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Maritime archeology resources potential in Belitung waters

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Abstract. In the national development agenda, the government is committed to building Indonesia to become the world's maritime axis. The commitment aims to restore the identity of Indonesia as a maritime nation which includes the development of infrastructure, political, socio-cultural, legal, security, and economic aspects. Archaeological research conducted by Balai Arkeologi Sumatera Selatan shows the Belitung waters have potential cultural material resources related to past maritime trade. The issue in this paper is to discuss maritime archeological resources found in Belitung waters through library research from the results of archeological research. This paper aims to provide an overview of Belitung waters which caused shipwrecks that crossing these shipping lanes in the past.

1. Introduction

As an archipelago, Indonesia's development paradigm is still more land-oriented. This orientation has emerged since the influence of European colonialism into the archipelago where the power of the great maritime kingdoms began to weaken. This is because they can explore the sea so that some Indonesian people seem to lose their collective memory of marine culture.

The government is currently committed to developing Indonesia returns to become the world's maritime axis. This commitment aims to make Indonesia as a strong and prosperous maritime country through the restoration of Indonesia's identity as a maritime nation, safeguarding maritime interests and security, empowering maritime potential to realize economic equality. This development covers aspects of infrastructure, politics, social culture, law, security, and economy; enforcement of territorial sea sovereignty; revitalization of marine economic sectors; strengthening and developing maritime connectivity; rehabilitation of environmental damage and biodiversity conservation, and improvement of the quality and quantity of marine human resources.

Based on this, in the development of the world's maritime axis, the government established five main pillars, by rebuilding Indonesian maritime culture; maintain and manage marine resources with a focus on building marine food sovereignty through the development of the fishing industry by placing fishermen as the main pillar; encourage the development of maritime infrastructure and connectivity by building sea tolls, seaports, logistics, and the shipping industry, as well as maritime tourism; maritime diplomacy that invites all Indonesian partners to work together in the maritime sector; building maritime defense forces.



According to [1] since the 7th century AD maritime trade in the Asian region was controlled by large emporiums such as the Umayyads (660-749 AD) and then the Abbasids (750-7870 AD) in the Asian region West, Tang Dynasty (618-907 AD) in the East Asian region and the Kingdom of Srivijaya (7-11 century AD) which controlled the Southeast Asian region. At that time Indonesia was a producer of spices, especially pepper, cloves, nutmeg, and mace [2].

Geographically, Belitung Island is located in the maritime crossing area between the northern and western regions of Indonesia and the eastern regions of Indonesia. The island is surrounded by shipping lines from the Malacca Strait and the South China Sea to the Java Sea. Based on archaeological research Belitung waters are known that the island is not only a destination of merchant ships but is also a transit point in the past shipping lanes. Besides, based on archaeological artifacts from the wreck ship site and the potential of the natural resources of Belitung Island also show that the island is not only a consumer but also a producer of the commodity traded as well as materials needed during shipping.

The condition of Belitung waters is relatively narrow and there are many reefs. This situation could cause an accident when ships passed in these waters. Based on the description above, the problem that will be discussed in this paper is what maritime archeological resources are found in Belitung waters? The purpose of this paper is to provide a description of Belitung waters which is the cause of shipwrecks that crossed the shipping lanes of the past.

2. Materials and methods

This research is a literature study, which uses the method of collection and analysis by reading, recording, and processing data from written sources [3]. The data source in this study is the result of archeology research conducted by Balai Arkeologi Sumatera Selatan from 2010 to 2019.

3. Result and discussion

Overall, maritime archeology sites in Belitung waters can be divided into two types, wreck site, and lighthouses. Six wreck sites have been conducted by Balai Arkeologi Sumatera Selatan from 2013 to 2019, Karangkijang, Karangpinang, Karangkapal, Karangkapal 2 (Karangtimah), Karangkapal 3 (Karangpican), and Karang Kennedy (see Figure 1). Meanwhile, there are four lighthouse sites in the Belitung waters that were researched by Balai Arkeologi Sumatera Selatan in the period 2010-2011, namely Lengkuas Island Lighthouse, Tanjung Lancur Lighthouse, Sumedang Island Lighthouse, and Pesemut Island Lighthouse (see Figure 1). The relative chronology of the wreck site dates from the 8 centuries to the beginning of the 20 centuries, while the lighthouse sites studied to date from the late 19 century. The detailed description of these sites is as follows,



Figure 1. Wrecksite and lighthouses on Belitung waters (source: Balar Sumsel)

3.1 Karangkijang

Karangkijang is 6.2 km to the southwest (258°) from the Fisheries Port of Tanjungpandan, Belitung Regency. This site has a depth of 1.5 - 2 m above sea level with the seabed dominated by sand, soft coral, hard coral, and seagrass (see Figure 2). Based on the material, the artifacts found on this site consist of glass, ceramics, wood, and andesite stone. In general, the artifacts are grouped and in broken conditions. This situation is likely due to illegal excavation and the use of explosives to catch fish [4,5]. Ceramics are the most common artifacts from the Karangkijang, in the form of fragments from the bottom, body, edges, and mouth. The shape of the ceramic artifacts is bowls, plates, cups, jars, pots, and bottles. Ceramics from Karangkijang generally come from China, the Ming and Ching dynasties, Burma, and Europe. In general, the material of ceramics is porcelain and stoneware. The decoration on ceramics from Karangkijang is turtle scales and flora. Based on the number of artifacts and its distribution, ceramics from the Karangkijang are probably commodity. The packing of this commodity is arranged in jars [4,5]. The wood artifacts from Karangkijang are part of the ship's plank, this can be seen from the hole in the plank. The holes in the plank are round and square. Based on the shape of the hole, it is probable that the wreck used pegs and nails. In addition to wood, the artifacts that are part of the ship that sank at Karangkijang were ballast stone. The type of stone used by the ship is andesite. The stone is not formed but still has a natural shape and the size that is almost the same, between 20 cm by 30 cm [4,5].



Figure 2. Situation of Karangkijang site (source: Balar Sumsel)

3.2 Karangpinang

Karangpinang is 12,8 km to the southwest (243°) from the Fisheries Port of Tanjungpandan, Belitung Regency. This site has a depth of 9 - 11 m above sea level with the seabed dominated by sand, soft coral, and hard coral (see Figure 3). Based on the material, the artifacts found on this site consist of ceramics, and iron. In general, part of the artifacts is grouped and scattered and also in broken conditions [4,6]. Ceramics from Karangpinang are fragments of the base, body, and mouth. The shape of the ceramics is bowls, plates, pots, and jars. Overall, the ceramics from Karangpinang originated from China, the late Sung dynasty, and the Ming dynasty. In general, the basic material of ceramics is porcelain and stoneware. On one of the jars on his shoulder, there was a Chinese character stamp. The decoration on the ceramics from Karangpinang is flora. Decorative techniques in ceramics are painting. Like ceramics from Karangkijang, ceramics from Karangpinang are probably commodities [4,6]. Iron artifacts from Karangpinang are probably frying pans. Based on the condition when it was found that it was piled up, it was estimated that the frying pan was one of the commodities transported by the ship that sank on Karangpinang. Other iron artifacts from Karangpinang are assumed as smelting container. This assumption is based on the thickness of the container which reaches 0,8 cm, the diameter is 45 cm, and has a basin as deep as 20 cm [4,6].



Figure 3. Situation of Karangpinang site (source: Balar Sumsel)

3.3 Karangkapal

Karangkapal is located on a cluster of barrier-reefs which is \pm 13 km north of the pier of Sungaipadang Village, Sijuk District, Belitung Regency. Environmental conditions around Karangkapal have many fringing reefs, shallow waters, and intertidal zone. The ship that sank on this site is a wooden ship whose condition is damaged and no longer forms the profile. Parts of the ship which are mostly wooden blocks deposited on the reef slope area at depths from \pm 7 meters to the seabed at \pm 16 meters depth [7,8]. Part of the ship that is deposited on the reef slope is partly below the reef rubble, while the other part deposited on the seabed is partially covered by sand (see Figure 4). Also, in some parts of the ship have been overgrown by coral reefs. The distribution of artifacts in Karang Kapal is spread over \pm 70 meters, with an irregular distribution pattern parallel to the reef slope zone [7,8].



Figure 4. Situation of Karangkapal site (source: Balar Sumsel)

3.4 Karangkapal 2 (Karangtimah)

Karangkapal 2 is located 100 meters from Karangkapal and has a depth of 3 to 10 m above sea level. The condition of the seabed is dominated by sand, soft corals, and hard corals (see Figure 5). This site is known by the locals of Sungai Padang Village by the name Karangtimah. This name is caused in the 1990s when the site was discovered there were many tin ingots inside the ship that sank at the site. The cause of the sinking of the ship at Karangkapal 2 is seen from the distribution of artifacts in the middle of hard corals, most likely due to crashing the coral formations that ran from west to east. Especially when viewed from the depth of the ship components that are at a depth of between 3-5 meters. Coral growth at a depth of between 5-10 meters will be faster because it is in an aquatic environment that is still able to be reached by sunlight [7,9].



Figure 5. Situation of Karangkapal 2/Karangtimah site (source: Balar Sumsel)

3.5 Karangkapal 3 (Karangpican)

Karangkapal 3 is located in 11.0 km to the northwest of 318° from the pier of Selindang River, Kelapakampit District, East Belitung Regency. This site has a depth of 3 to 5 m above sea level with the seabed dominated by sand, soft coral, and hard coral (see Figure 6). Environmental conditions around the site are fringing reefs, shallow waters, and intertidal zone. Karangkapal 3 is located in a barrier reef known by the locals as Karang Pican [7]. The ship found on this site is an iron ship. The condition of the ship has been damaged because many of the ship's components have been cut by residents. In general, the condition of the ship is not entirely observed so that the possible cause of the wrecked ship is unknown [7].



Figure 6. Situation of Karangkapal 3/Karangpican Site (source: Balar Sumsel)

3.6 Karangkennedy

Karangkennedy has located 15.2 km to the south of 179° from the pier of Mentigi Village. At this site, there is the wrecked ship but the whole shape cannot be recognized. However, based on the artifacts found it was a coal-fired iron steamship. The wreck is located in the North of Basar Tengah Island or Kennedy Island. The location is approximately 100 meters from the beach at a depth of 17-18 meters above sea level with the seabed in the form of muddy sand and there are many *Euplexaura sp* [10,11]. Geographically the location of the wreck is in the gap between two coral reef formations. So, it is suspected that the ship sank because it was trapped in shallow water so it got stuck in that gap. The artifacts found at this site consist of glass bottles, ceramic plates, ceramic cups, coal, iron fragments, wood, and nails that are part of the ship's components [10,11].

3.7 Lengkuas island lighthouse

This site is located in Tanjung Kelayang waters, Sijuk District, Belitung Regency (see Figure 7). This lighthouse serves to guide ships across the Karimata Strait. Built-in 1882, it has a circle shape and is made of metal. This site is a group of buildings surrounded by a 46.1 m long wall, 32.5 m wide, and 1.5 m high. In the center of the site stands a 65 m tall lighthouse [12,13].



Figure 7. Lengkuas island lighthouse (source: Balar Sumsel)

The lighthouse has 19 floors, with the entrance is on the northwest side. Above the entrance, there is a seven-line Dutch inscription, most of which letters are unclear because it is rusty. Dutch inscriptions are also found on the outer wall of the 1st floor. The condition of the inscription was peeling off due to rust so that several letters were no longer legible. From the 1st floor to the 16th floor has a wall of the metal plate. Each floor provided a ladder made of metal. The height of each floor varies, and also has two windows that are located vary, namely in the north and in the south or the west and the east. 17th and 18th -floor walls are made of wood planks with a metal wall frame. The outside of the 18th floor has a 60 cm wide terrace with an iron fence. At the top of the exit door, there is an inscription in English from a metal plate measuring 12 cm long and 8 cm wide. The 19th-floor wall is composed of glass panels with lights that were originally fueled with butane gas, but are now replaced with diesel oil [13].

3.8 Tanjung Lancur lighthouse

Built-in 1883, this lighthouse functions to guide ships that pass around Mendanau Island in Gelasa Strait waters. This lighthouse is located on a cape that has relatively high cliffs, steep, and rocky (see Figure 8). Around the lighthouse, there are no settlements except the lighthouse keepers' houses. The location of the lighthouse is surrounded by a wall measuring 45.9 m long, 32.8 m wide, and 2 m high [12,13]. Tanjung Lancur Lighthouse's shape is twelve square with a circumference of the bottom 23.3 m. The lighthouse is made of metal plates and has nine floors with 14 windows and an entrance.



Figure 8. Tanjung Lancur island lighthouse (source: Balar Sumsel)

3.9 Sumedang island lighthouse

Geographically the lighthouse is located in the Java Sea about 50 km southwest of Belitung Island (see Figure 9) [12,13]. The lighthouse was built in 1882 and its shape, technology, size, and time of

manufacture do not differ with the lighthouse on Lengkuas Island. The lighthouse entrance is located on the east side.



Figure 9. Sumedang island lighthouse (source: Balar Sumsel)

3.10 Pesemut island lighthouse

Geographically the lighthouse is located on an island which is about 65 km northeast of Belitung Island. This lighthouse functions to guide ships across the Karimata Strait (see Figure 10). The period of establishment is unknown but probably contemporaneous with three other lighthouses. Similar to the previous lighthouses, this site is a group of buildings that function as keepers' houses and machine rooms. In general, the buildings on this site have changed and new [12,14].



Figure 10. Pesemut island lighthouse (source: Balar Sumsel)

3.11 The cause of shipwrecks

Long-distance voyages did not only go to one port but also stop at several ports. At each transit point, commodities carried by the ships are traded and traders also buy other goods that are sold at those places. Besides, the ships also need to stop by to get supplies of food, drinks, and repair their ships. The weather is also one of the reasons why ships need to stop at a port. The monsoon wind that blows across the archipelago is very influential on shipping schedules, so the ships must wait for the right wind direction to sail to the destination port [15].

The geographical conditions of the archipelago cause monsoon wind to change direction every six months. From September to November the direction of the wind blows from west to east so that by utilizing this natural phenomenon in these months is the best time for ships from the western region to sail to the eastern region of the archipelago and vice versa from December to February [1]. Besides, in the archipelago waters there is often a sudden monsoon storm, although it does not last long it is very dangerous because it can block the view of the sailor so that it can be trapped into shallow water areas or crashing into reefs.

Base on Blue Chart Pacific Map, the Gelasa Strait is the shortest path from the direction of the Malacca Strait and the South China Sea to the Java Sea, but this strait is narrow and there are many small islands and shallow waters. Although as not as narrow as Gelasa Strait, geographically Karimata Strait has many reefs that stretch from the north to the eastern part of Belitung and in some locations, there are shallow waters and their depth is affected by tides. This situation is more complicated by the existence of islands and reef in the eastern part of Belitung as if it is a 'barrier fence' which extends nearly half of the width of Karimata Strait (see Figure 11).

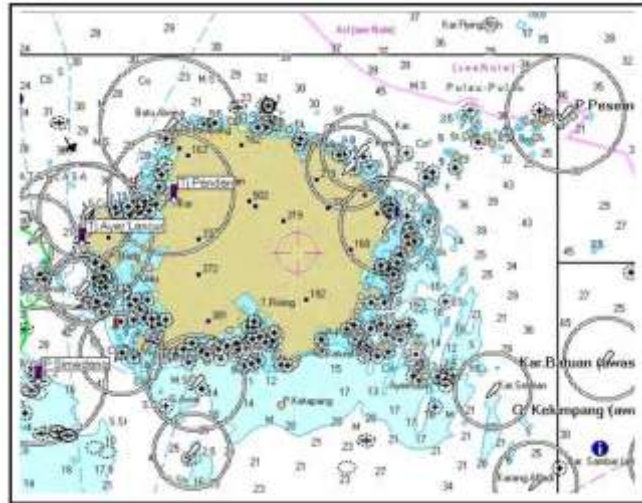


Figure 11. The situation of Gelasa and Karimata Strait (source: Balar Sumsel)

There are four main factors cause the shipwreck, namely marine geography knowledge, weather knowledge, warfare, and human neglect [16]. Based on the environmental conditions of the wreck sites that have been researched it can be estimated that the wreck ships because they crashed into a reef where they were previously trapped in shallow water. In general, the wreck sites are located in a group of reefs and intertidal zone so that they are unwittingly disastrous for ships passing through Belitung waters. Observation of water conditions is related to the local marine geography knowledge that must be owned by sailors so that the ship will not crash into reefs and avoid being sunk.

At first, the markers used by past seafarers are landscapes as navigational signs such as hills, cape, or small islands. Furthermore, the landscape was replaced by the lighthouse as a marker that marked the condition of a watershed. Lighthouses are built at dangerous locations such as reef, sandbank, shallow water, or narrow path to direct the ship by following the outer flare light which is a safe distance from the dangerous places. [17] the reefs and sandbanks are the most common hazards faced in navigating large vessels in Indonesia water. Marine accidents in these waters during the second half of the XIX century were mainly due to the absence of reliable sea maps and a description of navigable pathways. For this reason, the Dutch East Indies government from 1870 to 1933 carried out trigonometric research on Indonesia waters and built navigation signs [10,11].

3.12 Management of maritime archeology resources as tourism objects

In general, the depth of the wreck site in Belitung waters is quite ideal for divers of various criteria. Management of the site to become a tourist attraction product can be done by looking at conservation goals that take into account the nature and conditions of the site. Wreck dive is special interest tourism that only has less interest as other dive tourism, so for sustainability, it must be synergized with other dive tourism objects, such as coral reefs [18]. Observations at the time of the research, coral reefs are found around the site consists of hard coral and soft coral. Hard coral is dominated by Acroporidae while soft coral is dominated by *Goniopora sp* and *Sarcophyton sp* (see Figure 12).

The management of maritime archeological resources aims to protect and preserve the resources themselves. Law number 11 of 2010 about Cultural Heritage mentions that the physical preservation

of the Cultural Heritage, and the value it contains must receive legal protection by the government. Preservation of archeological resources is not just about preserving the physical object, but what becomes more fundamental is preserving the value contained by these resources. With legal guarantees, the existence of the cultural heritage can be maintained so that it can be utilized and developed for the benefit of the community [18].



Figure 12. Variation of coral reef in Belitung waters (source: Balar Sumsel)

4. Conclusion

Archeologically, the existence of wreck sites in Belitung waters proves how dangerous these waters were in the past shipping lanes. For Belitung waters, what was mentioned by Stroomberg can be proven where there were four lighthouses in these waters that were built in the period 1882-1883. The four lighthouses are located on Lengkuas Island in the northern waters, Sumedang Island in the southern waters, Tanjung Lancur in the western waters, and Pesemut Island in the eastern waters.

Until now, maritime archeological resources in Belitung waters are still not fully utilized either by the local community or government. Aside from being beneficial to science, archeological resources should also benefit the community. These benefits can ultimately lead to a sense of belonging so that the community will feel an interest in preserving archaeological resources which are a cultural heritage of the past.

Maritime archeological resources can be utilized as one of the economic resources of the community, as a marine tourism attraction, especially diving tourism. Maritime archeological resources and its environment need to be packaged in the attractiveness of marine tourism products including diving tourism based on coral reef conservation and site conservation. Integrated management of maritime archeology resources with other marine resources is needed because they are related to the sustainability of these two resources so that they can bring in tourists and investors who can ultimately increase the income of the local community.

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