

Exploration of a Steamship Wreck off Ameer Shoals, Goa, India: A Preliminary Report

Recent explorations off Ameer shoals, Goa, have brought to light the remains of a steel-hulled steam-engine shipwreck, scattered over a large area. Though sparse and heavily salvaged, this site represents the first discovery of a steam shipwreck in Goan waters, and its exploration becomes important in any reconstruction of local maritime trades. This paper discusses the wreck within the broader Goan maritime context, and offers a probable date on the basis of the finds.

Shipwrecks in Goan waters

There is only one reference to a pre-Portuguese-period shipwreck, datable to the early-medieval period. An inscription of Jayakeshi-I (1052 AD) of the Kadamba dynasty suggests that it occurred while Guhalladeva-I (980–1005 AD) was sailing on a pilgrimage to Somnath, Gujarat, on the west coast of India, in a ship from Chandrapura (modern Chandore). The mast broke on the way and he took shelter at the nearby port of Goa, where he was helped by a wealthy Arab merchant (Gune, 1979). Recently, the Centro Nacional de Arqueologia Nautica e Subaquatica (CNANS), Lisbon, has compiled a list of Portuguese shipwrecks in Indian waters (Alves *et al.*, 2007), which gives information on the wrecks but not their exact location. Similarly, Boxer (1959) and Mathew (1988) refer to several Portuguese ships wrecked off the Indian coast between 1497 and 1612 during their journey between Portugal and Goa. They cite no specific locations, but demonstrate that the majority of Portuguese ships were wrecked in the shallow waters off Goa, mainly because of storms, hidden reefs, and sandbars.

Trade between India and Portugal continued until the mid-20th century, and in the course of this many ships were wrecked along the west coast of India. The National Institute of Oceanography (NIO) has collected data on shipwrecks from marine records off the Goa coast (Gudigar *et al.*, 1996) as well from local scholars and divers. In order to understand aspects such as the volume of maritime trade, exchange of cargo, the construction pattern of ships, and the causes of wrecks, shipwreck exploration has been carried out in Goan waters since 1988. An early 17th-century Portuguese shipwreck has been explored off Sunchi Reef, where iron guns, the barrel of a handgun, an iron anchor, well-dressed granite blocks, a door-knocker, sherds of stoneware, ivory, hippopotamus teeth and bases of glass bottles were recorded (Sila Tripathi *et al.*, 2004; Sila Tripathi *et al.*, 2006). Similarly, underwater exploration off St George's Reef, Goa, brought to light the remains of an unreported

shipwreck in 15 m of water. The finds include various terracotta artefacts such as Corinthian column capitals, hollow column-drums, earthenware, drainage-pipes, vases, ridge, roof and floor tiles and chimney bricks, intended for house construction. These finds suggest that the wreck dates to the 19th century AD, and is the first wreck of the *Basel Mission Company* to be located (Sila Tripati *et al.*, 2003).

The site and its location

Amee shoals lie off Marmagao Bay, to the south of Sunchi Reef, dividing Marmagao Bay from the Arabian Sea (Fig. 1). Aligned in a north-south direction with a maximum depth of 9 m, the area has a gradual slope towards the west, and the shoals cover a wide area but are narrower in some places (Ambre, 1991). Soft corals and gorgonians grow on the shoals, while the sea-bed is silty, and a thin veneer of sediment can be seen on the shallower laterite outcrops. The River Zuari discharges sediments into the sea nearby, so sometimes suspended materials reduce underwater visibility. The current during ebb tide is quite strong, at just over 1 knot, and during the monsoon period waves, normally less than 1.5 m, can be as high as 6 m (Sanil Kumar *et al.*, 2006).

Based on information from Hydrographic Chart No. 2020, and from local divers, exploration was carried out in January 2008, using swim-line searches to locate the wreck. All finds were interconnected with rope to understand their distribution and positions. At places, hand-fanning was carried out to expose buried artefacts. Afterwards the co-ordinates of the explored area and shipwreck finds were taken by Magellan model NAV 5000 DLX GPS, and the site and artefacts were photographed. At the same times information was gathered on sea-bed topography, water-depth and current-direction.

The finds

Boilers, boiler-bricks (furnace-bricks), flanges, and broken copper pipes and tubes were found scattered over a wide area (Sila Tripati, 2008). The engine, which appears to be a triple-expansion type, is reasonably well preserved, though local divers have despoiled the wreck in the recent past, removing copper alloys, and other attractive and saleable items. The hull frames are severely corroded.

Three boilers lie in a north-south direction, the rear side of each facing the south. All three are made of wrought iron with single riveted lap joints, lying close to each other. They are of similar size, shape and 4 m high. Each boiler has three furnaces and a row of heat-exchange tubes, stay tubes, etc (Fig. 2a). Manholes and safety valves remain intact. Various types of bricks of different sizes are placed inside the furnaces in several layers in different directions. The first rows are horizontal, and then tapered bricks form a second row, above this is another row laid horizontally. The diameter of the furnace-hole is reduced by several rows of bricks and then a metal flange is fixed

on the front side. Only one boiler furnace is intact with its blanking flange (Fig. 2b), while the other eight furnaces have been ransacked (Fig. 2c). The size and diameter of all the furnaces are the same. Above the furnaces thin coiled fire-tubes are fitted.

Several boiler bricks are found scattered around the boilers (Fig. 3a). They are generally made of clay consisting mainly of silica and alumina, and were placed on the furnace front to resist heat and provide insulation—without them furnaces might develop spalling and cracking. Bricks are positioned back to back and one above the other, the joints sealed by binding material, presumably made of equal quantities of fireclay and finely crushed firebrick mixed with water to form a mortar. In-between the bricks and flange a layer of asbestos millboard sheet was provided and spring washers were fitted under the nuts that screw on to the brick bolts. Some of the bricks have stamped marks, on the upper side ‘FURNA...’ and beneath it ‘B 84’ (Fig. 3b). Detailed measurements of bricks were obtained, and they vary in size. Many bricks are still inside the boilers and some are trapped in between boilers and hull.

Three types of flanges belonging to different parts of the steam system were collected, among them a circular flange with eight holes (Fig. 4a), from the front of the boiler furnace. Its diameter is 52 cm and the distance between the holes is 18–20 cm. Similar flanges were seen trapped between the boilers and hull frames. The second type had six holes, and was stamped ‘SOUNDING’ and ‘No. 3 TANK’ (Fig. 4b), and could be from an oil tank. The third type is oval, with two holes at both sides; the central portion is elevated with a tube connected to it. A water-tank measuring 4 x 1.65 m was lying close to the boilers (Fig. 5a), and was probably used for recirculation of water from the condenser. Two pipes are fitted horizontally inside it. The bow section of the ship has been located, with what appears to be a hawser-hole (Fig. 5b). A hatch door was found near the boilers (Fig. 5c), heavily built to withstand heat. The exploration has so far not yielded any ceramics, pottery or cargo remains.

Discussion

Steamship wrecks have been explored and excavated in many parts of the world, for example, the *Indiana* in Lake Superior (Johnstone and Robinson, 1993); and the *Tasman* (1873-1883) off Tasmania (Nash, 2002). Further, McCarthy (1988) has provided insight into the exploration and excavation of iron and steam engine shipwrecks in other parts of the world including Australia. In India, preliminary explorations of only two steam engine shipwrecks have been carried out in the waters around Minicoy, in the Lakshadweep islands, and the remains have been documented (Rao *et al.*, 1995-96; Gaur *et al.*, 1998). This renders the Amee shoals unidentified wreck important as one of the first vessels of its type to be examined in the region.

The stamps on the flanges and the name on the firebricks of the Ameer shoals wreck suggest a British origin, and the three Scotch boilers indicate that the ship was a large merchant ship (naval vessels used water tube boilers), perhaps around 100 m long, dating from the 1880s (pers. comm. John Riley). These boilers are the last phase of development of fire-tube boilers before they were replaced by diesel engines. The boilers were oil-fired not coal-fired, and probably date to 1880 or later. By the 20th century, with the use of higher pressures, more modern designs replaced the simple boiler. As one example of vessels of this type deployed in this region, during the Portuguese regime in Goa, a British company was tasked with laying the railway line from Marmagao to Castle Rock in 1887 (Gune, 1979). The British transported steel from Sheffield, England, in several ships. However, the lack of datable finds means that it is difficult to identify the date and origin of this wreck.

Conclusion

The region between Ameer Shoals and Aguada bay has many potential sites for shipwreck exploration because of the presence of submerged reefs and shoals. Moreover, during the Portuguese regime ships had to cross these reefs and shoals to reach Old Goa, which was the main port of Goa. In India, very few shipwrecks have been explored to date; however the amount of information available on shipwrecks in marine records in Indian waters, and the rate of salvage, are quite high. The preliminary exploration of Ameer Shoals brought to light encouraging results with the discovery of steam engine shipwreck remains. Although the vessel has not yet been identified, further exploration may provide more clues. However, the wreck is under threat from local divers who salvage the brass, copper and other metals. Unless this is curbed by the authorities, nothing will remain for maritime archaeologists to undertake detailed studies of these wrecks.

Sila Tripathi, A. S. Gaur and Sundaresh

Marine Archaeology Centre, National Institute of Oceanography, Council of Scientific & Industrial Research, Dona Paula, Goa 403 004, India

Email: sila@nio.org

Acknowledgements

We are grateful to the Director of the National Institute of Oceanography for support and encouragement; to K. H. Vora for his suggestions and encouragement; to Charlie Beeker, Mike McCarthy, John Riley and Franco Fernando for providing information on steamship wrecks; to our colleague S. N. Bandodker for the underwater photographs; and to S. B. Chitari, Ravindra Uchil and Udaykumar Javali for preparing the drawings and computer tracing of the figures. This is NIO's contribution No. 4579

References

- Alves, J. F., Blot, M., Caleja, P., Carvalho, P., Henriques, R., and Rodrigues, P., 2007, A preliminary analysis of shipwreck data concerning Portugal and India based on written and archaeological sources, in A. Tripathi (ed.), *India and the Eastern Sea*, 97–119. New Delhi.
- Ambre, N. V., 1991, Topography and surface sediment distribution around Ameer shoal, Mormugoa, in S. R. Rao (ed.), *Recent Advances in Marine Archaeology*, 113–15. Goa.
- Boxer, C. R., 1959, *The Tragic History of the Sea*. Cambridge.
- Gaur, A. S., Vora, K. H., Sundaresh, Sila Tripathi., Gudigar, P., and Bandodker, S. N., 1998, Exploration of steam-engine wrecks off Minicoy Island, Lakshadweep, India, *IJNA* **27.3**, 225–36.
- Gudigar, P., Sila Tripathi., Gaur, A. S., and Sundaresh, 1996, Some important shipwrecks on Konkan coast, *Journal of Marine Archaeology* **5–6**, 45–8.
- Gune, V. T. (ed.), 1979, *Gazetteer of the Union Territory of Goa, Daman and Diu*, part 1. Goa.
- Johnstone, P. F., and Robinson, D. S., 1993, The wreck of the 1848 Propeller *Indiana*: interim report, *IJNA* **22.3**, 219–35.
- Mathew, K. M., 1988, *History of the Portuguese Navigation in India*. New Delhi.
- McCarthy, M. (ed.), 1988, *Iron Ships and Steam Shipwrecks*. Perth, WA. Add in the text
- Nash, M., 2002, A survey of the steamship *Tasman* (1873–1883), *Bulletin of the Australian Institute for Maritime Archaeology* **26**, 83–90.
- Rao, S. R., Vora, K. H., Gaur, A. S., Gudigar, P., Sundaresh, and Sila Tripathi., 1996, A Preliminary Shipwreck Exploration off Lakshadweep, *Journal of Marine Archaeology* **5–6**, 23–32.
- Sanil Kumar, V., Pathak, K. C., Pednekar, P., Raju, N. S. N., and Gowthaman, R., 2006, Coastal processes along the Indian coastline, *Current Science* **91.4**, 530–36.
- Sila Tripathi., 2008, Exploration and Excavation of shipwrecks in Goa and adjoining waters 2008, *Technical Report No: NIO/TR-1/2008*, 1–19.add in the text
- Sila Tripathi., Gaur, A. S., and Sundaresh, 2006, Exploration of a Portuguese shipwreck in Goa waters, western coast of India, *Bulletin of the Australian Institute of Maritime Archaeology* **30**, 127–36.
- Sila Tripathi., Gaur, A. S., Sundaresh, and Vora, K. H., 2004, Shipwreck archaeology of Goa: Evidence of maritime contacts with other countries, *Current Science* **86.9**, 1238–45.
- Sila Tripathi., Sundaresh, Gaur, A. S., Gudigar, P., and Bandodkar, S. N., 2003, Exploration of Basel Mission Company shipwreck remains at St George's Reef off Goa, west coast of India: Impact of the Basel Mission Co. on society and culture, *IJNA* **32.1**, 111–120.

Captions

Figure 1. The location of Ameer Shoals off Goa. (Sila Tripathi)

Figure 2. (a-c) Boilers of the steam-engine shipwreck off Ameer Shoals, Goa. (Sila Tripathi)

Figure 3. Boiler bricks from the shipwreck off Ameer Shoals; Fig. 3a, scale in 5 cm units; Fig. 3b, scale in 1 cm units. (Sila Tripathi)

Figure 4. Flanges recovered from the shipwreck site off Ameer Shoals; Fig. 4a, scale in 5 cm units; Fig. 4b, scale in 1 cm units) (Sila Tripathi)

Figure 5. a. Water tank of the wrecked ship lying near the boilers. (Sila Tripathi); 5b. Hawser for the anchor, scale in 5 cm units. (Sila Tripathi); 5c. Hatch door of the wrecked ship. (Sila Tripathi)

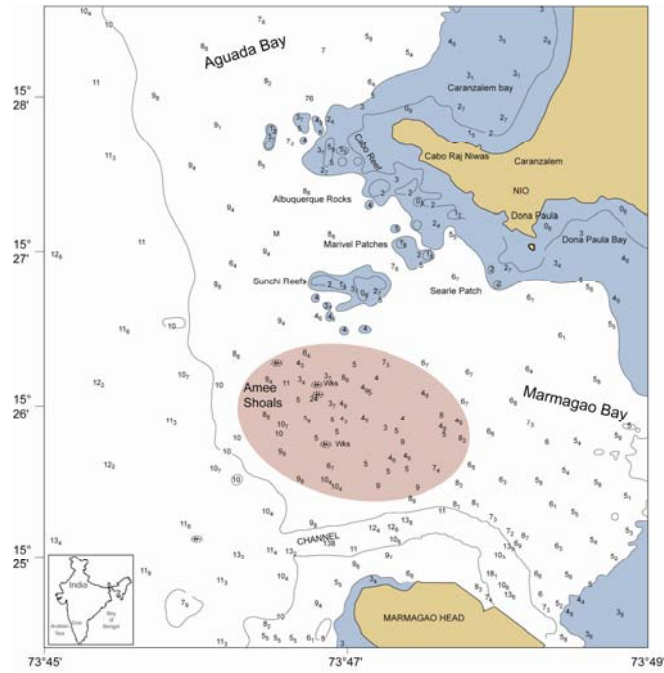


Fig. 1 Figure showing the locations of Amee shoals off Goa

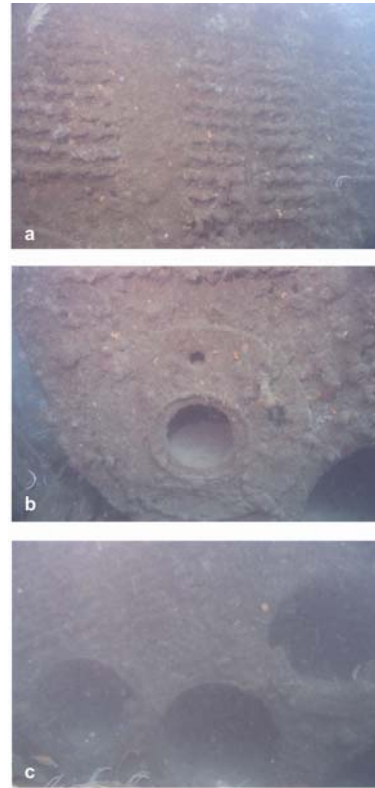


Fig. 2 Boilers of the steam engine shipwreck off Amee Shoals, Goa

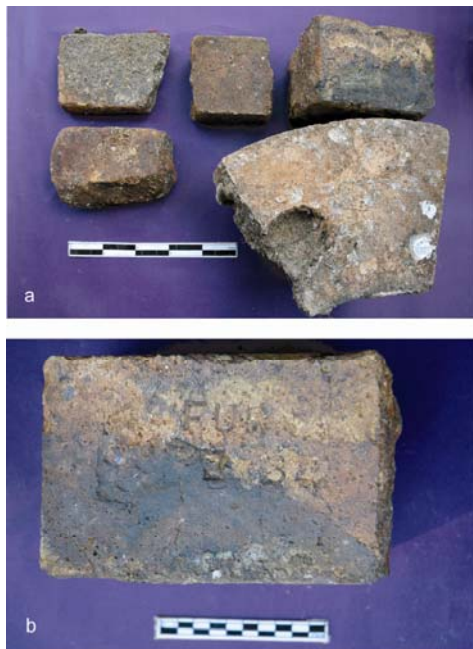


Fig. 3 (a-b) Boiler bricks collected from shipwreck site of Amee Shoals. (Fig. 3a: each unit of scale is 5 cm; Fig. 3b: each unit of scale is 1cm)



Fig. 4. (a) Flanges recovered from shipwreck site of Amee Shoals (each unit of scale is 5 cm).



Fig. 4 (b) Flanges recovered from shipwreck site of Amee Shoals (each unit of scale is 1cm)



Fig. 5 Water tank of the wrecked ship lying near the boilers off Amee Shoals.

Figure 5a



Fig. 6 Hawser for the anchor of the wrecked ship. (each unit of scale is 5 cm)

Figure 5b



Fig. 7 Hatch door of the wrecked ship noticed from Amee Shoals.

Figure 5c