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Maritime Archaeology of Gujarat: Northwest coast of India

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Abstract

The evidence of maritime activity in India may be traced back to the Bronze Age (early 3rd millennium BC to mid- 2nd millennium BC). The excavation of several Harappan sites including Lothal, Kuntasi, Padri, Nageshwar, Bagasra and many others have conclusively demonstrated an advance maritime culture during the third millennium Before Christ (BC). During the historical period several coastal towns had international trade and commerce including Bet Dwarka, Somnath, Hathab, Vallabhi, and Bharuch. Maritime activity reached it's zenith in Gujarat during the Medieval period (8th to 14th century AD) when Arab traders dominated the Indian Ocean for over a millennia. Underwater investigations have been carried out at various places along the Saurashtra coast and a large number of stone anchors were found.

This paper also discusses the effect of tide when using jetties and anchoring points along various parts of the west coast India. The archaeological evidence indicates that two gulfs along the Gujarat coast (Gulf Kachchh and Gulf of Khambhat) witnessed the hectic maritime activities in the past. Both gulfs have very high tidal ranges. The Gulf of Khambhat has the highest tidal range in India (11 meters). Ancient texts such as *Vishnu Puran* and *Periplus of the Eruthreanean Sea* vividly describe the tidal range and its uses in navigation. The discovery of the large number of stone anchors in the inter tidal zone along the gulf region support the above references.

Introduction

Maritime activities along the Gujarat coast dates back to the Harappan period and extensive excavations at Lothal (Rao 1974:70), Kuntasi (Dhavalikar, *et al.* 1996:76), Nageshwar (Hegde, *et al.* 1990:152), Bagasra (Sonawane, *et al.* 2003:41) and Nagwada (Bhan and Gowda 2003:51-80) have yielded conclusive evidence on maritime practices during the 3rd millennium BC. During the historical period (3rd century BC to 4th century AD) a series of ports existed all along the Gujarat coast and important among them were Nani Rayan (Irani and Dandekar 2003:91-97) Bet Dwarka (Gaur and Sundaresh 2003:57-66), Dwarka (Ansari and Mate 1966), Vallabhi, and Hathab (Pramanik 2004:133-140). Whereas by the Medieval period (8th to 14th century AD) the entire Gujarat coast had series of ports.

Gujarat coast is punctuated with several creeks and seasonal rivers that facilitated safe harbours all along the coast. The waters around the Gujarat coast are also rich in marine resources, such as shells which were used as food as well as export products. Conch shell have been a major economy source for many fishermen in Gujarat (Pota and Patel 1991:445-450).

The important sites of the maritime archaeological investigations along the Gujarat coast include Dwarka, Bet Dwarka, Miyani, Visawada, Somnath, Kodinar and Ghogha (Figure 1). The brief descriptions of the findings from these sites are provided in the following paragraphs.

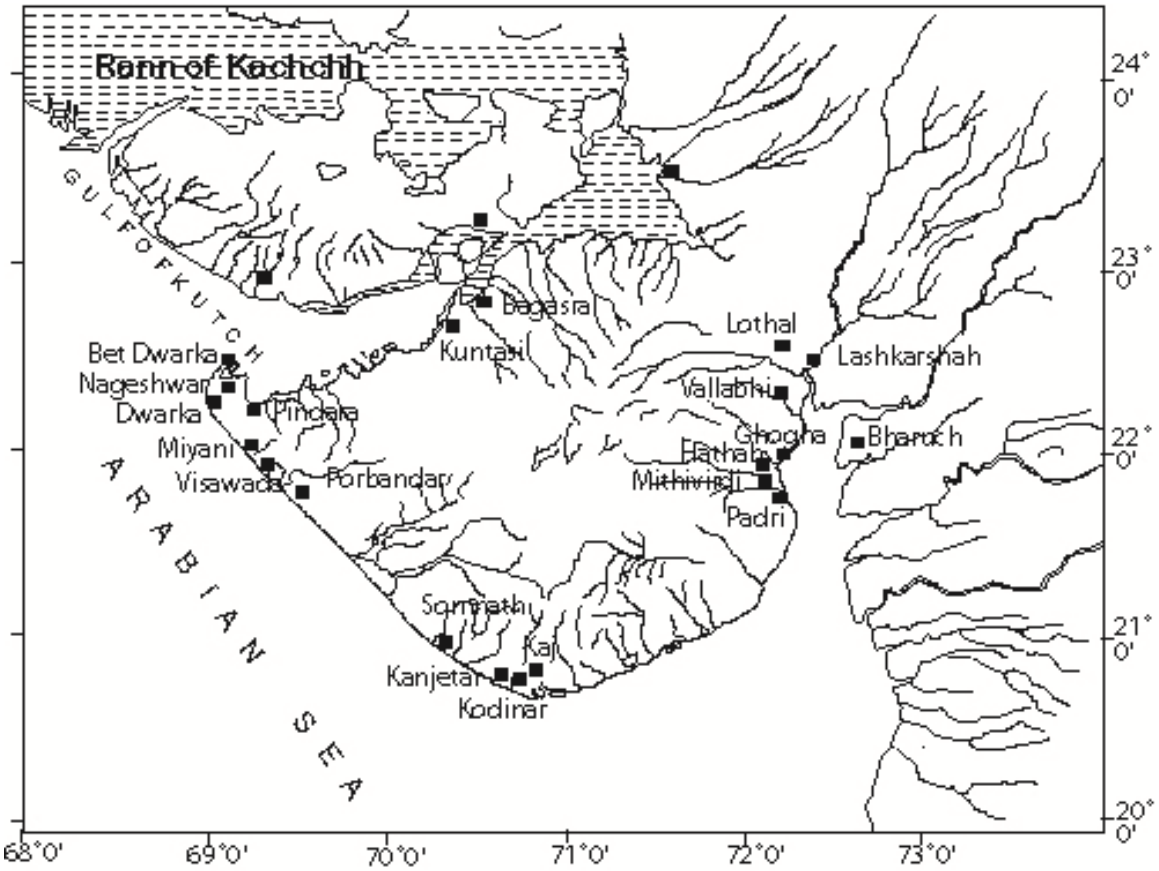

Figure 1. Map showing archaeological sites mentioned in the manuscript along Gujarat coast (Prepared by. S.B. Chitari)

Dwarka

Dwarka was the first site in India where marine archaeological exploration commenced and investigations continued for almost two decades (Rao 1988:47-53; Gaur, *et al.* 2004:1256-60). A number of artifacts were discovered during offshore explorations between 3 and 16 m water depths. Several stone structures were noticed off Dwarka and they are of various shapes and sizes. A few semicircular structures are partially intact and have jointed with hard binding material. The semicircular structures were constructed by using L-shaped blocks with provision for dowels (Gaur, *et al.* 2008:16). Besides semicircular blocks, a large number of rectangular blocks have been noticed in this area. They are scattered over a vast area and do not follow any regular plan. These blocks are found close to the semicircular structures, which indicate that these might have been parts of a larger structure. The circular and semicircular structures are presumably the bases of pillars and rectangular and square dressed blocks are of a main jetty structure that ran from shore into the water and continued until 300 m offshore. Hasmukh Sankalia (1966:10) has mentioned that “Sayajirao Gaekwad of Baroda had built a dock along the Gomati creek and a landing place on the opposite side, with huge stone pillars to facilitate tying the ship”. It is quite

likely that the remains lying on the shore and offshore regions are remains of the same dock. The presence of stone anchors that are lying along these structures also supports this hypothesis.

Along with stone structures a large number of stone anchors of different shape and sizes were noticed between the inter-tidal zone and 16 m water depth, the concentration of them being in 6 to 8 m water depth (Sundaresh, *et al.* 1999:229-252). Broadly these anchors have been divided into three groups,

a) **Composite anchors:** majority of the anchors have been chiseled out of a thin limestone block triangular in shape but often the narrower portion has a half circle with a circular hole known as rope hole and two rectangular or square holes on the wider side called fluke hole. The biggest anchor of this variety has a length of 1.8 meter and maximum width 86 centimeters (cm) and the estimated weight is 496 kilograms (kg) (Figure 2). The smallest anchor weighs 16 kg.

b) **Indo-Arabia type** of anchors were cut from a hard and long stone block with a tapering on one side and a circular hole and the other side with two rectangular or square holes on either face of the block (Gaur, *et al*. 2004a:134-51). The biggest anchor has a length of 2.37 m, a width of 40 cm and an estimated weight of 668 kg while the smallest anchor with its shape fully preserved has an estimated weight of 82 kg.

c) **Ring stone anchors**: twenty-four ring stone anchors have been found from Dwarka water and they are of various sizes (Gaur, *et al*. 2002: 390-404). The biggest has a height of 50 cm and diameter 52 cm and an estimated weight of 245 kg whereas the smallest ring stone weighs 20 kg. Similar types of ring stones have been reported from Oman waters (Vosmer 1999: 301).

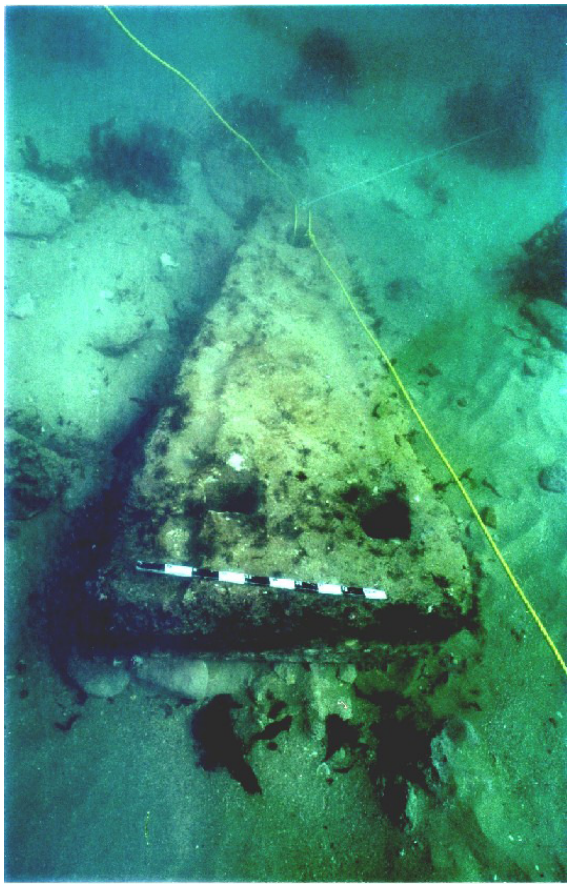

Figure 2. Dwarka: Composite type stone anchor
(Photo by S.N. Bandodkar in 2001)

Bet Dwarka

Bet Dwarka is an island situated in Okhamnadal and at the entrance of the Gulf of Kachchh. The area is also referred to as the Gulf of Barake in the Greek sea guide, the *Periplus Maris Erythraei* (Schoff 1912:38). However, Ptolemy mentioned Barake as an Island in the Gulf of *Kanthi*, which has been identified as the Gulf of Kachchh (McCrindle 1885:36).

In the 17th century BC the late Harappan people had established their settlement on the northwest part of the Island (Gaur and Sundaresh 2003:57-66). They used rich marine resources available around the Island such as the variety of fishes and shells (Gaur, *et al.* 2005:941-46). A large fishhook (Gaur and Sundaresh 2004:512-14) and shell artifacts are the testimony of the above statement. The scanty habitation deposit suggests that the site was abandoned after a couple of centuries (Gaur and Sundaresh 2003:57-66). The Island was again inhabited during the 8th century BC on the southeastern coast of the Island. Maritime activities reached it's zenith during the historical and the medieval periods. The Island continued to be an important center of maritime activity until the emergence of the Okha port in the Okhamandal area.

The underwater explorations were carried out near the present Bet Dwarka passenger jetty in two seasons (2001 and 2002). A large number of artifacts including sherds of amphorae, lead anchors, lead ingot, a hand-mill of

stone, besides 45 stone anchors, were noticed from this area between water depth of 5 and 8 m.

There are 42 stone anchors lying in Bet Dwarka waters close to the present Bet Dwarka jetty, in 6-8 m water depth. They are of two types: A) composite type: majority of them were cut from locally available limestone blocks. The circular hole (rope hole) is often found broken whereas two square/ rectangular holes on other side are preserved. The anchors are very similar to those reported from Dwarka and other places in Saurashtra. B) Indo-Arab type anchor are made of hard rock such as basalt and sometimes sandstone. The stone anchors have been dated between the historical and medieval periods.

Pindara

The ancient temple site of Pindara is situated close to the Northern Saurashtra coast in the Gulf of Kachchh about 36 km west of Khambhalia and 24 km from Kalyanpur. On the west of Pindara is a vast marshy land known as Okha Rann. Pindara is a well sheltered area, free from open sea waves. It is comprised of mud flats up to a distance of 2 km from the high waterline with a gentle slope. The average tidal range in the region is 1 to 4 m.

A huge temple complex (10 X 10 m) is exposed during low tide in Pindara at about 300 m from high water line (Gaur, *et al.* 2007:733-35). Presently, the floor area is made of dressed lime stone blocks (Figure 3), it is well preserved, while the superstructure has been destroyed and the stone blocks have been washed/ taken away. This temple was dedicated to the Lord *Shiva*, as a *yoni*[1] is present in the middle of the temple complex. The majority of the stone blocks measure 60 X 45 X 25 cms. The remaining part of the sanctum (*Garbha griha)* measures 4.75 X 4.5 m. The *yoni* measures 40 X 40 cms. The architectural feature of the submerged temple corresponds more or less with existing temple on the shore of Pindara. The size of the submerged temple must have been as big as other surviving temples in Pindara's group of temples dating back to the 7th to 10th century AD. The evidence indicates that the Saurashtra coast shoreline has changed significantly during the last 1000 years.

[1] Yoni is symbol of creation and worshipped across the Indian subcontinent since the antiquity.

Figure 3. Pindara: An ancient temple complex exposes during low tide (Photo by A.S. Gaur, 2006)

Miyani

Miyani is situated about 40 km east of Dwarka. This area is famous for ancient temples dating back to the 10th century AD (Sampura 1968: 87). On the coast of Miyani a temple is dedicated to a Goddess (locally known as Harshadmata). It is situated on a high hill. A vast creek known as Meda Creek runs a few miles into the hinterland, which has been used as a shelter in the harbour for local small craft, particularly fishing vessels.

Underwater explorations were undertaken about 1 km offshore of Harshad Mata temple. Archaeological findings comprised of twelve stone anchors of various types.

Visawada

The small town of Visawada lies about 40 km west of Porbandar and about 20 km east of Miyani. The Hindu pilgrimage center and a temple dedicated to the Lord Krishna, is situated in the middle of the town. Kindari Creek runs a long distance up to Kindar Kheda (a Harappan town) and perhaps the creek's name is derived from this particular ancient town. The western side of the coast is represented by a high cliff while the eastern coast consists of sandy beaches.

Explorations were undertaken off the Kindari Creek as a baseline, it is located about 500 m from the coastline. Features and artefacts were concentrated between 5-6 m water depths. A total of 14 stone anchors were

found and represent three varieties: composite, Indo-Arabia and ring stone types.

Somnath

The archaeological excavations on land at Prabhasa by the Baroda University and Deccan Collage Pune have yielded evidence of a township dated to 2000 BC (Rao, *et al.* 1992:13-16). The temple of Somnath nearby is dedicated to Lord Siva and the linga[2] is counted among the 12 *Jyotirlingas* of India mentioned in various Puranas.

The explored area in Somnath water is located at a distance of 400 m south-west of the Somnath temple. Somnath waters contained the largest occurrence of ring stones anchors (Figure 4). Out of the 43 total anchors discovered, 80% are ring stone. The water depth varies from 7 m to 15 m. The ring stones observed shallower than 8m water depth had seaweed growth, however ring stones of deeper depths have a layer of greyish marine growth.

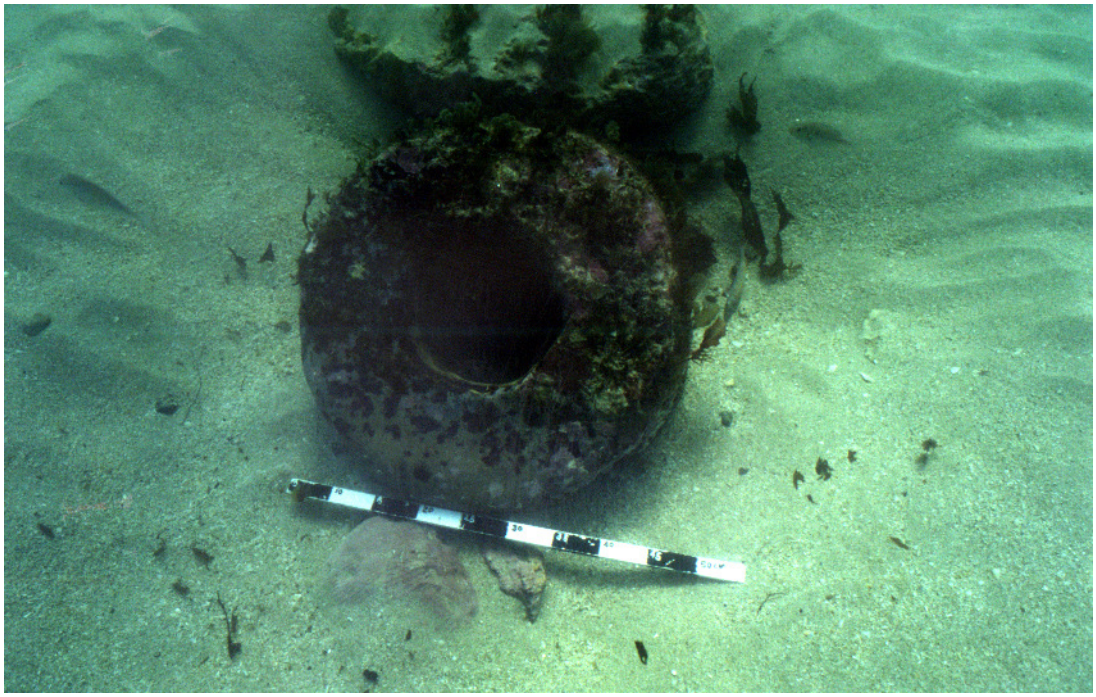

Figure 4. Somnath: Ring-stone anchor (S.N. Bandodkar in 2001)

Kodinar (Mul Dwarka)

A small coastal village known as Mul Dwarka near Kodinar in the district of Junagad is one of the claimants of the original Dwarka of Mahabharata. The proximity with Junagadh hills on the north and the sea on the south situate the town as being associated with Dwarka (Sankalia 1966:7). An ancient temple is situated on raised land close to the sea. The temple is dilapidated and not under worship. The shrine is dated to the post 10th century AD (Sampura 1968:113). A circular structure situated close to the ancient temple is about 4 m in height and

[2] Linga is a phallus symbol worshipped across the Indian subcontinent since the antiquity.

constructed with a similar type of dressed limestone blocks as that of the temple. Locally this structure is called as *Diva Dandi* which means a lighthouse (Gaur, *et al.* 2010:418-422). If this structure served as a lighthouse then this may be the oldest lighthouse remains on the Saurashtra coast. An ancient well was noticed near the jetty which is still used as a drinking water source.

The exploration in the inter tidal zone yielded a composite stone anchor. The anchor is exposed during low tide. It is made of sedimentary rock. The anchor is similar to those reported from Dwarka (Gaur, *et al.* 2008:23-57) and Bet Dwarka (Gaur, *et al.* 2005:113-129) and dated between the historical and the medieval periods.

The underwater investigations in and around Mul Dwarka (Kodinar) have been of significance in respect to understanding the archaeology of this region. Now the data of underwater explorations from all the three Dwarka on the Saurashtra coast are available and the most common aspects of them is the presence of similar types of stone anchors, therefore, the tradition of Dwarka at these places might have been existed contemporaneously (around 7^{th} - 8^{th} century AD). Another common aspect of these sites is the presence of Harappan (mid 3^{rd} millennium BC) and late Harappan (early 2^{nd} millennium BC) settlement within close proximity to each other. For example, Nageshwar and Bet Dwarka near Okhamandal Dwarka, Kindar Kheda near Mul Dwarka (Visawada) and Kanjetar and Kaj near Mul Dwarka (Kodinar). All the three Dwarka have ancient temples dated to the 10^{th} -12^{th} century AD. Nonetheless, these sites were busy ancient ports and perhaps temples were served as coastal marker points for navigators, as well as for worship before embarking on long voyages.

Mithi Virdi

The small village Mithi Virdi is situated about 30 km south east of Talaja, a *taluka* headquarter. The village is lying on a raised plateau close to the seashore. A small seasonal river merges with the sea on the western side of the village. The archaeological site is located about one km west of the village in an agriculture field.

Five stone anchors are lying on agricultural land (ground nuts are the important crop of this field) about 1 km north of the seashore. Three anchors are lying together at a distance of 10 m and oriented in the east-west direction (Gaur, *et al.* 2005:110-14) The fourth anchor is laying partially buried north of the other three and oriented in the east west direction.

All the anchors are similar to each other in shape and size. The anchors have rectangular cross-sections and trapezoidal longitudinal sections. These have sharp edges and chisel marks on them are clearly noticed. They have been cut from conglomeratic sedimentary grit rock, which is dark brown in colour and small gravel can be noticed. The anchors have two lower rectangular holes and an upper circular hole is absent in all the anchors.

Ghogha

The town of Gogha is located on the mid western coast of the Gulf of Khambhat in Bhavnagar district of Gujarat. A famous Gujarati proverb, "*Lankani lari ane*

Ghoghono var" (Bride of Lanka and groom of Ghogha) indicates direct overseas relation between Gogha and Sri Lanka in the past (Chaukasi 1989: 634). The presence of ancient Jaina temples at Gogha dating back to the 10^{th} – 11^{th} centuries suggest that this was a religious center also. The earliest Arabic inscription from Gogha dates to 1170 AD (Oza 1885: 2). During the British period ships up to 1500 tons were laden here (Habib 1982: 23).

The exploration at Gogha was undertaken during low tide and findings were recorded with still photography and drawing. A large number of stone anchors were recorded between 100 and 200 m distance from the high water line (Gaur 2010:146-155). The majority of the anchors belong to the Indo-Arab type and nearly about 40% anchors are fragmented. Interestingly, the fresh surface of broken parts suggests that fragmentation of the anchors took place during the manufacturing stage and not during the anchoring processes. A composite anchor made of lime stone was found at the site. A few unfinished anchors were found from Gogha and Hathab. However, these anchors were submerged in 5 to 7 m water depth during high tide. Thus, it indicates that big boats were anchoring at this point during high tide. The author of the *Periplus of the Erythrenean* also refers to such activities detailing that during low tide boats rest on the seabed.

The exploration in the inter tidal zone has also yielded several sherds of the glazed ware in the vicinity of stone anchors. These include a jar with internally and upper half externally glazed; and the rest of the sherds are glazed internally only. There are three main types of glazed ware (i.e. green, blue and brown). These are very similar to the Islamic glazed ware found from various parts of the country (Mohammad 1985:105). The medieval period glazed ware at Hastinapur (Lal 1954-55:5-151) was found in association with coins of Balban (1206-87 AD). The sherds recovered from the inter-tidal zone of Ghogha are very similar to those reported from another medieval period site at Lashkarshah in Khambhat which have been dated to 14^{th}-16^{th} century (Bhan 2006: 90-95). Thus the glazed sherds Ghogha may also be dated to the late medieval period.

Hathab

Hathab an early historical site is referred to as *Astacampra* in the *Periplus of Erythrenean Sea* (Schoff 1912: 40). On shore excavation yielded rich antiquities of the historical period and maritime contact with the west. It is located about one km into the hinterland. The exploration in the inter tidal zone of Hathab yielded two anchors similar to those of the Indo-Arab type and one anchor with a wide groove wrapped around the middle of the anchor. This is very similar to those reported from Japan and Chinese waters (Yang 1990:113-121).

The remains of a jetty were noticed at the mouth of the river Shetrunji near the village Sultanpur. This was primarily a wooden jetty now abandoned due to emergence of other ports in the vicinity.

Conclusions

Coastal and maritime archaeological investigations along the Gujarat coast have conclusively proven that it holds the earliest evidence of the maritime activity in

the Indian subcontinent. Archaeological set up of the Kachchh region provide enough indication that the Rann of Kachchh was a navigable body during the third millennium BC. During the historical period Gujarat witnessed hectic maritime activities and boats from various regions including the Mediterranean Sea. The maritime activity reached its zenith during the Indo-Arabia trading network of the medieval period and a large number of evidence indicates that Gujarat played an important role in the Indian Ocean trade system during this period. Marine archaeological investigations during the last two and half decades have brought out a number of potential sites along the Indian coast which include ancient ports, jetties, and shipwrecks. The extensive explorations of the Saurashtra coast revealed several ancient ports and jetties. Interestingly, archaeological discoveries suggest that natural phenomena like tidal variations have been very effectively used in the Gulf of Kachchh and the Gulf of Khambhat in the past.

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