP tankers
- PT Pertamina tankers
- Perum Port II Cargo Ship
- Coal Barges
- Nautical Fast Ship
- Speed Boats
- Jukung Ship

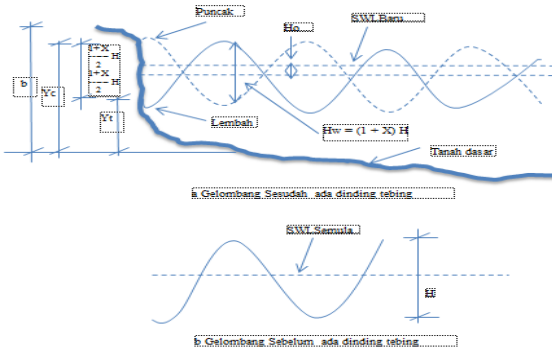
Tabel
Cepat Rambat Gelombang

No	Tanggal Survey	Nama Kapal	Kecepatan Rambat Gelombang (v) m/dt	Panjang Gelombang (λ) m	Waktu (t) dt
	7-02- 2021	PT Pusri	0.125	5	40
	21 Mar2021	Kapal Tanker PT SAP	0.15	6	10
	22 Mar 2021	Kapal Tanker PT Pertamina	0.125	5	40
	29 Mar 2021	Kapal Cargo Perum Pelabuhan II Sumsel	0.10	5	50
	2 Jun 2021	Kapal	0.10	4	40

	Tongkang Batu Bara			
5 Jun 2021	Kapal Cepat Bahari	0.072	4	55
6 Jun 2021	Kapal Speed Boat	0.12	3	25
10 Jun 2021	Kapal Jukung	0.066	2	30
Total Rata Rata		0.107	4.25	36.25

From the results of the calculation of the data grouping the average wave propagation speed is 0.107 m/s. And for the average wavelength is 4.25 and, and the average time is 36.25 m s

Compressive Force of Unbroken Waves on the Beach Wall



With:

Yc : Depth of water on the wall, when the crest of the wave hits wall (m)

Yt : The depth of water at the wall, when the crest of the wave hits wall (m)

H : wave height (m)

L : Wavelength (m)

W : Fresh water unit weight kg/m3

From the results of the discussion above, the author has carried out a field survey of the area along the edge of the Musi River in Prajin Village which is used as a residential area with a population of around 300 families (3RT) the length of the river bank is about + 700 meters. Most of these communities are domiciled on average on the shores of the Musi River, Prajin Village, which has a number of quite severe and complex problems. The problem is related to the decline in land function caused by coastal abrasion. The result has been felt by the people living around the coast.

This can be seen from the loss of several meters of land up to 20 meters from the river bank and until the houses of residents are flooded by high tide so that they can no longer be used as they should.

1 Tidal Conditions

To find out the tidal conditions, we conducted an observation of the water level of the Musi River which was carried out for 1 (one) month, from 1 (one) February to 28 (twenty-eight) February 2021. From the results of observations, we held data collection as shown below the tidal data.

HHWL = 1.1 m = 110 cm

LLWL = 0.1 m = 10cm

Tidal elevation is assumed to be +0.00 from LLWL, so we get:

LLWL = + 0.00 cm

MSL = 62.46 – 10 = +52.46 cm

HHWL = 110 – 10 = +100 cm

F = 1.50 < F 3.0 mixed type daily mixed mainly tides)

2 Waves Caused by Ship Traffic

From the results of the analysis above, the author has studied the waves caused by ship traffic, types of ships that pass, among others. PT. Pusri, PT Pertamina Tanker Ship, Tanker Ship and Speed Boat and Jukung Ship

The author has recorded the type of ship that passes by examining the speed of propagation of its wavelength to the cliff wall. average = 0.107 m/t and average wavelength = 4.25 m and average time = 36.25 s

Compressive Wave Force Doesn't Break On The Beach Wall

To find out the wave pressure, the writer first checks the field conditions according to the level of data required by the formula so that data that supports these activities can be obtained such as Yt . = 2.3 cm and its d is 1.0 m while Yc = 2.88 m and its d is 1.52 m. To determine how much the wave pressure is against the cliff wall, we get Fc = 118.9663 Kg/M3 and Ft = 96.87269 Kg/M

With an average wavelength of 4.25 meters and an initial wave height of d = 1 until it hits the cliff wall, the height changes to Yt = 1.36 m with the impact force being Ft = 96,87269 kg/m3 and after hitting the wall it changes to Yc = 2.88 m until it changes back to d = 1.52 m and wave pressure to Fc = 118.9663 kg/m3

With the wave pressure as big as what was mentioned above, it will cause the cliff walls to erode, so the author gives input that it should be given a cliff protector using a gabion or shit file

Formulation of Erosion Management Strategy

The formulation of coastal erosion management strategies is carried out by reviewing literature studies on the concept of coastal planning and

management. The results of this literature study are then compared with the results of the study of the characteristics of the coastal environment in the research area. So that the formulation of the appropriate coastal erosion management strategy is obtained in the research area. Analysis to obtain a strategy formulation in the form of:

a. tree planting on the beach area,

Some of the roles and benefits of mangrove forests include preventing water intrusion against waves, preventing erosion and coastal abrasion, as a natural deterrent and filter, playing a role in island formation and stabilizing coastal areas,

b. Installation of gabions of river stones

The functions of gabions include protecting and strengthening the soil structure around cliffs to prevent landslides, river banks, and embankments. Gabions can also be used as dam-formers to increase the volume of river water.

The riverbanks can experience erosion due to heavy and continuous river currents. Here, gabions will function as guards on the riverbank area from river currents so that the riverbanks will not be easily destroyed.

c. Sheet Pile Installation

Sheet piles are arranged as a retaining structure on highway cliffs, utilization of sheet piles as embankments in river flows, retaining structures in excavations, and sloped retaining structures to prevent the soil from sliding

Kesimpulan

Carried out a field survey of the area along the edge of the Musi River in Prajin Village which is used as a residential area with a population of around 300 families (3RT) the length of the river bank is about + 700 meters. Most of these communities are domiciled on average on the shores of the Musi River, Prajin Village, which has a number of quite severe and complex problems. The problem is related to the decline in land function caused by coastal abrasion. The result has been felt by the people living around the coast.

To find out the tidal conditions, we conducted an observation of the water level of the Musi River which was carried out for 1 (one) month, from 1 (one) February to 28 (twenty-eight) February 2021.

The author has recorded the type of ship that passes by examining the speed of propagation of its wavelength to the cliff wall. Average = 0.107 m/t and average wavelength = 4.25 m and average time = 36.25 s.

Checking the field conditions according to the level of data required by the formula so that data that supports these activities can be obtained such as Yt . = 2.3 cm and its d is 1.0 m while Yc = 2.88 m and its d is 1.52 m. To determine how much the wave pressure is against the cliff wall, we get Fc = 118.9663 Kg/M3 and Ft = 96.87269 Kg/M3

The formulation of coastal erosion management strategies is carried out by reviewing literature studies on the concept of coastal planning and management. The results of this literature study are then compared with the results of the study of the characteristics of the coastal environment in the research area. So that the formulation of the appropriate coastal erosion management strategy is obtained in the research area. Analysis to obtain a strategy formulation in the form of: Planting trees in the coastal area, Installation of gabions of river stones and Installation of Sheet Pile

Referensi

[1] Sharpkaya, T. and Issacson, M., Mechanics of Wave Forces on Offshore Structures, Van Nostrand Reinhold, 1981

[2] Chakrabari, S.K., Hydrodynamics of Offshore Structures, Springer- Verlag, Berlin, 1990

[3] Djatmiko, E.B., Perilaku dan Operabilitas Bangunan Laut di Atas Gelombang Acak, ITS Press, Surabaya, 2012

[4] Pratikto, W.A., Armono, H.D. dan Suntoyo, Perencanaan Fasilitas Pantai dan L Laut, BPFE, Yogyakarta, 1997

[5] Sorensen, R.M., Basic Wave Mechanics: For Coastal and Ocean Engineers, John Wiley & Sons Ltd., Chichester, 1993

[6] Nielsen, P., Coastal and Estuarine Processes, World Scientific Publishing, Co. Pte. Ltd., 2012

[7] Bambang Triatmojo , Teori Pantai Elivasi pasang surut (1999)

[8] G. Eason, B. Noble, and I.N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529-551, April 1955. (*references*)

[9] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.

[10] I.S. Jacobs and C.P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G.T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271-350.

[11] K. Elissa, "Title of paper if known," unpublished.

[12] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[13] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740-741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[14] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989..