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# Stone anchors from Sindhudurg Fort on the west coast of India

**Sila Tripati and A. S. Gaur**
*Marine Archaeology Centre, National Institute of Oceanography, Goa 403 004, India*

## Introduction

Seafarers have used anchors since they ventured into the sea. Various types of pierced stones were used before the manufacture of metal anchors. In India various stone anchors have been discovered during the course of exploration and excavations. Inshore explorations have been carried out in the Malwan region of Maharashtra on the west coast of India, as part of the project, 'Exploration and Excavation of Shipwrecks on the West Coast of India'. Sindhudurg (the Ocean Fort) was built between AD 1664 and 1667 by Shivaji, the Maratha king on a low lying island, about 1 km off Malwan (Fig. 1). The bay between Malwan jetty and Sindhudurg is very shallow and rocky and navigable only by small canoes. The submerged rocks near the fort may have caused shipwrecks (Fig. 2). A platform at the fort entrance serves as a jetty. The small Padamgad Fort built on an island opposite Sindhudurg Fort served as the Shivaji's shipyard. It is possible to walk to Padamgad Fort at low tide.

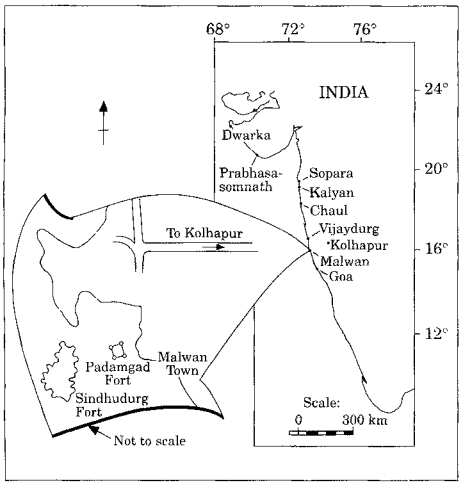


*Figure 1.* Map showing the location of sites of stone anchors and ancient port towns of Maharashtra. (Drawing: S. Chitari.)

This article discusses the triangular and grapnel stone anchors found during recent explorations at Sindhudurg and Padamgad Forts. Grapnel anchors were probably used for safer anchorage on a coral bottom (Raban, 1990). Eight anchors were found, of which three were triangular and three the grapnel-type, used to construct the jetty (Fig. 3) along with the locally available sand stone. The two remaining grapnel-type anchors were erected on the jetty for mooring purposes. Another grapnel-type stone anchor was noted at the entrance to Padamgad Fort (Fig. 4) but none was present on the fortification wall.

## Description of the anchors

The anchors are cemented on the jetty and cannot be disinterred. However, the distinctive colour and shape of the stones confirms them as anchors. They are made of locally available porous, fine laterite and sandstone. Their surfaces have undergone substantial weathering following exposure to the weather and use as paving stone. The hole at the top of an anchor is for rope and the lower holes are to hold pointed and curved wooden stakes that function

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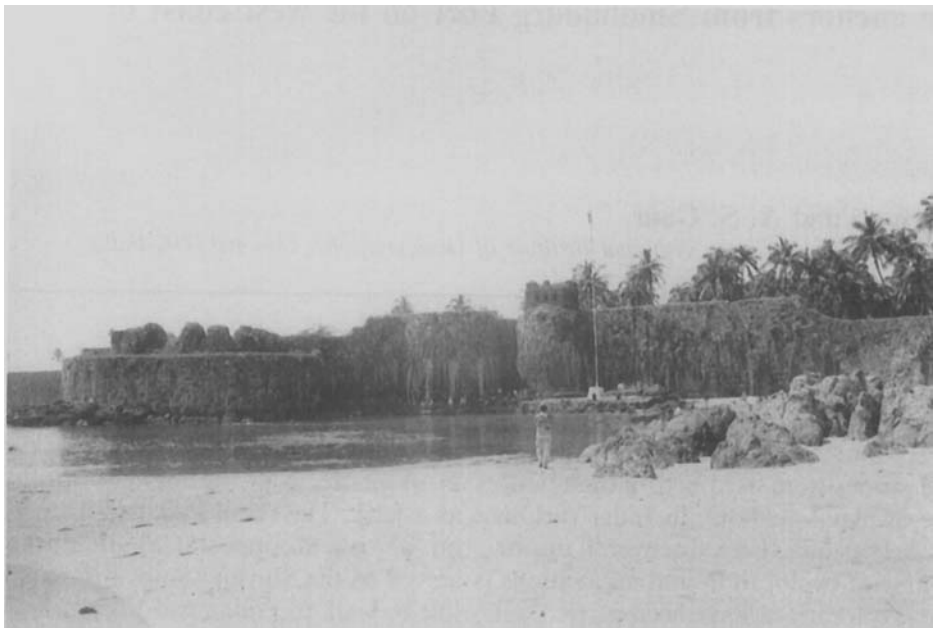

*Figure 2.* General view of the Sindhudurg Fort. (Photograph: S. N. Bandodkar.)

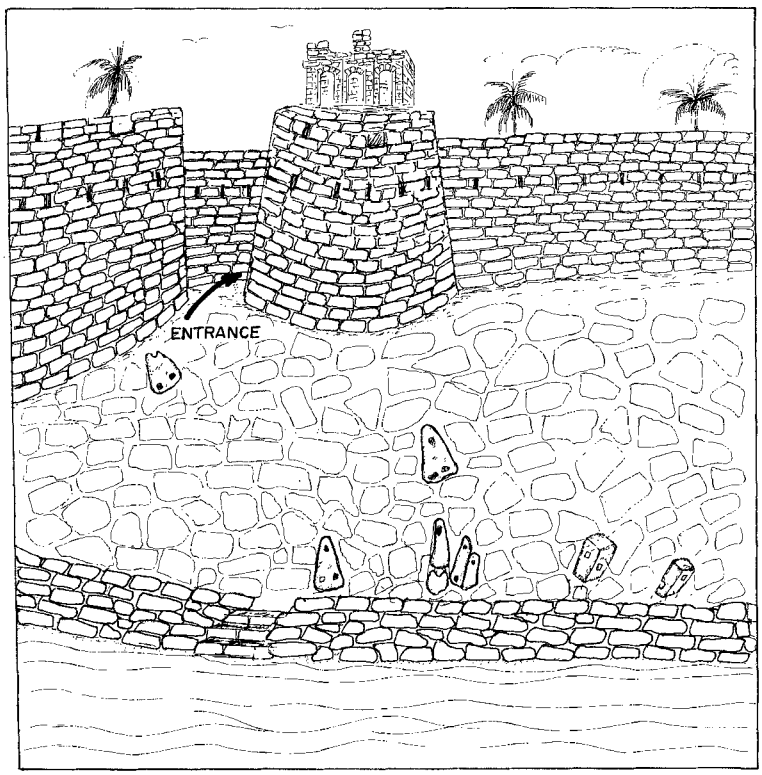


*Figure 3.* Location of anchors on the platform of Sindhudurg Fort. (Drawing: S. Chitari.)

**Table 1.** *Dimensions of the triangular and grapnel anchors of Sindhudurg Fort*

| No. | Type of anchor | Raw material | Length (cm) | Width (min. & max., cm) | | Top hole (cm) | Lower hole (cm) |
|---|---|---|---|---|---|---|---|
| 1. | Triangular | Grey sandstone | 75 | 45 | 60 | 10 | 12 × 10 |
| 2. | Triangular | Laterite | 170 | 28 | 105 | 10 | 16 × 12 |
| 3. | Triangular | Yellow sandstone | 160 | 35 | 80 | 15 | 20 × 18 |
| 4. | Grapnel | Yellow soft stone | 180 | 30 | 45 | 18 | 12 × 10 |
| 5. | Grapnel | Laterite | 155 | 25 | 40 | 12 | 24 × 16 |
| 6. | Grapnel | Laterite | 110 | 30 | 30 | 14 | 12 × 10 |
| 7. | Grapnel | Laterite | 80 | 30 | 36 | – | 14 × 14<br>18 × 14 |
| 8. | Grapnel | Laterite | 66 | 26 | 38 | – | 16 × 13<br>16 × 10 |

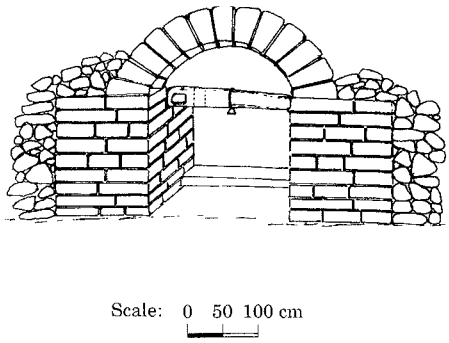


*Figure 4.* Grapnel anchor used as lintel at entrance of Padamgad Fort. (Drawing: S. Chitari.)

like the flukes of a metal anchor and secure it to the sea bottom. Details of the anchors are given in Table 1, and Fig. 5 illustrates what is visible of the Sindhudurg Fort anchor.

Anchor No. 1 (Figs 5 and 6), a three-hole anchor of hard grey sandstone with a rounded top, lies at the entrance to the fort and is cemented in with stones. The holes are filled with cement, and the upper part of the top hole is broken. Anchor No. 2 (Figs 5 and 7), of porous yellow laterite, lies near the jetty. All three holes were filled with cement. This was the biggest stone anchor found at Sindhudurg. Anchor No. 3 (Figs 5 and 8) is cemented into the edge of the jetty. It was made of soft yellow sandstone, and had a smooth surface. The top and one lower hole were filled with cement and the other lower hole was used for securing boats. Anchor No. 4, also made of soft yellow sandstone is a two-hole grapnel anchor kept at the edge of the jetty. One of the lower holes was used for mooring boats. The top and the lower holes have worn out due to continuous use. Anchor No. 5 is a grapnel anchor of porous laterite lying parallel to anchor No. 6. Two holes were visible but filled with cement. Anchor No. 6 is a grapnel anchor made of porous laterite. It was also lying at the edge of the jetty. Its holes were worn through due to continuous use, and one lower hole had been used for mooring boats. Anchor No. 7 (Figs 5 and 9) is of the grapnel type, made of yellow porous laterite with shell inclusions. It is erected on the jetty and serves as a mooring stone today. Anchor No. 8 (Figs 5 and 10) is also of the grapnel type, made of porous laterite and erected on the jetty to serve as a mooring stone. The middle hole has worn out. Due to the continuous tying up of canoes to anchors Nos 7 and 8 these were also worn out.

This grapnel anchor (Fig. 11) was used to form a lintel towards the back of the entrance of Padamgad Fort. Chisel marks are visible and the upper side tapers. The

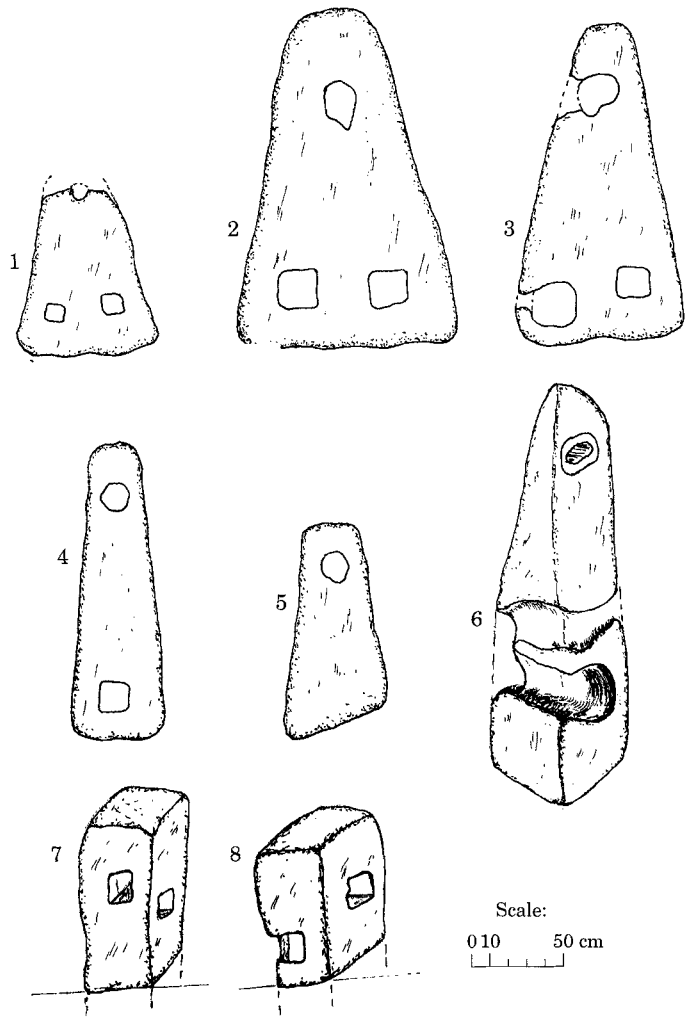


*Figure 5.* Triangular and grapnel anchors from Sindhudurg Fort. (Drawing: S. Chitari.)

rope hole was hidden inside the wall. The anchor measures 175 cm long, 30 cm wide and 30 cm high. The lower holes were 15 × 13 cm and 15 × 15 cm. It was worked from both sides by chisel. A modern brass bell is now tied to it.

## Discussion

This discovery adds to the maritime history of Malwan. The Sindhudurg anchors are the first of their type to be found in this region.

These triangular stone anchors are similar to those found at Dwarka and Prabhasa-Somnath. Underwater exploration at Dwarka revealed anchors dated from 1400 BC, associated with Late Harappan pottery (Rao, 1990) and at depths from 3 m to 10 m. The Sindhudurg anchors were smaller and more worn out than those of Dwarka. Similar types of anchor have been discovered during underwater exploration at Prabhasa-Somnath, a port contemporary with Dwarka (Rao

*Figure 6.* Triangular anchor No. 1 embedded in the platform of Sindhudurg Fort jetty. Total scale 20 cm. (Photograph: S. N. Bandodkar.)

*Figure 8.* Triangular anchor No. 3 embedded in the platform of Sindhudurg Fort jetty. Each unit of scale is 10 cm. (Photograph: S. N. Bandodkar.)

*Figure 7.* Triangular anchor No. 2 embedded in the platform of Sundhudurg Fort jetty. Each unit of scale is 10 cm. (Photograph: S. N. Bandodkar.)

*et al.*, 1992). The size, shape, age and raw materials of the anchors differ from place to place. In India, the earliest triangular anchors date to 2300 BC (Rao, 1985: 565) and were used in the Historic Period until the introduction of their metal counterpart. These triangular anchors are similar to those found in the Mediterranean Sea (Frost, 1970) and Egypt (Frost, 1979) belonging to the period 1200–1400 BC.

The grapnel-type of anchor found at Dwarka and Prabhasa-Somnath resemble those from Sindhudurg and Padamgad Fort (Fig. 11). Similar grapnel anchors have also been found in East Africa dating from the 9th to the 13th century AD (Frost, 1979). Similar types of grapnel anchors were found at Kilwa Kisiwani and Mogadishu on the East African coast (Chittick, 1980). It is likely that the grapnel anchors of Sindhudurg also belong the Historical Period and may have been used prior to the construction of the fort by Shivaji. During the 17th century, iron anchors were employed extensively and their stone counterparts fell into disuse. Thus it is likely that the latter were used for such things as paving and mooring.

Sopara and Kalyan were the chief harbours during the Mauryan and the Satavahana periods (3rd century BC–2nd century AD). The other minor ports were Vijaydurg (Byzantine) and Malwan (Aurannoboas). Schoff (1974) refers to Aurannoboas which McCrindle (1879) identifies with modern Malwan. These minor ports had direct contact with Sopara and Kalyan. All the ancient ports of Maharashtra were under the sovereignty of the Mauryan and the Satavahana kingdoms, which extended to the present boundary of Goa. Even Yajnasri Satakarni of the Satavahana dynasty issued coins with boat motifs highlighting the importance of maritime activity during that period. The west coast of India had maritime trade contacts with the Roman and

*Figure 9.* Grapnel anchor No. 7 embedded in the platform of Sindhudurg Fort jetty. Each unit of scale is 10 cm. (Photograph: S. N. Bandodkar.)

*Figure 11.* Grapnel anchor used as lintel at the entrance of Padamgad Fort. Each unit of scale is 5 cm. (Photograph: Sheikh Ali Karim.)

South-east Asian countries from ancient times and the region's submerged rocks could have caused loss of anchors and occurrence of shipwrecks. The nearby archaeological site of Brahmapuri on the bank of the River Panchaganga near

*Figure 10.* Grapnel anchor No. 8 embedded in the platform of Sindhudurg Fort jetty. Each unit of scale is 2 cm. (Photograph: S. N. Bandodkar.)

Kolhapur yielded evidence of commercial contact with the Mediterranean world from 200 BC to AD 200. It is very likely that the trading community of Brahmapuri contributed to the spread of Buddhism in this region (Ghosh, 1989). It appears that after the end of Satavahana power, Malwan and Vijaydurg lost their status until they were absorbed into the empire of Shivaji. Other archaeological finds are Satavahana coins at Kolhapur and other locations closer to Malwan. Archaeological sites near Sindhudurg Fort have not yielded antiquities earlier than the Mauryan and Satavahana periods. On the basis of maritime activity in this region, the anchors are presently datable from the 3rd century BC to the 2nd century AD. It would appear that they came into use about 2300 BC and continued into the Historical Period when they were replaced by metal anchors. On the basis of archaeo-

logical finds from the Malwan region, Satavahana coins, the description of the *Periplus* and the earliest date of Malwan maritime history (Aurannoboas) it is possible that these stone anchors belong to the Early Historic Period.

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