ARCHAEOLOGICAL REMAINS OF THE ANCIENT HARBOURS ALONG THE WEST COAST OF INDIA: A LEGACY OF OUR MARITIME HERITAGE

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Abstract

The maritime activity has played a vital role in the emergence of well-developed civilizations around the world during mid-Holocene period. Cultural interaction, exchanges of technology, trade and commerce led the human society to reach at present day height. However, this development is the result of a well-organized town planning, construction of jetties and harbours in the past. The archaeological explorations during last one century brought to light a large number antiquity related to ancient Indian harbours and maritime activities.

Archaeological excavations brought to light a jetty at Kuntasi in Rajkot district of Gujarat, dating back to Harappan period. The site is located on the river-bank and it is believed that during high tide boats were reaching the site. It is generally believed that Lothal on the head of Gulf of Khambhat, was an international trade centre during Harappan period. Marine archaeological explorations by the Marine Archaeology Centre of NIO brought to light the existence of harbours at Dwarka, Bet Dwarka, Somnath, Vijaydurg, Sindhudurg, Gopakapattana and Pooppuhar. Identification of ancient harbour is based on the discovery of archeological evidences like stone anchors, stone structures etc.

1.0 INTRODUCTION

Archaeological and literary evidence have indicated that the maritime activities by the ancient man led to the development of many civilizations along the coasts across the world. Coastal navigation and safe harbour played a pivotal role in cultural and technological interaction between the civilizations in the past. The urbanization of Egypt, Mesopotamia and Indus Valley Civilizations can be attributed not only to the high productivity of their respective regions but also to the ease with which the produce could be moved from one place to another through the sea and river routes (Gaur, 1991). India has a long coastline and is netted with the rivers, which facilitated the ease movements of products and this facility has always been the attraction for the foreign invaders from the ancient period.

The ancient Sanskrit words like Pattana and Dronimukha (Roy, 1994) have been used for coastal port city where national and international ships and boats were harboured. The oldest reference to the harbour came from the Mesopotamian text where mention has been made about the boats from Meluhha were anchored in Agade harbour datable to the mid- 3rd millen-

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nium BC (Kramer, 1964). Archaeological excavations brought to light a jetty at Kuntasi in Rajkot district of Gujarat, dating back to Harappan period (Dhavalikar, et al., 1996). The site is located on the tidal river-bank and it is believed that during high tide boats were reaching up to the site for cargo handling. It is generally believed that Lothal on the head of Gulf of Khambhat, was an international trade centre during Harappan period (Rao, 1979). There are several references in Mesopotamian inscription about the trade and commerce with the Indus Valley Civilization. Mesopotamians were importing particularly semi-precious stone, shell artifacts and teak-wood. During the historical period several ports along the Indian coast were active such as Dwarka, Porbandar, Somnath, Bharuch, Sopara, Elephanta, Goa, Malpe, Muziris on the west coast and Korkoi, Poompuhar, Vasavasamudram, Arikamedu, Machlipatnam, Palur and Tamralipti on the east coast. During early medieval period Arabs were dominating power in the Indian Ocean and they traded nearly for 1000 years. Their trade activities were spread from China, Malaysia, and Indonesia on the east and Mombassa, east African coast and Red Sea on the west. Indian spices, semiprecious stones and teak-wood has always been the attraction for the foreign navigator to venture Indian coast.

Changes in coastline and river courses due to natural factors led to the abundance of the ancient ports and remains are either lying submerged or located far hinterland (Gaur and Vora, 1999). There are several instances where no archaeological traces of ancient ports have been found despite of references in ancient literatures. Primary reason for the absence of the remains of the port installation, may be the fact that the most of the settlements were situated either on the river banks or the bank of backwaters which would have been served as an excellent natural harbour. Excavations at Poompuhar brought to light a wharf situated on the bank of old course of the river Kaveri (Soundar Rajan, 1994). Similarly, onshore excavation at Elephanta Island yielded a wharf dating back to the early centuries of the Christian era.

Marine archaeological explorations by the Marine Archaeology Centre of the NIO brought to light the remains of harbours at Dwarka, Bet Dwarka, Somnath, Porbandar, Vijaydurg, Sindhudurg, Gopakapattana and Poompuhar. Identification of ancient harbour is based on the discovery of archeological evidence like stone anchors and structures etc., (Gaur, et al, 2000).

2.0 ANCIENT HARBOURS AND JETTIES

2.1 Lothal

One of the best known Harappan site at Lothal is located about 80 km south west of the Ahmedabad. The excavations at Lothal brought to light a brick structure in trapezoidal shape. It measures about 214 X 36 m and the height is 3.3 m with 42 brick courses. The excavator identified this structure as first dockyard of the world (Rao, 1979). There are few perforated stones, which have been suggested as anchors. Other supportive evidences include warehouse in south-western corner of the dockyard. However, a number of serious objections have been expressed against the hypothesis of dockyard such as (i) why the dockyard built away
from the river side and very close to the residential area (Possehl, 1976). (ii) what is the 
function of outlet channel if it was a tidal dock (Gaur, 2000) and lastly (iii) what was the 
coastline during Harappan times as the dock is located about 12 m above sea level (Pandya, 
1977). Despite of all these concerns Lothal had been active an international trade center 
during Harappan time as a large number of antiquities of ancient Egypt and Gulf countries 
have been recovered from the site.

2.2 Kuntasi

Harappan site at Kuntasi, is located on the southeastern coast of the Gulf of Kachchh and 
lying on a tidal river. The excavations at Kuntasi brought to light two fold cultural sequence 
namely mature Harappan (2300-1900 BC) and late Harappan (1900-1700 BC). A structure 
was exposed on the southern side of the site measuring 9.5 m x 4.1 m are set with large 
stones in mud masonry. The excavators believe that this must have served as a landing 
platform for going down to the river for loading and unloading cargoes in the boats (Dhavalikar 
et al., 1996).

The excavation of Kuntasi indicates that it was not an agricultural settlement but was a center 
for acquiring and processing raw material for export. The geomorphological studies suggest 
that Kuntasi might have been a creek port during Harappan period (Dhavalikar, et al., 1996).

2.3 Inamgaon

A chalcolithic site at Inamgaon in Maharashtra was excavated during the early 70’s which 
yielded a landing platform built on the slope towards the river reaching right up to the river bed. 
The structure is 9.8 m long and 4.5 m wide. Dhavalikar et al. (1988:248) opine that the struc-
ture might have been still larger but due to successive annual floods, got destroyed and 
reduced in its size. However, available evidences are enough to suggest that the structure 
might have served as a landing platform for boats for descending and ascending to and from 
the river. It is relevant to mention here that small boats with high pro and stern and with oars 
have been depicted on spouted vessels recovered from the burial sites (Dhavalikar, et al., 
1988). These paintings stand in support of river navigation in this area.

2.4 Dwarka

Dwarka is situated on the extreme west coast of Indian territory. The glorious town of Dwarka 
was submerged by the sea just after the death of Lord Krishna. As Dwarka has the historical 
importance and association with the Mahabharata the site has attracted archaeologists and 
historian besides scientists. Marine Archaeology Centre of the NIO has been carrying out the 
exploration since 1983 (Rao, 1990). However, here we refer the explorations carried out be-
Underwater visual explorations were undertaken about 200 m westward from the Samudranarayan temple and opposite to the mouth of Gomati creek, which revealed a large number of stone structures (Fig. 1). These structures are found between 3 and 6 m water depths and are mainly consisted of semicircular and fallen walls.

A few semicircular structures are partially intact and some have jointed with hard binding material. Structures with 2-3 courses have been noticed at least at 10 locations. The semicircular structures were constructed by using L-shaped blocks with provision for dowels. The average size of a block of semicircular structures is 95 x 55 x 25 cm. The sizes and shapes of the blocks are similar to those noticed onshore.

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 form any regular plan. However, at a few places 2-3 courses of blocks noticed which are the remains of fallen structures. These structures are found close to the semi-circular structures, which indicate that these may be the part of some larger structure. The rectangular blocks have various sizes and important ones are 120 x 60 x 16 cm, 115 x 50 x 17 cms, 110 x 50 x 18 cms and 45 x 30 x 14 cm (Gaur, et al., 2000). Most of the structures are lying exposed on rocky seabed, however, a few of them are partially buried in sand. The exposed portion of the structures is covered with thick vegetation. A few circular structures and others have been noticed in the inter tidal zone of Dwarka (Fig. 2) and these are very much in alignment with the offshore structures.
Fig. 2. A circular structure of ancient jetty, exposed during low tide.

These structural remains appear to be the remains of an ancient jetty. Similar type of structures have been noticed during low tide in Rupen Bundar, which is located about 2 km north of Dwarka. Local fishermen inform us that these are the remains of an ancient jetty. Therefore it is relevant to conclude that these submerged remains at Dwarka could be the part of a jetty (Gaur, et al., 2004). The other supportive evidences along with these structures are a large number of stone anchors discovered in Dwarka waters. Their characteristic features and varieties are mentioned below.

2.5 Vijaydurg

A sheltered dockyard is located about 3 km upstream on left bank of the river Vaghotan. It was built by the Angre of Chief of Maratha Army during 17th century AD and further enlarged and renovated by Anand Rao Dhulp. Ship with 500 tonnage capacity can be anchored in this port. The length of the dockyard is 110 m and width 75 m. The width of entrance is 7.5 m wide at the bottom and 11.5 m on the surface. The walls in South and north directions, made of natural rocks served as protection walls while north and west sides walls constructed with dressed stone blocks. Presently dockyard is filled with 2 m thick sediments. This dockyard was generally used for repair and maintenance of ships. The ships generally used to enter into the dock during high tide. A raised platform was noticed in the central part of the dock, which was used for the repair of the bottom of the ships (Sila et al., 1998). The significance of the dockyard of Vijayadurg is that this dock is the first of the type of Maratha period to be found in this region. The dockyard was built at such a place that it is difficult to locate, which shows the defense strategy of the Maratha navy.

2.6 Porbandar

Famous port of Porbandar is located between two important Hindu religious centers, Dwarka and Somnath. The place is also famous as the birthplace of the Father of the Nation M.K. Gandhi. Inscriptional and traditional history of the region suggest that Porbandar was established around the 5th century AD. However, the recent onshore exploration brought to light the
remains of a late Harappan settlement known as Kotada in Porbandar. Besides, of above site the exploration also revealed four ancient jetties locally known as Juna Dhakka were noticed in the creek area in a stretch of about 3 km. The location and description of each jetty is given below.

A. The first jetty (the upper most part of the creek) is situated near the present Kanya Gurukula and opposite to Porav Mata temple. The major portion of the jetty has been destroyed and the length of remaining part is about 10 m and visible height is 1.5 m and made of irregular huge limestone blocks. The jetty was constructed parallel to the creek. The local information suggests that this jetty was used as passengers jetty and small size boats with sails used to visit this jetty.

B. Second jetty is located about 200 m south of the present bridge between Bhokhira and Porbandar over the creek. The jetty is well preserved but is partially covered under the present metallic road. The remaining portion of the jetty measures more than 50 m in length and 3 courses are visible. The jetty is made of fine dressed and uniform limestone blocks. It is constructed parallel to the creek. As per local information, this jetty was used for loading and unloading cargoes such as cotton and woolen cloths, wood, grains etc. The boat having a length of 10-15 m used to reach at this jetty.

C. Third jetty is noticed about 100 m south of the earlier one and it is in very poor state. A few irregular scattered limestone blocks can be noticed during low tide.

D. The fourth jetty is located near the present cremation ground on the creek. The major portion of the jetty is covered with a modern structure. As per local tradition this jetty was used to ramp the creek by bullock carts as the remains of the same were noticed. This jetty was constructed perpendicular to the creek and part of the same extended a few meters in the water (Fig. 3). The jetty is made of uniform and dressed limestone blocks.

Fig. 3. Remains of an ancient jetty at Porbandar.
Ancient jetties in the Bhokhira creek suggest that this was an important maritime trade center. The location of jetties suggests that these were used as tidal jetties. During high tide boats could reach up to the jetty and again boats would move out during high tide. These jetties are also indicative of the advancement in harbour architecture during medieval period. However, to ascertain the date of these jetties we need some more data and finds like anchors or nearby ancient habitational site. So far, no parallel structure has been discovered from the coastal area, yet some remains of ancient jetties have been reported from offshore area of Dwarka and Rupen Bandar (Gaur, et al., 2003) in Okhamandal region. The tradition of construction of jetty and dockyard is as old as Harappan period in Gujarat (Dhavalikar et al., 1996; Rao, 1979) but they are presently located either at a higher level in far hinterland. As per local information these jetties were in use till late 19th century AD.

While interviewing aged fishermen, they informed that stone anchors were present in Porbandar, however, due to reclamation of the land for construction of the new port, most of the ancient remains might have been destroyed and buried under modern structures. A few local fishermen have mentioned that stone for anchors, used to come from Barda hills which is of basalt.

3.0 ANCHORS

3.1 Dwarka

Stone anchors are the fundamental requirement of navigation as every ship need to be anchored in the sea. The explorations in Dwarka waters brought to light the largest number of stone anchors in the world. They are of various shapes and sizes. They include triangular type (Fig. 4) with a circular upper hole and lower two square holes with often even thickness, grapnel type is rectangular in shape with a upper circular hole and lower two rectangular holes on either face. The third variety is circular in shape with an across hole in the center. The amount and varieties of anchors from Dwarka suggest that maritime contacts of Dwarka were with various countries in different phases of history. Similar type of stone anchors have been discovered from several places across the world and variously dated between 4500 years BP and modern period. The study of stone anchors along the Indian coast suggest that these could be dated between 2000 years BP and 300 years BP (Gaur, et al., 2001 and Sundaresh et al., 1999).

Fig. 4. Triangular stone anchor from Dwarka.
3.2 Bet Dwarka

Bet Dwarka island is situated in the mouth of the Gulf of Kachchh. It can be approached by boat and the nearest port is Okha. Bet Dwarka played an important role in maritime activities of the Okhamandal region from the beginning of the 2nd millennium BC (Vora, et al., 2002). The exploitation of marine resources has been observed from early times. The island has been under occupation since the late Harappan period and habitation continued till date. The primary reason for the early settlers is the availability of marine resources along the Bet Dwarka coast such as conch shell and fishes. This is also confirmed by the discovery of one of the biggest fishhook from this island dating back to the late Harappan period (Gaur and Sundaresh, 2004). Bet Dwarka island has been referred as Baraca by the Periplus of Erythreanean Sea. Author says that it is very difficult to navigate in the Gulf of Baraca as several invisible reefs cause the grounding of ships (Schoff, 1974). A large number of Roman amphorae have been discovered from this place (Fig. 5). The presence of Roman amphorae suggests that perhaps Roman boats also reached Bet Dwarka waters.

![Image](image.png)

*Fig. 5. Lower portion of Roman period amphora from Bet Dwarka.*

The presence of a large number and variety of stone anchors in Bet Dwarka suggests that this was one of the important ports during the historical period. The most interesting aspect of the island is a long cultural sequence, which commenced with the remains of the protohistoric period (4000 years BP) and continued till the present time (Sundaresh & Gaur, 1998; Gaur et al., 2000). The water around the island is rich in conch shell, varieties of fishes and corals, which must have been the reason for the habitation of protohistoric man and its continuation.

The anchors have been observing near the present Bet Dwarka jetty between the inter-tidal zone and 8 m water depth. This area falls in a low and high tide current, which has a maximum speed of 6 knots. Therefore, heavy artifacts like stone anchors can remain under the sea.
However, a large quantity of pottery, partially buried in the sediment, was found from this area including a few sherds of Roman amphorae. This evidence indicates that this could have been an anchoring place for boats since the early centuries of the Christian era. Most of the anchors are made out of limestone, which is locally available in the Okhamandal region. The material of a few composite anchors is porous and fragile, while rock of other composite and grapnel anchors is fine-grained and with a smooth surface; however both types of rocks are available in this region.

3.3 Somnath

Somnath is situated 5 km east of the present Veraval port. Somnath also known as Prabhash Patan has been a historical town as it finds the mention in the Mahabharata. Archaeological excavations at this place brought to light the remains of Harappan settlement dating back to 4200 years BP (Rao, 1991). Marine archaeological explorations off Somnath temple yielded a large number of stone anchors of various types, however, majority of them are ring stones (Gaur, et al., 2002). They are made of either basalt or limestone (Fig. 6). The discovery of these anchors indicates that this was an anchoring point during early period. This port decline because of the rise of present Veraval port about 5 km west of the Somnath temple.

![Ringstone anchor in Somnath waters.](Image)

4.0 CONCLUSION

Archaeological discoveries along the Indian coast have indicated that maritime traditions are as old as it’s civilizations. Harappans used Gujarat coast as the most potential area for the maritime activities and also the exploitation of marine resources like shells, fishes and salt. Offshore explorations at Dwarka and Bet Dwarka confirmed their important role in the history of maritime activities. Onshore explorations in Porbandar brought to light for the first time the remains of a late Harappan settlement dating back to the 16th-14th century BC, which is very
similar to that from Bet Dwarka. This is another evidence to suggest that Harappan legacy
of maritime activity continued till late Harappan period on the Saurashtra coast. The discovery of
ancient jetties along the Porbandar creek signifies the importance of Porbandar as an active
center of maritime activities in the past. Probably these jetties were built during medieval
period. The siltation of the creek and emergence of new port are the important causes of
disuse of these jetties. Marathas built a well developed dockyard on the bank of Vaghtotan river
near Vijayadurg. All above findings are suggestive of the prosperous and well developed
harbour engineering during ancient India.

5.0 ACKNOWLEDGEMENTS

We are thankful to the Director NIO, for permission to present this paper in the conference.
We also thank to Shri. K.H. Vora, for providing facilities for the study. Shri. S.N. Bandodkar
provided photographs and Shri. S.B. Chitari prepared line drawings, we thank them.

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