

‘Stapled’ boatbuilding tradition of Bengal: a case study on *chhot* boat

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ABSTRACT

We have documented a boat-building procedure that is unique in Bengal (India). The typological name of the boat is *chhot*. A smooth-skinned, rabbeted, and stapled boat of Bengal with a 'v'-shaped cross section and prominent keel. The project took place in Dihimondalghat of Haora district on the bank of river Rupnarayan. Digitization of the entire process of boat building was undertaken on this EMKP, UK project. Panchanan Mandal and his four sons created a full-scale boat measuring 35 feet in length and 9.5 feet in the cross beam. Documentation of *chhot* is important as the boat type is no longer used on the river. The crafting skill of *chhot* boat building will disappear shortly. It is the first project on the digitization of a boat in India. The presentation is through still photography and videography along with narratives.

Keywords: stapled, *chhot*, Namasudra, *jolui*, shell built

UNDERWATER CULTURAL HERITAGE AND MARITIME MUSEUMS

This part of the world (Bengal, India) is not landlocked but rather riverine. Though we have a rich maritime culture, underwater cultural heritage was not documented. Riverine culture has been documented through various ethnographic studies but maritime and riverine culture has not been studied in depth. Maritime ethnography has been a key tool to document Underwater Cultural Heritage through the study of present boats. Hence this study is an exemplary study on the documentation of Underwater Cultural Heritage.

Documentation of a boat and the way of making that boat is the prime focus of the present study. The technology, which it follows, is meticulously documented. A boat has been commissioned for the entire research work. Traditional boat builders built that boat using their traditional tools. Minute-to-minute documentation through photography, videography, and interview of the entire process of boat building has been recorded for posterity.

It was felt that immediate documentation of the watercraft is highly important because all traditional boats as well as skills of boat building are in grave danger. The reasons of course are simple. It is one of the many cumulative effects of the development of the world we live in. Heavy siltation on the riverbed is caused by many anthropogenic as well as geographical conditions, of which obstacle in the natural flow of water is the most important. It is high time to document the watercraft and the process of the building because already some are lost and some are at stake and thus one of the oldest technologies is going to be lost altogether, shortly.

The most important source of information other than major finds of the ancient boat is that provided by the boats of the ancient building traditions, which still exist today. In this context, an important aspect put forward by McKim Marriott (1955) in the form of the concept of 'Over Developed Technology' is highly acceptable. According to him, a particular technology forms a cobweb with the various aspects of the social-cultural domain like belief, ritual, custom, etc., of that particular society both in time and space. This integral interactional pattern of society carries in it, the traditional concept of civilization. Therefore, following McKim Marriott's arguments, it can be stated that the

study of a particular traditional technology enfold the historical background of the community that practises it and also the ecological conditions and economic requirements of that area at a particular time. It will, thus, enable the researcher to understand the complex interactional pattern of traditional material culture and social customs as well as the patterns of belief in a single study.

CASE STUDY

The *chhot*-builders of West Bengal Project: Documenting the vanishing craft knowledge of a unique boat-building tradition' is the title of the initiative of a team, in a collaborative project between the University of Exeter, UK, and Central University of Haryana, India.

Material knowledge— understanding of the resources, skills, technologies, and social values necessary to create and maintain the material world around us- is endangered. In this precarious world, the diversity of material knowledge is being lost at an unprecedented rate as mass-produced goods and industrial technologies subsume or replace local practices. Changes to the environment and habitat loss—through industrialisation, deforestation, green grabbing, and other factors—jeopardize local ecologies and raw material sustainability. Meanwhile, shifting socio-political dynamics, such as large-scale urbanisation and rural depopulation, imperil long-practiced forms of learning, apprenticeship, and knowledge transfer.

The Endangered Material Knowledge Programme (EMKP) supports knowledge holders, practitioners, and scholars to conduct new research on critically threatened material knowledge globally, especially in understudied areas and where local funding opportunities are limited.

About the boat

The *chhot*, a typological variety of lower Bengal boats, is unique as it can venture into the open sea. Probably this is the only boat of Bengal (presently State of West Bengal in India) which was used for maritime activity in the Bay of Bengal. The *chhot* is a rarity in that its planking is joined using metal staples, a technique unknown elsewhere in India that echoes sewn-boat construction, while its keel-less construction echoes traditional watercraft in southeast Asia.

About the boat builders

Panchanan Mondal, a 70 years old boat maker who was a master boat builder at his young age is the resource person and advisor to his team. The guild of boatmakers comprises his four sons Amol Mondal, Monimohan Mondal, Dilip Mondal, and Deepak Mondal. Except for Mohimohan all other sons reside in the same hamlet but they all maintain separate kilns for food. Panchanan Mondal received his knowledge of boat building from his father at the early age of 14. All four sons of Panchanan also received training in boat building from their father Panchanan. It has been noticed that the last five generations are with boat building activity. And they are experts on *chhot* boats.

Panchanan belongs to the Namasudra community, a caste under the Hindu caste system. As per Risley, Nama Sudra, a non-Aryan caste of Eastern Bengal termed as Chandal, “engaged for the most part in boating and cultivation... They are the only Hindus employed in the boats (*bajra*) hired by Europeans; they form a large portion of the peasantry." In lower Bengal Namasudra is a predominant caste group engaged with cultivation as well as fishing.

Area of the project

Dihimondalghat is a village situated on the left bank of River Rupnarayan in the district of Haora, West Bengal, India. Rupnarayan is the name of a river that confluence with river Ganga a few

kilometres downstream of Dihimondalghat. The origin of the river is in the Chhotonagpur plateau. Damodar, Silabati, Dwarakeswar, and Mundeswari are the sources of river Rupnarayan.

Boat building technology

Chhot boat, a shell-built boat with a keel, followed a tradition of Bengal to fasten two planks with a kind of metal pin (staple-like) called *jolui*. This process of fastening is termed as stapled technique here which is unique and perhaps only visible in some parts of Odisha, some parts of Bihar and Uttar Pradesh, and the entire West Bengal, Assam, and Bangladesh.

The process of boatbuilding is described herewith in sequence:

1. Shaping of wood: Selected timbers are sawed under the supervision of the chief boat builder. The quality of wood and its length is one of the important criteria for this selection procedure. Planks of different dimensions are sawed in sawmills but hand saws are also occasionally used. The wood used in the boat construction are Krirish (*Samanea saman*), Sai Bilati (*Pithecellobium dulce*), Arjun (*Terminalia arjuna*), Babla (*Vachellia nilotica*). In earlier days boats were used to build with Sal (*Shorea robusta*) and Segun (*Tectona grandis*) timbers.
2. Firing and Bending: A trench of requisite length is used to heat specific planks. Saw dust is used as fuel. After requisite heat treatment planks are placed on a raised device to bend planks as per requirement. For twisting certain planks generally, planks are placed on the ground and paved with pegs.
3. Erection of keel (Figure 1): With the help of support structures keel is laid on the ground with a proper contour. A string is tied in between two terminal ends of the keel. The string is used to test the perfection of the alignment of the keel in the same plane.



Figure 1. Entire keel after erection. Various support systems are used to hold the keel in its position.

4. The support structure: A series of coconut logs two feet in length is placed on the ground at regular intervals and fixed with wooden pegs to act as the support structure of the bottom of the hull and specially the keel plank. Curved keel planks are joined with the central keel plank with a complex scarf and wooden pieces are used to support the structure. At the two terminal ends of the keel plank tripod or diagonal supports are used. Galvanized wires are used to hold the central plank with the ground.

5. Planking (Figure 2): Planking starts from the mid-ship portion of the boat on either side. Planks if needed to be bent are heated first and bent accordingly and then placed on the position and temporarily clamped. Finer adjustments are marked with a traditional device called *karan* (fixed divider) and *boa karan* (expandable divider). Clamps are removed and marked portions are chiseled out. Again planks are placed in their actual position and with the help of *karan* a scratch line was marked along the seam line on the central keel plank and also on the outer surface of the garboard plank that will be fitted later. Now the garboard plank is removed again. A medial line is marked with *kursud*, a marking device, along the thickness of the garboard plank as well as on the keel. Based on the marked scratch on the central keel plank half lap portion of both connecting surfaces is removed. That is termed as *ban kata* the rabbet. After doing rabbet on both connecting surfaces planks are now ready to fit in the marked portion. Various types of clamps are used to keep the plank in position. Then a slot is made at regular intervals with the help of a chisel. This slot is generally done at a distance of *char angul* (four-finger width) (roughly 3 inches).



Figure 2. Hull planking. Planks used in the hull planking are run parallel to the keel. Smaller planks are used in the stem and stern region.

6. Rabbeting: Rabbet is the half lap. On the thickness of the plank, half of each side is removed to fit it with the other side. All planks of the hull are attached to this type of joint.
7. Stapling (Figure 3): When the planks are aligned, shallow slots, about one-eighth of an inch in width, are cut across the seams on the inner side of the boat at intervals of 4 inches. These intervals depend upon specific positioning in different sections of the boat as also on the expense to be incurred on the boat. The length of these slots on either side of the seam is of varying ratios. The *jolui* are never equally positioned across two planks. Three-quarters of the length of the slot lies in the plank that has the tongue of the rabbet on the inside. This is usually the newly added upper plank. The remaining quarter length of the slot lies in the plank that is already fitted. *Jolui*, a flat double-pointed staple of galvanized iron, is first driven at an acute angle into the plank, which is already in position. The pointed end of the *jolui* is then driven into the newly added plank in an angular fashion.



Figure 3. Entire hull structure. Hull planks are run parallel to the keel but the sheer strake connects stem head to stern head.

8. Clamping: Various types of clamps are used to hold planks in a fixed place. The use of ropes and bamboo poles is the most important device for clamping called *jat bari*.
9. Joining: Garboard strake at the mid-ship portion is fitted first then to lengthen the garboard strake vertical scarf joints are used. All hull planks use scarf joints whereas the topmost planks and next to sheer strake use a complex scarf like that of the central keel plank.
10. Framing: Before putting sheer strake cross beams are added. The number of crossbeams depends on the length of the boat. Generally, the distance between two cross beams is three feet. For fishing boats, cross beams are aligned with the outer surface of the boat but for cargo, those are protruded out. Cross Beams are joined with the strake with a kind of groove that is complex. After putting crossbeams, futtocks are added at a regular interval. These futtocks are curved pieces of logs holding each side planks with the help of specially made iron nails. After placing all futtocks (*baras*), floor timbers are also added corresponding to each pair of futtocks.
11. Hull planking and accessories: After completion of framing now boat builders used to put some additional support structure like outer stringer, temporary deck, steering oar and paddle. After doing all those activities the outer surface of the boat needs to be made smooth on all joints of the plank.
12. Caulking: After completion of all carpentry work caulking takes place on every horizontal as well as vertical joint of planks. A type of cotton is used to plug on the entire outer surface of the boat. After that, extract sap from the *Gaub* fruit (*Diospyros malabarica*) is painted on the outer hull as well as on the plugged cotton.
13. Sail: Rectangular sail made of cotton cloth is used on a single mast placed centrally. Sail is hung on the yard not medially rather than in a 60:40 ratio.
14. Trial run (Figure 4): After completion of the entire boat *chhot* boat was launched on the river Rupnarayan after a brief ritual performance and then sailed.



Figure 4. Trial run with square sail on river Rupnarayan

TEAM

Boat Builders: Panchanan Mondal, Amol Mondal, Manimohan Mondal, Dilip Mondal and Deepak Mondal.

Prof (Dr) John P Cooper and Dr Zeeshan A Shaikh are the collaborators of the project and were involved in the field investigation along with Mr. Swarup Bhattacharyya, as Research Associate.

OUTCOME

The commissioned boat has been kept on the bank to handover to the authority of the National Maritime Museum, Gujarat, India. The entire digitised document will be kept in the archives of the British Museum.

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