Shipwrecks around the World
Revelations of the past

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Maritime archaeological explorations in Indonesian waters

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Indonesia has a vast sea of approximately 5.8 million km² and has a large potential resource, both in terms of quantity and diversity. Indonesia is the largest archipelago in the world which consists of 17,480 islands which stretch across 5,100 km along the equator between the Pacific and Indian Oceans with a 95,181 km coastline (Nontji, 2002; Soesilo, 2006: 1-2). The Indonesian archipelago has had a strategic position as a very busy international shipping and sea trading line between the Western and Eastern world since ancient times because it is located in ‘The Silk and Spices Routes’ (Reid, 1993; Ricklefs, 1999)¹ (Fig. 1). Since the early centuries AD, Indonesia has had the history of being a ‘maritime country’ where Indian, Arab and Chinese² merchants met such as in Sriwijaya, Cirebon, Batavia, Bintan, Ternate, Tidore, and Aceh (Djamil, 2009; Billiton, 2004). Many famous voyagers such as Marco Polo, Magellhaens, I-Tsing, Cheng Ho, Ibn Batutah, James Cook, Raffles and many more noted Indonesia as the archipelago of many kingdoms and prosperous Spice Islands. Indonesia is well known for exotic herbs and spices such as nutmeg, cloves, vanilla, turmeric, ginger, tea, coconut, coffee, cocoa, tobacco, and cinnamon which is recognised as the best and the most flavourful cinnamon in the world (Reid, 1993; Poesponegoro and Notosusanto, 1984). Since the kingdoms in the archipelago have been emerging and growing, the spice trade have been very busy. Pepper, cloves, and nutmeg of Maluku are very popular³. Nusa Tenggara’s sandalwood and myrrh which many found in the forests of Borneo and Sulawesi, were well-liked by Indian and Chinese people for their religious ceremonies. The spice trade was a major economic pillar in colonial times, hence the Dutch felt it was important to control the manufacturer in Indonesia and colonized Indonesia for more than 350 years. Therefore, a lot of Dutch VOC ships came to Indonesian territory. Information and an overview of VOC ships that crashed, were wrecked, and lost in Indonesian waters can be known from the VOC Archives. These shipwrecks and their contents have become maritime archaeological resources which scattered in Indonesian waters territory.

Maritime archaeological resources known as the ‘Archaeological and Historical Objects’ (United Nations Convention on the Law of the Sea/UNCLOS 1982), ‘Underwater Cultural Heritage’ (UCH) (UNESCO Convention on the Protection of Underwater Cultural Heritage 2001), Objects of Cultural Property (Indonesian Law No. 11/2010), or also ‘Valuable Objects from a Sunken Ship’ (Presidential Decree No. 19/2007 regarding the National Committee for Salvage and Utilization of Valuable Objects of the Sunken Ship. UNESCO Convention 2001 also mentions that underwater cultural heritage that is found should be stored, preserved, and managed in a way that ensures long-term maintenance (Article 2, paragraph 6).
The Potential of Maritime Archaeological Resources in Indonesia

The number of UCH in Indonesian waters until World War II is expected to reach thousands based on historical sources, i.e. Vereenigde Oostindische Compagnie (VOC) Shipwrecks List (Dutch VOC Shipwreck, n.d, http://www.vocshipwrecks.com), English East India Company (EIC) data (East India Company Ship, http://www.eicships.info/voyages/lost-t.htm: 1999), Chinese sources, the literature about the Pacific War, the research results of Ministry of Marine Affairs and Fisheries and Ministry of Culture and Tourism, and also based on data from the National Committee for Salvage and Utilization of Valuable Objects of the Sunken Ship (popularly known as PANNAS BMKT). According to the data from
Ministry of Marine Affairs and Fisheries in 2002, there are around 463 ancient ship locations based on information from Chinese literature, VOC archives, EIC archives, etc. Chinese historians said that between 10th and 20th century there was around 30,000 Chinese ships which sailed into Indonesian waters territory but did not return. From VOC archives it was known that there were 245 VOC ships sunk in Indonesian waters. Since the year 1650, there were about 800 Portuguese ships that sailed from Lisbon, and 150 of them were lost. Between 1600 and 1800, the EIC lost more than 7,000 ships. In 1808-1809, the EIC lost 10 ships that were sailing home with an estimated worth of charge approximately one million Pound Sterling. VOC also lost 105 ships that sailed between the years 1602 and 1794. Between the years 1725-1749 VOC lost 44 ships (Ridwan, 2011; Wells, 1995; Supangat, 2006). Nowadays, in Indonesia, the underwater artefacts which are the result of both legal and illegal exploration which have been done by a number of shipwreck salvage companies, are still spread over in a number of warehouses as in Cileungsi (301,000 pieces), Sentul (32,072 pieces), Sawangan (47,095 pieces), the National Gallery (around 23,500 pieces), and Tanjung Priok (9,500 pieces), and some still stored in Bintan, Jepara, and Lodan warehouses.

**National Regulation**

In Indonesia, the first product of law which protect the cultural heritage is *Monumenten Ordonnantie* No. 19/1931 (Staatblad 1931 No. 238) later changed into *Monumenten Ordonnantie* No. 21/1934 (Staatblad 1934 No. 515). Today maritime archaeological resource is a cultural heritage that is protected and regulated by Law No. 11/2010 regarding Cultural Property Protection. This new law is a revised result from Law No. 5/1992. From an economic viewpoint a shipwreck and its cargo in the Indonesian territorial waters have been considered as a treasure which was thus much sought after by treasure hunters locally, nationally, and internationally. Since the number of UCH theft cases like the *De Geldermalsen* incident in Riau Islands which was led by Michael Hatcher, the government established National Committee for Salvage and Utilization of Valuable Objects of the Sunken Ship (*PANNAS BMKT*) in 1989 based on Presidential Decree No. 43 Year 1989 regarding the Establishment of *PANNAS BMKT*. This committee was formed to deal with the case of salvaging sunken treasures, to manage and to issue the permit for salvage companies because the presidential decree allows private companies to conduct surveys, exploration, and artefact removal from shipwrecks. *PANNAS BMKT* consists of a number of ministries in Indonesia. To complicate matters, management of *PANNAS BMKT* changed hands from the Minister Coordinator of Politics, Law, and Defence to the Minister of Marine Affairs and Fisheries with the Minister of Culture as a vice chairman after the Belitung wreck was salvaged in 1998. Presidential Decree No. 43/1989 was replaced by Presidential Decree No. 107/2000 and then has been changed again to be Presidential Decree No. 19/2007.
Legal Maritime Archaeological Exploration in Indonesian waters

Explorations of sunken ships have been done legally with the permission of the government with special handling by PANNAS BMKT (Table. 1). There are 26 licences from PANNAS BMKT which have been issued for several salvage companies to conduct survey and salvage; out of 12 survey activities only 10 salvage activities have been done. Here are some famous shipwreck sites in Indonesian waters that have been explored:

Table. 1 Maritime Archaeological Explorations in Indonesian Waters (1986 – 2007)
( Resource: National Committee of Salvage and Utilization of Valuable Cargo from Sunken Ship, modified by Agus Sudaryadi, 2011)

<table>
<thead>
<tr>
<th>Years</th>
<th>Location</th>
<th>Companies</th>
<th>Artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>Karang Heluputan, Riau (De Geldermalsen)</td>
<td>Illegal (Foreigners)</td>
<td>140.000 ceramics 225 gold bars</td>
</tr>
<tr>
<td>1989</td>
<td>Pulau Buaya, Riau</td>
<td>Muara Wisesa Samudera</td>
<td>30.000 ceramics etc.</td>
</tr>
<tr>
<td>1991</td>
<td>Pulau Belanda, Kepulauan Seribu, DKI Jakarta</td>
<td>Illegal (fishermen)</td>
<td>1183 ceramics etc.</td>
</tr>
<tr>
<td>1997</td>
<td>Kepulauan Seribu, DKI Jakarta (Intan wreck)</td>
<td>Sulung Segara Jaya and seabed exploration</td>
<td>11.000 ceramics etc.</td>
</tr>
<tr>
<td>1998</td>
<td>Batu Hitam, Belitung (The Belitung wreck)</td>
<td>Sulung Segara Jaya and seabed exploration</td>
<td>60.000 ceramics Gold vessels, Silver etc.</td>
</tr>
<tr>
<td>1999</td>
<td>Blanakan, Subang, West Java</td>
<td>Lautan Mas Bhakti</td>
<td>14.000 ceramics etc.</td>
</tr>
<tr>
<td>2000</td>
<td>Selat Gelasa, Bangka Belitung (Teksing)</td>
<td>Illegal (Foreigners)</td>
<td>400.000 ceramics etc.</td>
</tr>
<tr>
<td>2001</td>
<td>Karang Cina, West Kalimantan</td>
<td>Tuban Ocean Research Recovery</td>
<td>25.000 ceramics etc.</td>
</tr>
<tr>
<td>2004</td>
<td>Karang Heluputan, Riau</td>
<td>Adi Kencana</td>
<td>25.000 ceramics etc.</td>
</tr>
<tr>
<td>2004</td>
<td>Cirebon Utara, West Java</td>
<td>Pratama Putera Sejahtera</td>
<td>314.171 ceramics etc.</td>
</tr>
<tr>
<td>2005</td>
<td>Teluk Sumpat, Riau</td>
<td>Adi Kencana</td>
<td>15.000 ceramics etc.</td>
</tr>
<tr>
<td>2005</td>
<td>Perairan Datu, West Kalimantan</td>
<td>Illegal (Fishermen)</td>
<td>280 ceramics</td>
</tr>
<tr>
<td>2007</td>
<td>Mandalika, Jepara, Central Java</td>
<td>Adi Kencana</td>
<td>unknown</td>
</tr>
</tbody>
</table>
1. Java Sea Wreck

A shipwreck in the Java Sea were discovered and looted by fishermen before the site was notified to the licensed salvage company in Indonesia. Due to lack of funds, the excavation was continued by Pacific Sea Resources under the coordination of Michael Flecker 1996. This ship is believed to be of Indonesian ship from the 13th century which sailed from China to Java with a cargo of iron and ceramics. A total of 200 tons of iron shipped in the form of cast iron and wrought iron bars. There are also 100,000 pieces of ceramics and approximately 12,000 ceramics from the Song Dynasty which consist of bowls and plates of the early celadon type from kiln in South China (Ardiwidjaja, 2006: 4-5). Half of the cargo was handed over to the Indonesian government, and the other half was donated to the Field Museum of Natural History, Chicago, USA (Flecker, 1999: 10).

2. Intan Wreck

The Intan shipwreck that has been found by Indonesian fishermen lies only 18 km from the Java Sea Wreck location. The Indonesia Navy arrested the fishermen when they began to loot the contents of the shipwreck, and then notified the licensed company in Indonesia as an effort to rescue the shipwreck’s cargo. Then in 1997, the company worked together with a German company, The Seabed Explorations, to conduct a thorough excavation on site. The Intan wreck has been dated early to mid 10th century through Chinese coin dates, stylistic analysis of ceramics, and radiocarbon dating. From timber identification, a glimpse at construction techniques, cargo types, wreck location, strongly indicate that Intan is an Indonesian ship of lashed-lug construction (Flecker, 1999: iv). This ship may have sailed from the capital of Srivijaya, Palembang, headed to Central Java or East Java. The cargo ship is very diverse, consisting of several thousand Chinese ceramics, tin bullion, silver, bronze, Indonesia gold jewellery, Chinese mirrors, Arabic glass, cast iron, figure of Kala head (Fig. 2), and a variety of organic materials (Ardiwidjaja, 2006: 5).

3. Belitung Wreck (Tang Cargo)

The wreck was discovered by fishermen diving for sea cucumbers in 1998 in Karang Hitam Water, the Gelasa Strait, in 16 m depth of water less than 3 km off the western shore of Belitung Island. The dig was subsequently financed and excavated by Tilman Walterfang and his team at Seabed Explorations, under a license of co-operation with the original salvage company, and after a request from the Indonesian Government and security was provided by the Indonesian Navy. The excavations spanned two expeditions, one which commenced in August 1998 and the second in 1999. The exploration of Tang Cargo involved Michael Flecker. The underwater artefacts have been raised from the sea and then have been delivered (18 gold pieces) to Germany and (47759 ceramics) New
Zealand in April 1999 with the permission of PANNAS BMKT (Fig. 3). These items are then auctioned off and purchased by the Sentosa Leisure Group, Singapore. The auction which was held in Christie’s reached US$ 32 million. The agreement to share a half of selling value with the Indonesian government has been broken and Indonesia got only US$ 2.5 million. Besides, Indonesian government has only 39 collection objects. However, 50% of the Tang Cargo artefacts should have become the property of the Indonesian government. The problem of Tang Cargo then was handed over by the Minister Coordinator of Politics, Law, and Defence to the Minister of Marine Affairs and Fisheries on January 7, 2003 (Sudaryadi, 2011; Krahl, et al., 2011; National Committee Report, 2003).

4. Cirebon Wreck

Shipwreck exploration in Cirebon waters was carried out by Paradigma Putra Sejahtera Company (PT PPS) in cooperation with Cosmix Company from Belgium since early May 2004. At first, the fishermen in Cirebon found urn-shaped Chinese ceramic, gold fragment, silver, precious gems, and porcelain at 30 m depth. Based on the fishermen’s information the PT PPS began an exploration in that area with the permit of PANNAS BMKT. All
objects removed from the site amounted to 314,171 pieces of artefacts consisting of ceramics, pottery, carnelian beads, lapis lazuli beads, opal beads, glass beads, wooden beads, a bronze statue of Tara, *khakkara*, *visvavajra*, *ghanta*, *darpana*, tripod for tubs, bowls and spoons bronze, mortar and pestle, sword hilt of gold, Chinese coins, a stone inscription in Arabic, and others (Fig. 4). Cirebon shipwreck is thought to originate from the 10th century AD and believed to be the original ship of Southeast Asia. The ship is estimated to have lifted anchor at a port of the Srivijaya Kingdom in Sumatra. The process of salvaging was done systematically under supervision of government official (Utomo, 2008). Until recently, most of the artefacts from Cirebon shipwreck site were stored in the Pamulang and Cileungsi Warehouse (Fig. 5). In addition to the artefacts removed to the surface, in *Cirebon* shipwreck site could still be found the remains of the wooden hull were thought to originate from the 10th century AD (Fig. 6).

**Illegal Maritime Archaeological Exploration**

There are a lot of ships that crashed and sank in Indonesian waters. The ships are mostly merchant ships carrying valuable cargo so that they are much targeted by treasure hunters.
Fig. 4 Artefacts from Cirebon shipwreck site. (National Committee of Salvage and Utilization of Valuable Cargo from Sunken Ship)

Fig. 5 Artefacts from Cirebon shipwreck site in display room in Pamulang warehouse. (Nia Naelul Hasanah Ridwan, 2011)
Theft of maritime archaeological resources by individuals or companies, local and foreign, has been rife in Indonesia since the 1980’s until now. Looting problem in Indonesia is very serious. The looters are not only private companies, local or international, but also local people, for example villagers or fishermen who live near the location of the shipwreck sites. The local people often hunt the treasure from the shipwreck due to the poverty problem that they are facing. They take not only the pieces of artefacts but also iron parts of the ship. The iron price from the shipwreck is quite high in the market because it has better quality rather than the recent iron (Ridwan, 2011). The establishment of PANNAS BMKT has not yet reduced the illegal exploration of underwater sites. During 2005-2011 there have been 11 theft cases reported. The following are the examples of huge and well-known illegal salvaging cases in Indonesian waters:

1. De Geldermalsen (Nanking Cargo)

In 1985, Michael Hatcher conducted illegal exploration of cargo VOC shipwreck, De Geldermalsen, which sank in 1752 in Karang Heluputan water, Tanjung Pinang, Riau.
Hatcher has lifted 225 gold ingots and 160,000 pieces of ceramics of Ming and Qing Dynasty. The results auction of these artefacts at Christie’s reached to US $ 18 million. *De Geldermalsen* exploration was one case which inspired to seek and get ‘the treasure’ from a shipwreck in the sea, particularly in Indonesian waters. On the other hand, the *De Geldermalsen* case also made the government of Indonesia begin to pay attention to the importance of underwater heritage in their territory (Ardiwidjaja, 2007; Flecker, 1999; Habermehl, 2011).

### 2. Gelasa Strait Shipwreck (*Tek Sing* Cargo)

On June 5, 1999, Michael Hatcher again discovered and explored illegally the shipwreck in Gelasa Strait, South Sumatra which is known as *Tek Sing* Cargo. The big part of the finding which was blue white ceramics was put into 43 containers and sent to Australia. The remains of a shipwreck which was named *Tek Sing* is a large Chinese junk boat, measuring 50 x 10 m, and weighs about 1000 tons. *Tek Sing* sailed from Xiamen, China in January 1822 headed to Java, carrying 400 crew and at least 1,600 passengers. In February 1822 there was a disaster; *Tek Sing* hit a coral island in the South China Sea, 2° south of the equator, in the eastern part of northern Sumatra and Java. Besides passengers, the *Tek Sing* was carrying more than 350,000 pieces of Chinese ceramics consisting of plate bowls and cups. Other items were iron cannon, brass and bronze, pocket watches, Chinese ink containers, candle holders, folding knives, incense burners, and Chinese coins. Most of the ceramic is a kind of blue and white ceramics from the 19th century which are produced from the Dehua kilns in Fujian province. The goods of *Tek Sing* cargo were mostly auctioned in Nagel Auction in Stuttgart, Germany in November 17-25, 2000. The auction reached 7,000,000 DM. Government of Indonesia requested as many as 1400 best ceramics and half of auction results (Ardiwidjaja, 2007; Flecker, 1999). Then those ceramics were brought home to Indonesia and handed over to the National Museum.

### Recent Research on Maritime Archaeology in Indonesia

In 2001, Research and Development Centre for Marine and Coastal Resources was formed based on the Ministerial Decree No.1/2001 regarding Organization and Administration of the Ministry of Marine Affairs and Fisheries. In this research centre there is a Sub Division of Marine Archaeology. The main task and functions of Sub Division of Marine Archaeology are: preparing materials of technical analysis for development policy, planning and conducting programs and activities, and evaluating marine archaeological research. So since 2001 until present, this research centre has been carrying out strategic research related to maritime archaeology such as searching for, recording, identifying, and analysing the underwater sites in Indonesian waters, and studying how to protect and manage the maritime archaeological resources, and also studying maritime archaeological research methods. There are many things that we need to develop.
such as: conservation and preservation, community based development, sustainable development, balancing on carrying capacity (natural and cultural), etc. Our research results will be disseminated to international, national, and local stakeholders. The major output from research can be utilized to support the maritime archaeological resources development. Within each maritime archaeological research activity, we always strive to work together and involve the other related institutions such as Directorate of Underwater Heritage, Directorate of Coastal and Marine Office for Preservation of Archaeological Heritage of Makassar, Tourism Research and Development Centre, The Office for Tourism, Arts, and Culture; The Office for Fisheries and Marine Affairs in every regency, etc.

Our research centre, as an institution under the Ministry of Marine Affairs and Fisheries, Republic of Indonesia has a role in giving research support and scientific input in the management and development of maritime archaeological resources as a part of marine and fisheries sector, and also in supporting the marine and fisheries policy, including policy related to maritime archaeology or underwater cultural heritage. This role becomes more important with the growing challenges of the future. The mission is to bring this sector as one of the leading sector in national economic improvement, national welfare improvement, and community self-supporting empowerment. The establishment of the role must be exposed through productive and effective applied research. The maritime archaeological survey team in Ministry of Marine Affairs and Fisheries has been equipped with marine survey equipment such as side scan sonar, multibeam echosounder, GPS, DGPS, underwater and video camera, ROV, and diving equipment. Our maritime archaeological research always uses various methods ranging from literature studies, archives, interviews, and field survey to collect underwater archaeology data (Wirasantosa et al., 2006). In the field we use the diving method and a number of marine equipment to search for the shipwreck (Fig. 7). Sometimes we take a number of artefacts from underwater sites to the surface for the purposes of research and rescue. We also conduct assessments of various aspects for protection, preservation, utilization, and development in the future.

The aim of maritime archaeological research activities in our research centre are:

- Determine the existence and location of maritime archaeological resource
- Assess the significance of maritime archaeological resources, marine conditions, and its existing condition for the development of the region
- Map the cross-sectional profile of the seabed and the inventory of locations of shipwrecks
- Examine the prospects for the utilization interests of science, culture, and the economy.
- Invite the participation of the general public to raise the ‘sense of belonging’ to the people themselves who directly will maintain the site as their cultural assets.
- Discover the distribution of the wreck site to determine the pathways or shipping networks and trade in the past. In addition, historical data can also examine whether the presence
of sunken ships are in accordance with a written source, or if not contained in it, it will add a new historical data.

- Knowing the types, origins, and the chronology of commodity goods, as well as the pattern of distribution of goods. Whether in a vessel containing only one type of commodity or more.

- Knowing the archipelago’s strategic role in the international-regional trade.

- Providing information to the public about the legal aspects in the exploration of maritime archaeological resources on the seabed.

- Knowing the type of conservation necessary to preserve the maritime archaeological resources and identify the factors that cause its damage and deterioration whether human factors or natural process such as disaster and climate change impact.

- Up to now Indonesia has not fully developed a system of zoning that can be used as guidelines to clarify the potential designation of an area of shipwreck site for conservation purposes as well as marine tourism interests. It is expected that studies on this will provide a general description of potential areas to support the formulation of regional
tourism development master plan required by the government, especially local governments in setting the direction for a better policy in the development of wreck diving.

- Provide solutions to develop marine resource use patterns for the management of marine, coastal and small islands of Indonesia.

The scope of the maritime archaeological research activities in our research centre include:

- Consultation and technical meetings with relevant resource persons to obtain input and suggestion.
- Coordination with local governments to prepare everything necessary for the survey activities, including transportation, accommodation, equipment, etc.
- Collecting historical data (literature study) on the distribution of shipwreck of old documents (from National Archives, National Library, and other sources and also the web study).
- Collecting information from the community through interview techniques. This activity is conducted to capture information about the existence of archaeological remains of marine resources found in the study area, historical background, and others. Interviews conducted on local government, community leaders, fishermen, sea cucumber diver, and others (Fig. 8).
- Collecting archaeological data: assessment of the location (reconnaissance), the initial observations of maritime archaeological remains

Fig. 8 Interviewing local people as a part of research survey activity (Ministry of Marine Affairs and Fisheries)
Mapping the topography of the seabed and site anomaly through the cross-sectional profile of marine sediments by boat rides and Side Scan Sonar equipment

Collecting data about the local oceanic data in the form of tides, current conditions, wave, as well as sampling i.e. to measure water quality.

Synthesis, analysis, and interpretation of overall data.

Marine archaeological research in principle is not different from land archaeological research. The key difference is the working environment and differences in equipment used. Archaeological research work in the water has a number of difficulties and requires expertise in diving, mastery of technology and marine instruments for the search and plotting the location, as well as findings documenting efforts that require underwater photography capabilities (Koestoro, 2007). Marine archaeological research in Indonesia continues to be encouraged to try to apply the latest technologies such as the use of underwater robots (ROV), tracking using side scan sonar, and use of sound waves. The technology is used to produce maps of underwater videogrammetry (Soesilo, 2006: 307). Combining several methods in imaging the seafloor object, such as side scan sonar data, multi-beam echosounder, underwater camera and underwater video. ROV, sub bottom profiling, proton magnetometer, will provide more information about the shape and size of the object without having to go to the seabed. Meanwhile, the positioning system would tell us latitude and longitude position. Various types of positioning systems can be used as stand-alone Global Positioning System (GPS), differential GPS (DGPS), and microwave/fix transponders. To search the location, the points are made by tracking the path using the base map. Transect is shown on top of some basic maps and Landsat satellite imagery. Map used is usually a sea map published by Navy Bureau Hydro oceanography (scale 1: 200,000) and digital vector maps published by RAN. Meanwhile, the navigation survey is conducted in real time where the map or the image is displayed using the Global Mapper program connected with the GPS. This allows the design of a survey to be made earlier and at the time of the survey the vessel track may continue to be displayed on the computer.

In survey activity, diving is usually done several times to verify the existence of the targeted shipwreck based on the locals’ information, and side scan sonar and echosounder data anomalies. Diving activities are also conducted to record the site conditions and the condition of the ship and its cargo. Diving equipment used in marine archaeological survey work in Indonesia has been in accordance with the standards of dive safety from Diving Sports Association of Indonesia (POSSI). Diving techniques undertaken in marine archaeological survey activities can be found in NAS Underwater Archaeology Guide such as a linear search technique, circular search technique, and others (Bowen, 2009). There are many significant factors considered in the planning and carrying out of shipwreck research for example the diversity of the local environmental conditions, different natural conditions of each site, especially the condition of oceanographic, hydrographic, geological,
morphological, and climate, are the main basic elements in addition to the culture and demographics. Elements of it will be very important as an input to the formulation of planning and management of the shipwreck site area.

In survey activities in Indonesian territorial waters, sometimes there are a number of constraints encountered by researchers such as:

- Inadequate number of personnel and equipment, especially if the research activities are carried out in small islands.
- Weather conditions and water conditions that sometimes become difficult.
- Local government and local communities sometimes do not support research activities due to a lack of awareness.
- The researchers sometimes have to deal with treasure thieves both by local communities as well as a private company.

**Conducted Maritime Archaeological Research in Several Regions in Indonesia**

1. **Mandeh Wreck, Pesisir Selatan Regency**

Mandeh shipwreck site is located in Pesisir Selatan Regency, West Sumatera and lies between 17 and 31 m water depth. Through diving activities in 2012 done by Research Institute for Coastal Resources and Vulnerability and diving activities done by Research Centre for Maritime Territories and Non Living Resources in 2006, we found metal and wooden part of the ship, bottle glasses, and wood fragments. The ship is believed to belong to Dutch in Colonial period. The local people said that they have seen the date ‘1908’ on part of the ship body (Research Centre for Maritime Territories and Non Living Resources, 2006b). Based on interviews with local community, the existence of some shipwrecks along Sumatra’s West Coast that is located directly opposite the Indian Ocean caused by accidents due to weather condition and sea condition that could suddenly become dangerous, especially during the eastern wind season. The Sumatra’s West Coast has an important role in international shipping and trading activity in the Dutch Colonial period. Sumatra’s West Coast is a producer of gold, silver, coal, and pepper which attracted the Dutch. The site can be preserved as in-situ Preservation Site and also can be developed as a dive tourism destination which is expected to improve the local community’s welfare.

2. **Taka Kappala Wreck, Selayar Regency**

The aims of the shipwreck study in Selayar waters in 2008 and 2009 were to search and to find out the distribution of shipwrecks in the territorial waters of Selayar Regency, South Sulawesi Province for the purpose of their protection, development, and utilization. The
study was done on request from the local government that cares about the importance of the existence of shipwreck for the regency. It is based on the fact that until the year 2007, research and study efforts of marine archaeological resource in Selayar waters had never been done. For some time now Selayar Islands have been an important area in national and international trading and shipping routes (Said, Ramli, and Sumantri, 2007; Heersink, 1999). It is predicted that there are many shipwrecks in Selayar Waters. Survey conducted in West Selayar Waters found the UCH site located at Taka Kappala, Flores Sea which is administratively located in Tambolongan-Appatanah Village, ± 2 miles from Pulassi Island, ± 2 miles from Nambolaki Island, and ± 5 miles from Bahuluang Island. The team obtained information about this point from the local people and then followed up with two diving activities. A shipwreck was located at 8-12 m depth. The shipwreck has been severely damaged and is difficult to identify due to illegal activity that has lasted for ± 2 years by local people\(^8\) (Fig. 9). It is made of iron and wood. The local fishermen had found a metal fragment with reading ‘London Srinity’ (or ‘London Trinity’?) from hull section. Artefacts found in this site include ceramic fragments (white, blue, red and white), bottle glass fragments, irons, coal, bone fragments, metal and wooden parts of
ship (Directorate General of Marine, Coastal and Small Islands, 2008). Based on interviews with the local people it seems that the ship sank due to navigational error. The ship was to go to Makassar, but as captain of the ship saw the lights of houses that indicate a settlement, the captain thought that they had arrived in the Makassar city. Then the captain turned the ship toward the settlement he saw which is Pulassi Island. Halfway to the island, the ship hit a reef and slowly sank. For the Taka Kapala location marine archaeological survey we used some marine instruments which are set on a research vessel namely Side Scan Sonar C-MAX, GPS Garmin 60, and GPS Echosounder 178c combined with diving activities and interviews of the local community were done at Walvish Rocks, Sangkulu-kulu, and Benteng Waters. The result showed some anomalies on the bottom of the sea that are predicted as shipwrecks and their contents (Research Centre for Maritime Territories and Non Living Resources, 2008; 2009).

3. **Liberty Wreck, Tulamben Bali**

*USAT Liberty* wreck is located in Pekraman Village, Tulamben, Karang Asem Regency, Bali. In January 1942, *T Liberty* was enroute from Australia to the Philippines with railway parts and rubber cargo. *Liberty* was torpedoed by Japanese submarine *I-166* on January 1942 about 10 nautical miles (NM) (~19 km) southwest of the Lombok Strait, near position 08°54′2 S 115°28′2 E; 8.9°S 1 15.467°E; -8.9; 115.467. US destroyer *Paul Jones* and Dutch destroyer *Van Ghent* took the damaged ship in tow in an attempt to reach Singaraja, the Dutch port and administrative centre for the Lesser Sunda Islands on the north coast of Bali. However it took on too much water and so was beached on the eastern shore of Bali at Tulamben so that the cargo and fittings could be salvaged. In 1963, the tremors associated with the eruption of Mount Agung caused the ship to slip off the beach, and it now lies about 200 m from shoreline at coordinates position 8°17′33 S, 115°52′213 E. Liberty lies on a sandy slope in 30 to 100 feet (9.1 to 30 m) of water and provides one of the most popular dive locations in Bali (Wikipedia the Free Encyclopaedia, n.d) (Fig. 10). *Liberty* wreck site also contains educational aspects for visitors and has always been a training ground for underwater archaeologists. The sinking of the *USAT Liberty* has provided enormous benefits to the Tulamben community. Since the late 80s, underwater tourism in Bali developed. *Liberty* wreck has become the main diving object in East Bali and the principal livelihood for the local community. The community could provide lodging services, dive resorts, restaurants, parking, dive guide, souvenir shops, dive shops, car rental, grocery store, helper and porter services, and others. Thus it can also reduce the rate of unemployment in the village. The local community is fully aware that it can generate foreign exchange and be favourable for economic development in that region. Therefore Tulamben community felt the need to help preserve this area. With the awareness of the UCH, the people themselves feel a positive impact in the social, economic, and cultural fields (Kamaluddin, 2002: 146-147). One of the ways to preserve *Liberty*
wreck and the surrounding water areas by local community is to make a customary law called *Awig-awig* which is fully obeyed by villagers. *Awig-awig* is a set of rules that manages its citizens in the customary village. It is a part of local wisdom to conserve resources in their territory (Kusumajaya, 2005; Supriyatun, 2007). *Awig-awig* contains prohibitions evident of UCH public awareness. The rules in *Awig-awig* in Tulamben are:

1. No fishing within 100 meters of the shipwreck
2. No taking the remains of the shipwreck
3. No damaging the attached coral reefs at the shipwreck
4. No taking the stones around the shipwreck
5. No cutting plants around the beach

People violating the above prohibitions will receive moral sanction, be ostracized from society and not allowed to follow religious rituals (Akhmad, 2002; Wirawan, 2002, Ridwan, 2011).
4. Karang Kapal Pecah Wreck, Natuna Island

In 2011, we conducted a survey in Natuna water, Riau Islands Province and found Karang Kapal Pecah site administratively located in Sepempang Village, Bunguran Timur Sub-District, Natuna Regency, Kepulauan Riau Province. Geographically it lies in eastern part of Natuna Island and southern part of Senua Island which is located in South China Sea. The size of the overall site is about 8 m wide and 17 m long. The depth of the site is 17-19 m. The materials we found under water are many type of bottles (torpedo and round bottom shape bottles), and there are some bottles reading ‘Royal Germany Spa’ (Fig. 11). The other artefacts are piles of square-shaped glass, ceramic fragments (Fig. 12), wooden fragments part of the ship, metal fragment, grains of tin, and a copper plate (apparently part of the ship, salvaged by local people) reading on one side:

    JAMES EWING & Co
    SOLE MANUFACTORS OF
    GRAVELEY’s PATENT STEAM SAILOR &
    DISTILLING APPARATUS LONDON

and reading on the other side:

    W.H. GRAVELEY
    PATENTEE
    WINCHESTER & Co MANUFACTURER’S
    LONDON

Based on the materials we found, the ship is probably a British steamship from 1900s which carried passengers and cargo. This shipwreck is important as an archaeological and historical evidence for shipping, trading, and travelling which proves that Natuna has been on the international shipping line since long time ago.

The Concept of the Establishment Maritime Conservation Area in Indonesia

Recently, focus of Indonesian government policy is not only for protection, but also for development and usefulness, with balance and proportion (Research Centre for Maritime Territories and Non Living Resources, 2006a). Nowadays Ministry of Marine Affairs and Fisheries is trying to develop a research and development program that integrates the shipwreck, the sites, the environmental ecosystems, and local community, to serve as a Maritime Conservation Area which would raise public awareness of maritime heritage in the region. This area is an area of special archaeological or historic interest with a character or appearance that is desirable to preserve or enhance. The concept of establishing the Maritime Conservation Area which is based on the Minister of Marine Affairs and Fisheries Decree No.17/2008 regarding Conservation Areas in the Coastal Zone and Small Islands is one effort to protect, conserve, and utilize marine archaeological resources in accordance with national sustainable development. The idea of this policy is almost similar with in-
Fig. 11 The large numbers of bottles in *Karang Kapal Pecah* shipwreck site, Natuna Island. (Nia Naelul Hasanah Ridwan, 2011)
situ Preservation in UNESCO Convention 2001 regarding Protection of Underwater Cultural Heritage. The decree mentions that Maritime Conservation Area is an area of protection of maritime tradition and culture that has archaeological, historical value; maritime historical sites; and places of religious rituals or the customs and characteristics, that is in line with conservation of coastal and small islands, and does not conflict with national law. Purpose of the enactment of the conservation area of coastal and small island is to provide a reference or guidelines to protect, conserve, and utilize the coastal regions and small islands, all their resources (natural and cultural), and their ecosystems. The target aim is the protection, conservation, and utilization to ensure the existence, availability, and sustainability of resources by maintaining and improving the quality and value of diversity. For these purposes, we need research and a feasibility study on shipwreck site as the first step in the designation process (Wirasantosa et al., 2006; Sedyawati, 2006). The study would include an assessment of maritime archaeological resources; identification of a proposed management entity; a proposed heritage area boundary map, etc. The Maritime Conservation Area encourages cooperation among heritage organizations with shared interests, and it could provide a marketing opportunity for local tourism businesses (Ridwan, 2010 and 2011; Tahir, 2011).

Fig. 12 Ceramic bowl found during *Karang Kapal Pecah* shipwreck survey in Natuna Waters, September 2011. (Ministry of Marine Affairs and Fisheries)
Conclusion

There are many future challenges for maritime archaeological study in Indonesia. Only a few sites in Indonesia can be investigated, while others are damaged due to looting and illegal exploration by salvage companies and also local people. Studies on maritime archaeology in Indonesia could play an important part in the development of various fields of study. In the implementation in the field, maritime archaeological research requires various steps that must be followed. These stages are data collecting, data processing, data analysis, and reporting and publication phase. Maritime archaeological research in our ministry that has been developed include identifying shipwreck and its cargo through the method of diving on a shipwreck site and the use of marine instrument, disclosing an idea of maritime archaeological resources utilization opportunities for various purposes in accordance with the requirements of the existing sector, and formulating a model framework as a comprehensive reference or guide in support of the process of problem solving and decision making in the development of resource use. The expected result of the shipwreck study at our institution is in the form of recommendation for policy makers in the fields of marine affairs, cultural and tourism affairs, and local government interest that will be useful for the further preservation, utilization, and development of sustainable marine and culture resources. In addition, the expected result of such research can be a baseline study for a variety of sciences for the public. Therefore, the research on the maritime archaeological resources and study of its protection and utilization would reduce looting and illegal exploration. Studies of shipwrecks could give a positive impact for building an image and national identity because shipwrecks with its cargo are potentially remnants of history. The results of studies on potential maritime archaeological resource is expected to assist the efforts of government and local government in strengthening the awareness, concern, and appreciation of the stakeholders in protecting, developing, and utilizing state assets wisely and sustainably.

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Endnotes

1 Western world in this case includes trade area located on the west of Malacca Strait as India, Persia, Egypt and European countries. Meanwhile, the East included areas to the east of Malacca Strait as China, Japan, the Philippines, etc. Indonesia gained a strategic position because it is located in the middle of this region and for centuries has controlled Malacca Strait as a key of sea trade between the west and east, i.e. in the Srivijaya and Majapahit Era.

2 Since the beginning of AD, Chinese Jungs usually took one of two routes through Southeast Asia, sailed to the west coast of the Philippines, Borneo and Celebes through the Moluccas Islands or along the coastline of Vietnam, Thailand, and the Malay Peninsula with the help of monsoon winds. From there they moved to the south to Java or Sumatra, or to the western Indian Ocean for the long journey to India and other further areas.

3 The most popular spice producing area in the world is Mollucas Islands, in the eastern region.

4 Those underwater artefacts now are under the authority of Indonesian government. (National Committee for Salvage and Utilization of Valuable Objects of Sunken Ship and Ministry of Education and Culture).

5 This law is a legacy of Dutch colonial period in Indonesia.

6 Initially the name of this research centre is Research Center for Maritime Territories and Non Living Resources.

7 In 2005, Ministry of Culture and Tourism established Directorate of Underwater Heritage. So, since 2005 until now, Ministry of Marine Affairs and Fisheries always tries to work together with this institution in conducting survey, research, and protecting program in term maritime archaeological resources.

8 When the survey team came to the site, there was active looting going on by four other unknown ships.

9 Natuna Islands is the northernmost islands of Indonesian archipelago which has boundaries Vietnam and Cambodia in the North; Singapore, Malaysia, Riau in the West, in Eastern part there are East Malaysia and West Kalimantan, and in Southern part there are South Sumatra and Jambi.

10 Based on information of local people, there are grains of tin in significant amounts. The salvaging of those grains of tin has been done by the local fisherman since few years ago.

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