An overview of shipwreck explorations in Goa waters

Sila Tripati[1]

Abstract

Since the beginning of maritime archaeological research in Indian waters, marine records housed in archives of India and abroad provide details of the shipwrecks and the loss of Indian ships in foreign waters. Information on more than 200 shipwrecks in Indian waters has been gathered from archival records and attempts made to explore in Goa, Lakshadweep and Tamil Nadu waters. These shipwrecks are dated to the post 16th century AD. Shipwrecks were explored off Sunchi Reef, St George's Reef and Amee Shoals in Goa waters. Sunchi Reef and St George's Reef were wooden hulled sailing ships whereas Amee Shoals was a steel hulled steam engine shipwreck. Sunchi Reef exploration led to the recovery of guns, barrels of handguns, storage jars, Chinese ceramics, elephant tusks, hippopotamus teeth, iron anchors and other items that are evidence of Indo-Portuguese trade and commerce in the 17th century. Exploration off St George's Reef uncovered timber and terracotta artefacts such as column capitals, drums, ridge tiles, roof and floor tiles and chimney bricks The bricks and tiles have the distinct inscription of Basel Mission Tile works 1865. Amee shoals exploration revealed the remains of a steel hulled steam engine shipwreck in which boilers, boiler bricks, and engine parts were found. The stamps on the flanges and the name on the firebricks suggest a British origin, dating from the 1880s or later.

Keywords: Shipwreck, Sunchi Reef, St George's Reef, Amee Shoals, Goa, Portuguese, Basel Mission Company

Introduction

The geographical context of this paper lies centrally in Goa. The city is located on the central part of the west coast of India. It has its western boundary along the Arabian Sea and eastern border along the Western Ghats. Chandrapura (Chandor) on the bank of river Paroda, (a tributary of the Zuari) was the oldest port of Goa. The discovery of Roman coins and amphorae sherds from Pilar near Gopakapatana port indicates that Roman ships were called in ports of Goa during the Satavahana period (Costa 1997:24-30). The Shilaharas and Kadambas were maritime powers and had trade contacts with West Asia and East African countries (Gune 1990:117-136). The depiction of a naval battle in the memorial stones (l2th-13th centuries) exhibited in the Archaeological Museum, Old Goa, reflect the maritime activity of this region (Rajagopalan 1987:35; Sila Tripati 2006:88-96). During the Portuguese regime, Old Goa was the main centre of commercial activities and garrison. The *Nau Cinco Chagas, Galeao Bom Jesus, Madre de Deus* and *Nau S. Joao Baptista* ships were built in the Old Goa shipyard (Mathew 1988:304).

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Shipwrecks in Goa Waters

Evidence on pre-Portuguese shipwrecks in Goa waters is limited. An inscription source mentioned Guhalladeva-I, from 980 to 1005 Anno Domini[2] (AD), sailed from Chandrapura to Somnath, Gujarat on the West coast of India (*Oriente Portugues* 1938:6-18). The mast of the ship broke off and he took shelter at Gopakapatana port. The stranded king was helped by Mohammed, the chief of the Arab traders (*Hanjamananagar*) in Goa (Gune 1979:95; Moraes 1990:171-72). Portuguese records held in the archive India House, Lisbon mention Portuguese shipwrecks. A. B. Souza (1930:54-57) has compiled a list of 806 ships that sailed from Lisbon to India between 1497 and 1612, among them 20 ships ran aground, 66 were shipwrecked, 4 captured by the enemy, 6 burnt, 285 remained in India while 425 returned to Portugal. Archival records emphasise that a majority of Portuguese ships were wrecked in the shallow waters off Goa mainly due to hidden reefs, sandbars, severe storms and lack of proper maintenance. However, these records do not provide exact locations of shipwrecks the Centro Nacional de Arqueologia Nautical e Subaquatica CNANS, Lisbon has listed the Portuguese shipwrecks along the Indian coast based on archival and archaeological sources (Alves, *et al.* 2007:97-119).

The Portuguese ships wrecked in Goa waters were namely the following: *S. Cristovam* wrecked in a storm on l7th August 1594 while returning to Goa; The *nau Santo Andre* left Lisbon on l7th February 1607 and reached Goa in May 1608 but wrecked off Goa. The *Nossa Sra Dos* and *Remedios* sank off Goa on 28th January 1616 in a storm, people were saved but cargo was lost (Gudigar, *et al.* 1995-6:45-48). Twelve Portuguese ships, en route to Calcutta (Kolkata) from Goa sank near Aguada Bay due to an unseasonable storm in 1648 (Boxer 1960:35-54); Five Portuguese sailing ships namely *Santa Helena* (1654-55)*, Sao Joao Evangelista* (1652-53)*, St. Francisco* and *St. Thome* set sail to Goa from Portugal, but only two ships reached the coast of Goa but were wrecked in a storm on 10th March 1651 (Esparteiro 1974:93). Findings of shipwreck explorations off Sunchi Reef, St George's Reef and Amee Shoals are recorded here. The nature of the seabed floor, water current patterns, water depth and visibility vary from site to site.

Sunchi Reef

Sunchi Reef region is shallow, full of laterite boulders and in a high-energy zone. The shipwreck remains were located in 3 to 6 meters (m) water depth and scattered over a large area (Figure 1). The survey identified and recovered cast iron guns, a iron shot, a barrel of a handgun, various types of stoneware sherds (Martaban pottery), Chinese Blue on white sherds, glass bottle bases, elephant

[2] Designation used to label or number years used with the Julian and Gregorian calendars. This calendar era is based on the year of the birth of Jesus of Nazareth, with *AD* counting years after the start of this epoch.

tusks and hippopotamus teeth, metal handle and dressed granite stone blocks (Figure 2; Sila Tripati, *et al.* 2004:1238-1245).

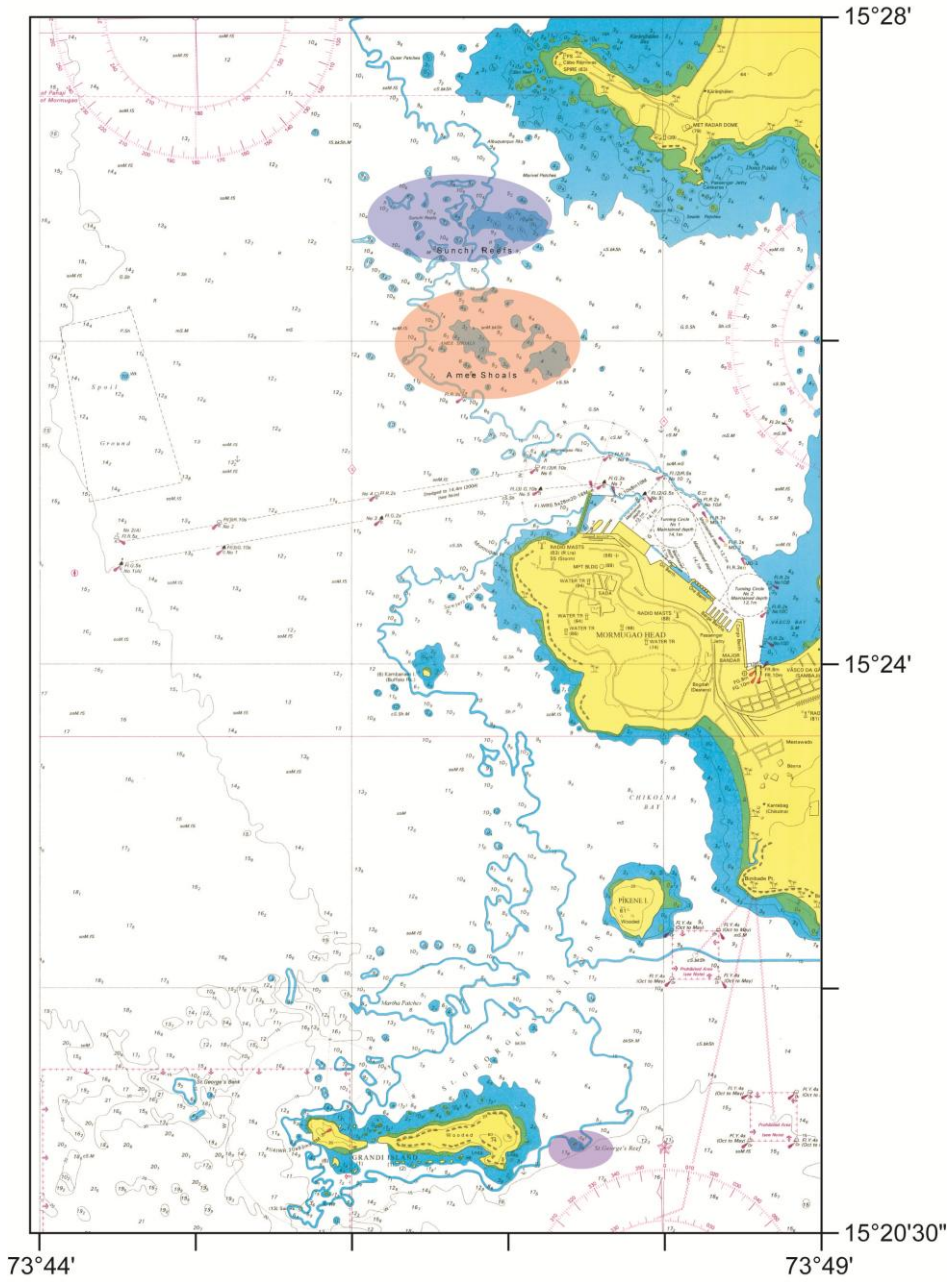

Fig. 1. Location of shipwreck exploration sites (Sunchi Reef, St George's Reef & Amee Shoals) off Goa waters.

Figure 1. Location of shipwreck exploration sites (Sunchi Reef, St George's Reef & Amee Shoals) off Goa waters (Tripati, *et al.* 2004; Tripati 2004; Tripati, *et al.* 2003b; Tripati, *et al.* 2010 respectively)[3]

[3] The findings of Sunchi Reef such as ivory, hippo teeth, pottery, Chinese ceramics, handgun, glass bottle bases; some bricks, tiles and other terracotta artefacts of St Georges Reef; and boiler

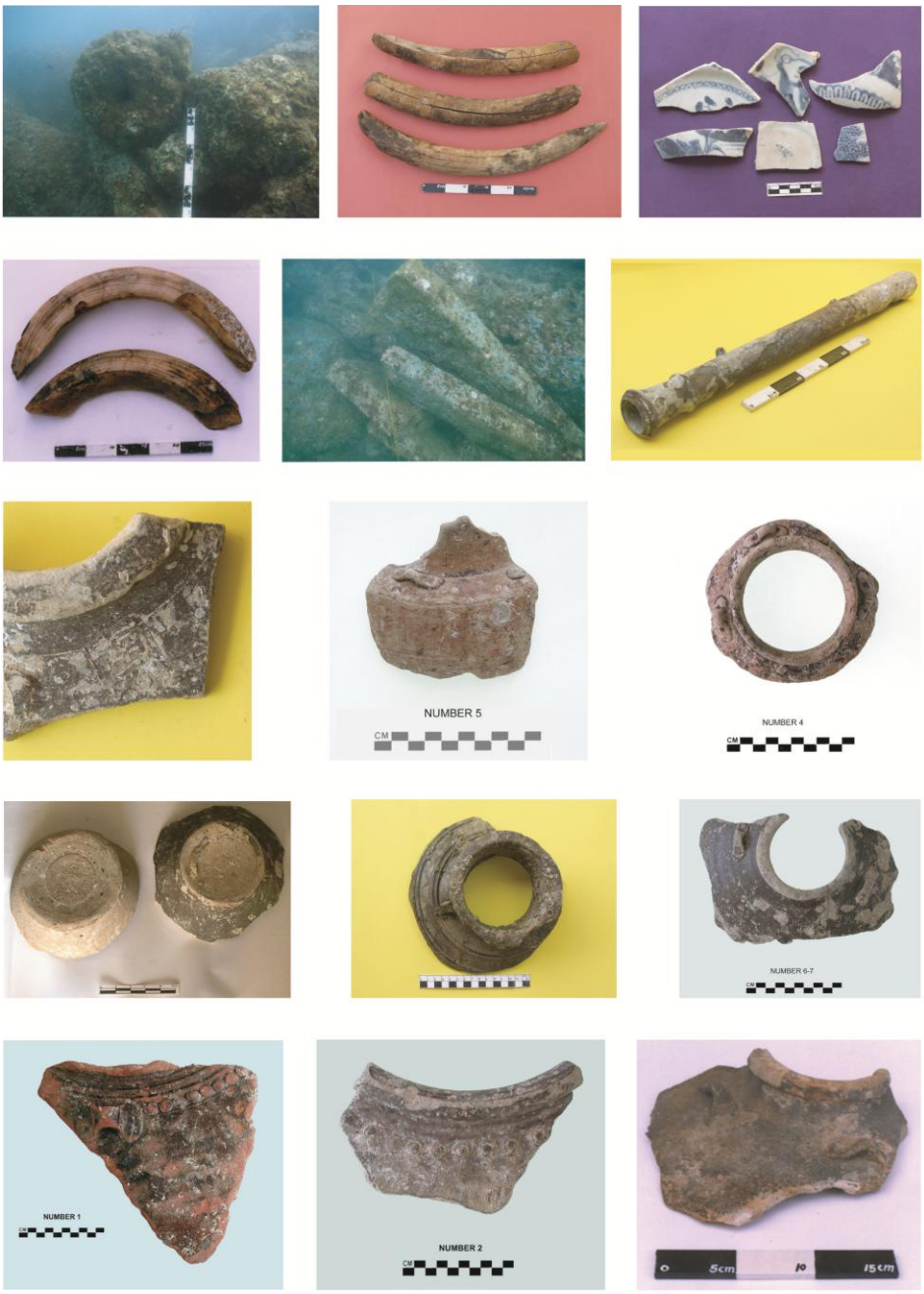

Fig. 2. Cast iron guns, elephant tusks, hippopotamus teeth, handgun, Chinese and stone ware sherds and granite blocks found from Sunchi Reef shipwreck.

Figure 2. Cast iron guns, elephant tusks, hippopotamus teeth, handgun, Chinese and stone ware sherds and granite blocks found from Sunchi Reef shipwreck (Sila Tripati, S. N. Bandodker, and Sheikh Ali Karim (2000-2006).

bricks and flanges of steam engine shipwreck of Amee Shoals have been collected and displayed at NIO.

Each cast gun is about 2 m long. Their exteriors are overgrown with barnacles, mussels and heavily concreted. The muzzles of two guns lay horizontally on the seabed whereas the other two were oriented towards the seabed. The guns have swivels on both sides but do not have any lifting rings. The iron shot found west of the guns is 1.218 grams (gm). Its surface has an uneven-flaking nature and its shape is slightly conical at the top, flat at the base. Cracks formed after retrieval was due to dehydration and the interior was fully rusted. Marine water in the shot was subsequently removed in the lab. The brass barrel of a handgun 56 centimeter (cm) long and weight 2.200 kilogram (kg) was half buried below the granite blocks. The barrel has two notches, one is intact and the other is broken, these are meant for fixing screws to the wooden part of the gun. It has a screw thread at the back for attaching the firing mechanism. The gun and other parts attached to the barrel are missing. A two fluked, long iron anchor found on the southern side of the guns had fallen between laterite[4] boulders. Similar anchors were discovered off Aguada and also resemble the anchors kept in the Archaeological Museum at Old Goa and Goa State Museum, Panaji (Sila Tripati, *et al.* 2003a: 97-106).

The exploration led to the recovery of eight elephant tusks (65 to 32 cm in length) only partially visible in the seabed. Among them two were inscribed, one has three Roman letters “ICM” and the other has some geometrical designs. Nine hippopotamus teeth of different sizes have turned brownish in color. The elephant tusks and hippopotamus teeth have turned soft, brittle, flaky and degraded because of burial in marine water for more than 300 years.

Stoneware sherds consisting of rims with loop handles, bases, lids and fragments buried in the sediment and crevices of laterite boulders were also recovered. The paint and glaze coat has been washed out on some whereas a dark brown glaze coat can be noticed on others. All these sherds belong to storage jars. In addition to the loop handles on rims, the sherds with dark brown glaze also have raised dots around the neck and floral designs. Thermoluminescence dating purports the pottery is 360$\pm$40 years old. Chinese ceramic sherds with blue on white designs were also found. A number of dark green square and round glass bottle bases were retrieved on which marine growth is present. In addition a number of dressed granite blocks of varied sizes scattered randomly were noticed at the site. They were possibly used as ballast (Sila Tripati 2004:19-29).

St George's Reef

St George's Reef is situated on the eastern side of Grande Island (Figure 1) and the shipwreck lies in 15 m water depth. The wreck contains a collection of terracotta building materials such as chimney bricks, roof, ridge and floor tiles, column capital and drum (Sila Tripati, *et al.* 2003b: 111-120). Bricks and floor tiles are inscribed “Basel Mission Tile Works 1865”. Bricks are made of white clay, moulded, the obverse is inscribed and the reverse is plain (Figure 3). A

[4]Clay formed by weathering of rocks in a tropical climate, composed chiefly of iron and aluminium oxides

Corinthian type of hollow capital, closed on one side, was found. All artefacts are well burnt and made of well-levigated clay. The timber remains of the ship found near the reef has groove marks on the upper side whereas the lower side is plain and U-shaped. Carbon^{14} dating (114.3$\pm$1.5%) of the timber suggests that the wreck is 115 years old. Anatomical analysis indicates that the timber belongs to the *Lagerstromia microcarpa syn Lagerstromia lanceolata* species, whose trade name is *benteak* (Sila Tripati, *et al.,* 2005:1022-1027).

Fig. 3. Terracotta artefacts and timber collected from St George's Reef shipwreck.

Figure 3. Terracotta artefacts and timber collected from St George's Reef shipwreck (Sila Tripati, S. N. Bandodker, and Sheikh Ali Karim (1999-2000).

Amee Shoals

Amee Shoals lies on the south of Sunchi Reef, close to the Marmagao bay (Figure 1), and the shoals have extended in a larger area with varied depths (Ambre 1991:113-115). The exploration revealed a steam engine shipwreck and boilers, boiler bricks, water tank, flanges, and copper pipes were noticed at 6 to 9

m water depth. Three boilers made of wrought iron were found close to each other, approximately 4 m in height with single riveted lap joint[5]. Each boiler has three furnaces and a row of heat exchanger tubes, and stay tubes. Manholes and safety valves of the boilers are undamaged. Among nine furnaces of three boilers only one is intact (Sila Tripati, *et al.,* 2010:182-189), while the other eight have been destroyed by local divers robbing brass and copper objects (Figure 4). Different sizes of bricks are placed in various directions in many layers inside the furnaces then a metal flange is fixed on the opening.

Fig. 4. Boilers, boiler bricks, water tank and hawser of the steam engine shipwreck noticed off Amee Shoals, Goa.

Figure 4. Boilers, boiler bricks, water tank and hawser of the steam engine shipwreck noticed off Amee Shoals, Goa (Photographs: Sila Tripati, (2006-2008).

[5]The connection of edges of plates by single row of rivets.

The bricks inside the furnace resist heat, provide insulation and prevent cracking due to heat exposure. Bricks are made of clay consisting of silica and alumina. The binding material used to join the bricks is made of equal quantities of fireclay and finely crushed firebrick mixed with water to a make mortar. On the obverse some bricks of Amee Shoals have the stamp mark "FURNA…", followed by illegible words. Below this marked "B 84". There are no marks on the reverse. Brick sizes vary in measurement. Numerous bricks are still in the boilers and others are scattered nearby. A circular flange of 52 cm diameter with eight holes probably used on the front side of the furnace boiler was found. The other flange could be of an oil tank found near the boiler. It has two stamp marks namely "SOUNDING" and "No. 3 TANK[6]". A water tank measuring 4 x 1.65 m, probably used for recirculation of water from the condenser (Sila Tripati 2008:1-19), lay close to the boilers. The tank has a reinforced steel frame with plates on all four sides. Two horizontal pipes are fitted inside and the tank is highly corroded. Water tanks were a common feature in steam engine ships. The bow section hawser hole of the ship has a large lip edge. The hatch door which would be part of the steam drive system, designed for heavy duty and withstand heat, was noticed near the boilers.

Discussion and Conclusion

Human errors in navigation, submerged rocks and inclement weather have caused most of the shipwrecks in Goa waters. Strong currents during ebb tide reduce visibility and affects survey work.

The shipwreck in Sunchi Reef lies in a high energy zone not conducive to preservation of shipwreck remains. The location evidently represents that the ships struck the submerged rocks and subsequently sank. Except pottery, guns, shot, granite blocks no remains of the ship have been observed. The finding of iron guns, anchor and other artefacts suggest that the Sunchi Reef shipwreck could be a wooden-hulled cargo sailing ship not of Indian origin. The Sunchi Reef shipwreck findings are indicative of trade and commerce between Goa and the Portuguese empire as mentioned in the literature (Ahmed 1991:146-156). Sunchi Reef wreck is the oldest wreck so far surveyed in Indian waters and the first Portuguese shipwreck explored and detailed.

The discovery of St George's Reef wreck has elucidated the history of the Basel Mission Company and its trading activities with India. The findings suggest that the vessel came either from Mangalore or Calicut because the mission had a number of tile factories between Malabar and South Canara however the mission had established the first tile factory at Jeppo, Mangalore in 1865 (Raghaviah 1990:35). The underwater exploration and metal detector survey did not reveal any metallic anomalies at St George's Reef. It appears that the ship could have been a wooden hulled sailing craft. The thermoluminescence dating of pottery

[6]A metal dipping rod with graduations for checking the fluid levels in the tank is often called sounding. These were common till the introduction of gauges.

(360± 40 years) and radiocarbon dating of ivory shows an age of 740 ± 130 yrs with a calibrated age range of 740 to 560 years Before Present (BP), in view of these dates it is suggested that the Sunchi Reef shipwreck could be dated to the Portuguese period (early 17th century AD), whereas the radiocarbon dating of the timber (114.3 ± 1.5%) of St George's Reef shows the wreck is more than a century old.

The steam engine shipwreck of Amee Shoals imparts significant information about this ship-style development and technological aspects, because the introduction of steam ships brought to an end the sailing ships. This is the first steam engine shipwreck that has been observed in Goa waters and could have occurred while approaching or disembarking from Marmagao port. One of the possible causes for shipwrecks in shallow waters off Goa could be an inadequate knowledge of bathymetry of the region. The preliminary exploration indicates that Amee Shoals shipwreck could be of a single ended scotch boiler, steel hulled, triple expansion steam vessel. These boilers, manufactured during the 1880s, are the last phase of development of fire tube boilers, later replaced by diesel engines. The shape and size of three scotch boilers suggest the ship could be 100 m in length and the wreck could be dated to 1880 AD or later. Possibly, this could be a steel hull with wooden superstructure.

Explorations off Goa waters suggest that this region possesses rich potential for shipwreck archaeology, requiring further in-depth exploration which may bring new evidence on the maritime and shipwreck archaeology of Goa. In the absence of such reports the artefacts described in this paper provides new information on this aspect.

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