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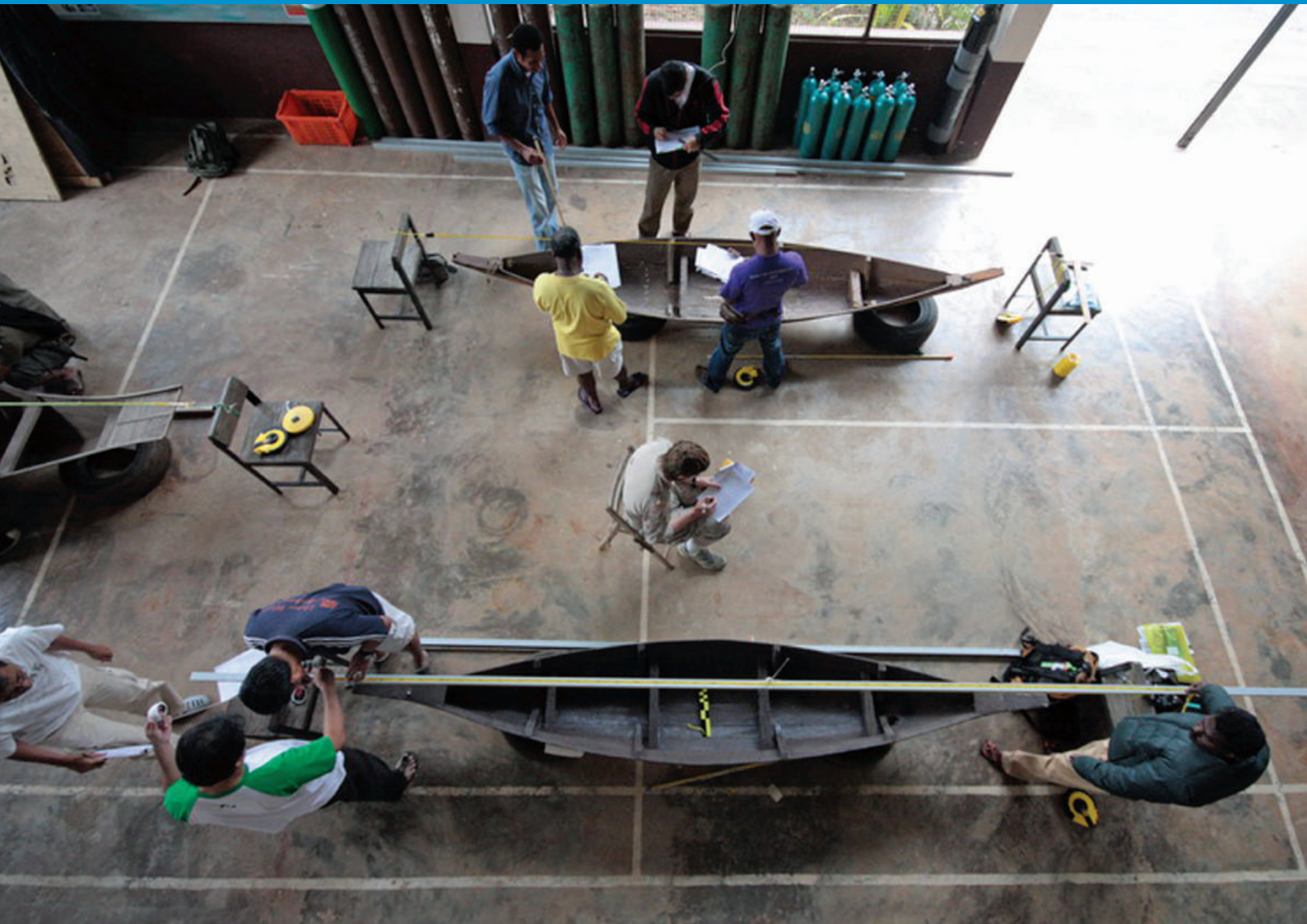


The Protection of the
Underwater Cultural Heritage

APPENDIX A

Author Charlotte Minh-Hà L. Pham

Ethnographic Boat Recording Practicum



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APPENDIX A

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APPENDIX A

Author Charlotte Minh-Hà L. Pham

Ethnographic Boat Recording Practicum

Core Knowledge of the Appendix

This appendix introduces students to the practice of maritime ethnography and demonstrates how it can be a valuable research tool.

On completion of the Ethnographic Boat Recording Practicum, students will learn:

- Understand what maritime ethnography is and its advantages and potential
- Understand how to plan boat recording sessions
- Understand how to take the measurements required to make a traditional line drawing
- Have knowledge of which key elements need to be addressed in a report

Introduction to the Appendix

Although maritime trade was central to the development of South-East Asia and the body of knowledge is growing, there is still little information about the vessels that facilitated these activities. Historical documents, iconography or archaeology provide some insight, but seldom address the boats used in accurate detail.

In the absence of archaeological evidence, maritime ethnography can provide a rich alternate source of data to inform us about ancient seafaring and early boat building traditions. It provides a key to forming a clearer picture of the actual shipbuilding process, navigation techniques and the diversity of boat use.

When financial support or specific training is not available to conduct underwater excavations or surveys, it is still possible to build knowledge of boat traditions and develop an understanding of the maritime aspects of culture, through the practice of maritime ethnography. This approach can be a stepping stone in the development of maritime archaeology in regions where the discipline is not yet practiced to its full potential. When done accurately, maritime ethnography can be a powerful research tool to complement our understanding of the role of boats and boatbuilding in a historical, political, economical, environmental and cultural context.

In this appendix the definition, potential and advantages of maritime ethnography are discussed, as well as its practical application and preparation. Although a full record of a boat cannot be conducted during this practicum (which would include recording a full construction sequence, specific vocabulary or interviewing the boat builder or boat owner), it will address the practical aspects of preparing a systematic recording, and outline the essential steps required to produce an accurate drawing.

This practicum adopts a traditional recording method that can be conducted with limited budget, time and materials.

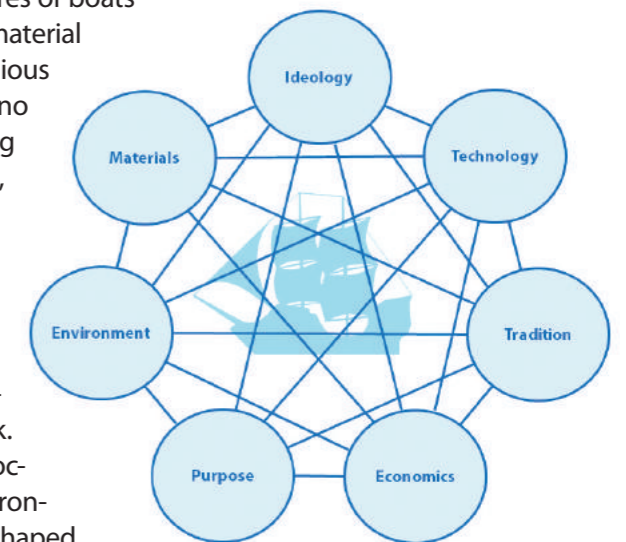
See Unit 14: *Asian Shipbuilding Technology* and Appendix B: *Basic Terminology of Shipbuilding*.

1 Maritime Ethnography

Maritime ethnography 'is the study of contemporary maritime cultures and their materials, through first hand observation' (Blue, 2003, pp. 334) and simply aims to record present day maritime material culture.

Maritime ethnography enables the study of boat building traditions, relating them to cultural elements of a society. Not only can this kind of study help us to understand more deeply the reasons for technological changes or choices, but can also show how the story of the boat can mirror history, social change and organization, beliefs or customs. Because a boat is not only a means of transportation solely dictated by function or environment, its study can provide additional data and a more practical understanding of boat use and production, reflecting the associated culture that influenced its shape, construction and use. As Mckee (1997, pp. 44) explains, 'The shape of boats must depend a great deal upon the personality of the men who build and use them'.

The factors that are thought to influence the features of boats most particularly include function, technology, material resources, environment, economy and socio-religious context or ideology (Adams, 2001). 'Some criteria no doubt are more important than others in dictating boat shape; all have different roles to play' (Blue, 2003, pp. 335). Maritime ethnography can help to examine each of these variables that are intertwined with culture and can contribute to a holistic understanding of a boat.



Various variables can be reflected in boat building traditions (after Adams, 2001, pp. 301).
© UNESCO/Montakam Suvanatap

From a practical perspective, the accurate recording of vessels requires both research and field work. Research has to take into consideration historical documents and iconographic data, as well as the environment, social, economic and historical factors that shaped the cultural background in which the boats were built.

Maritime ethnography consists of systematically taking measurements, photographs and noting the main features and specific details regarding a boat. This information is then complemented by additional interviews with the boat builders and owners about the tools, materials, use, cargo types, distances, navigation capabilities, design and concepts (McGrail et al., 2003).

The benefits of maritime ethnography are:

- *It provides more information than archaeological remains because it treats complete representatives of specific boat types and, therefore, offers a clearer idea of the shape, details, materials or tools related to boat use and production.*
- *It creates a baseline from which to undertake retrospective study, providing the knowledge required to understand or compare eventual boat finds.*
- *It prepares us for future excavations by increasing the knowledge of boat technology necessary to identify eventual shipwrecks or boat finds on land. 'Such a systematic record when analysed and synthesized can provide a twentieth century datum from which to undertake maritime historical and archaeological research' (Blue et al., 1997, pp. 189-190).*
- *It adds to the identification of earlier boat types.*
- *It enables us to draw parallels with past conceptions and methods of construction, as well as comparisons with neighbouring traditions.*

Maritime ethnography can connect through an analogy of human behaviour and material culture by suggesting relationships that might not be otherwise apparent (Wylie, 1985). By studying living traditions and compiling present data, it increases the sources of information that we can use to understand boats as artefacts, therefore, revealing unfamiliar aspects of the community under study (Kramer, 1979; Wylie, 1985). Such studies also reveal cultural reasons that are not always identifiable from material culture (Kramer, 1979). This type of research offers a holistic appreciation of boat use and production and allows researchers to reveal the essence of boat building traditions. As Chilton (1999, pp. 2) explains, 'In many ways ethno-archaeology is the mother of all constitutive theories of material culture. [Ethno-archaeologists] have shown that artefacts reside in a complex web of meanings and can only be interpreted with respect to their unique historic and cultural context'.

Finally, maritime ethnography is an essential tool for the preservation of maritime cultural heritage and can contribute to the development of maritime archaeology by building on the existing knowledge of boat traditions. For example, ethnographic boat recording was conducted in South Asia (India, Sri Lanka and Bangladesh) by McGrail, Blue, Kentley and Palmer (1997, 1998, 1999, 2000, 2003). They recorded a vast array of traditional boats that up until then were only known by the local communities or very few aficionados. Amongst the various traditions they put forward (stitched boats, hide boats, frame-first plank boats) their work introduced the specific and relatively rare reverse clinker construction technique of the Patia. This study not only provided detailed information about this particular technique, but in turn also furthered our knowledge on other boat types and completes, for example, our understanding of the construction of the medieval Hulk from northern Europe, whose construction and evolution are still relatively unknown (Greenhill, 2000).

Work conducted in Bangladesh (Greenhill, 1957, 1966, 1971, Jansen et al., 1989, Blue and Palmer, 2010) which commenced in the 1950s, also documented aspects of water transport which had not been brought to attention before. These studies provided the most complete record of the boat types that were in operation at that time.

Gerhard Kapitan (2009) produced a series of remarkable scale drawings (with model building enthusiasts in mind) and photographs of boats from Sri Lanka. His recordings and classification system are the most comprehensive body of work on the boats of Sri Lanka. Kapitan's strong belief in the necessity

to preserve the craft tradition of the region, also led to the founding of a museum in 1992 (which was unfortunately destroyed during the 2004 tsunami).

Other isolated studies include the work of Tom Vosmer on the coast of Oman (1992, 1997). His work is so far the most extensive in relation to the traditional boats of the region. The expertise and understanding of Omani craftsmanship that Vosmer provided, led to the construction of a replica of a ninth century stitched sailing ship, called the Jewel of Muscat (see: www.jewelofmuscat.tv).

Another notable contributor is Kurt Stenross who spent a number of years during the 1970s in Madura (Indonesia), recording local boat use and construction. This data formed the basis of a recently published book that examined the local salt and timber trade, demonstrating how material culture and maritime history, past and present, feed into each other.

All of this work demonstrates how the accurate recording of boat traditions can help build knowledge on maritime cultural heritage and create a more complete image of ancient seafaring activities, abilities and boat construction techniques. Traditional water transport is fast disappearing alongside related craft traditions and ways of life, so there is an urgency to record them. By doing so, 'not only can today's maritime cultures and technology be documented but also indirectly, the past can be illuminated' (McGrail et al., 2003, pp. 8).

Once an overall understanding of the context of boat building is acquired, contemporary boat construction can be recorded and an interpretation of past use and construction can be suggested. 'The standard to be aimed at when recording a traditional boat is the same as in a boat excavation: to compile a record from which a competent model builder could build an accurate model and from which a detailed account of the boat's routine uses could be written' (McGrail, 2001, pp. 18).

A full ethnographical study of boat building tradition should include:

- *Measuring and producing accurate drawings (plan view, profile view and sections)*
- *Taking notes on the main features*
- *Photographing the features and details of construction*
- *Recording the construction sequence (video and notes)*
- *Interviewing the boat builder and the boat owner, discussing subjects such as:*
 - *Materials (choice of materials and supply)*
 - *Costs (materials and workforce)*
 - *Apprenticeship*
 - *Work time*
 - *Uses, cargo load, distances*
 - *Operational performances (sailing methods)*
 - *Traditions and ceremonies*
- *Listing the specific vocabulary related to particular boat types, complemented with drawings and pictures*
- *Observing the types of tools that are used in the construction and describing how they are being used*

Ethnographic boat recording in Vietnam. Mr. Toan Huyen's boat yard, Huong Hoc village, Quang Ninh Province.
© Michel Girard



2 Preparing the Boat Recording Session

The following methodology is based on McGrail *et al.* (2003) and is specifically related to ethnographic boat recording in the field. The methodology is supplemented with information from Steffy's (1994) guidelines that are most essentially related to boat excavation.

2.1 Selecting the Boat to Record

There are many variables to consider when selecting which boat to record. For example, during their project on boats of South India, McGrail *et al.* chose to record three distinct boat traditions for the following reasons:

- Because they constituted an important regional tradition
- Because they had unusual features
- Because they appeared likely to provide interesting insight into maritime history and archaeology

Having defined the general boat tradition to be documented, a representative example (an archetype) has to then be identified. If time allows, variants of one specific type can also be recorded, or at least, their distinctive features need to be precisely documented.

Scouting to find the best location for work is crucial. The recording can be conducted at a boatyard (ideal as it simultaneously provides the possibility to observe a construction sequence), at a port or harbour, at the house or boat shed of a collaborative boat owner or even in a museum where traditional boats are stored.

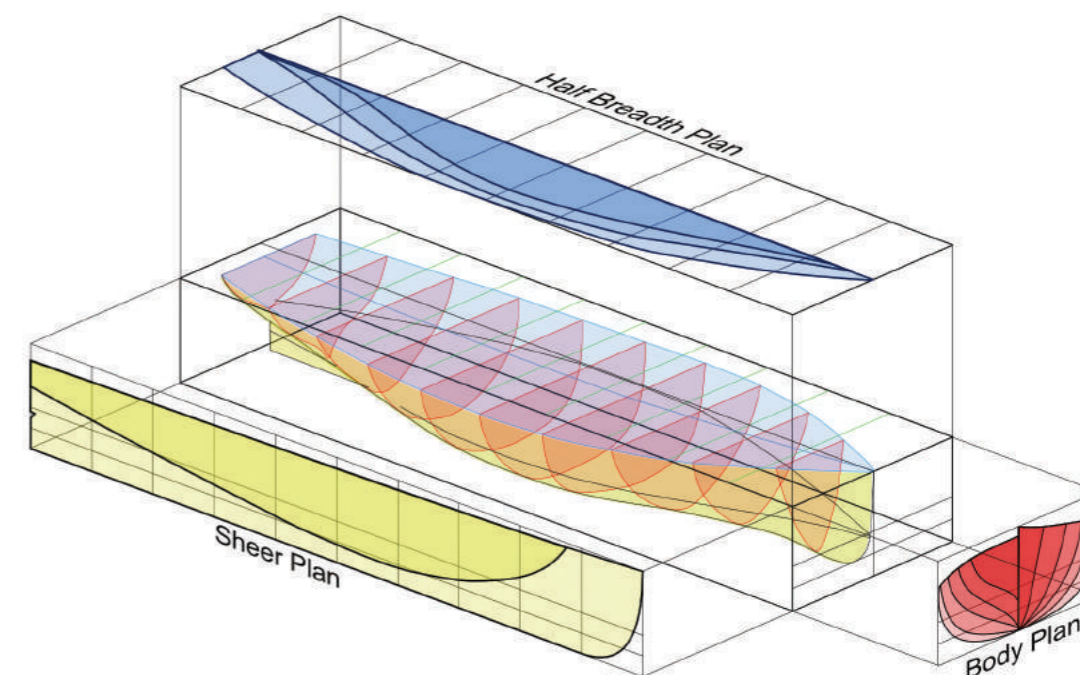
It is mandatory to reach an agreement with the owner for the use of a boat for the required period. McGrail *et al.* (2003, pp. 22) notes that most essentially, it is necessary to ensure that the boat will not be moved during documentation (this is where photo modelling and other innovative recording materials have a distinct advantage).

Once it is agreed, the chosen archetype should be positioned at a suitable site for working (above high water and preferably under shade). Next, the boat must be levelled and the reference lines rigged, these reference lines (datum lines) should also not be moved during documentation.

2.2 Setting Up: Understanding the Drawing

A measured drawing of a boat's hull can be compiled in several ways. Offsets from horizontal and vertical datum lines are needed to produce a plan, alongside several transverse sections and a longitudinal section. This is the preferred method, as would be found at an archaeological excavation (McGrail *et al.*, 2003, pp. 19).

A minimum of three drawings are necessary, each depicting a different view of the boat:



Three basic views: middle view (plan view), sheer plan (longitudinal view) and body plan (cross section). © Tosaka

1 Plan View (View from the Top)

Sometimes, only half of the boat is drawn, Steffy (1994, pp. 15) explains,

The top view is known as the half-breadth plan because only half of the hull is shown, as if it had been sawn right down through the centreline. On some drawings this view is called the waterline plan or level-line plan. This shows the hull contours as seen from above or beneath one-half of the hull. ... To begin with, lines drawings are made with the assumption that both sides of the hull are identical. They seldom are, but they are usually similar enough that the lines of one side are reasonable indicators of those on the other.

This is useful if apprehending hull remains that are partially preserved. However, in boat ethnography, considering time constraints and practicalities, a full plan should be drawn.

2 Sheer Plan or Longitudinal View (View from the Side)

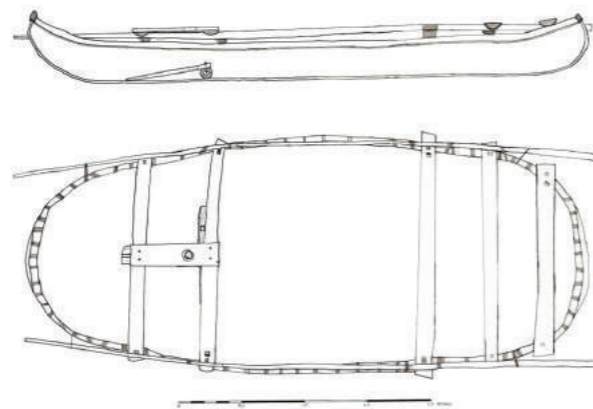
Steffy (1994, pp. 15) writes,

The side view is called the sheer plan. Sometimes it is referred to as the elevation plan or the profile plan. Both are acceptable, although the sheer plan is more traditional and practical; the other two terms can become confusing in archaeological descriptions. The sheer plan presents the broadside view of the geometry of the hull. It can be as elementary or as sophisticated as the draftsman deems necessary to explain the design.

3 Cross Sections (View from the Bow or Stern, Through the Structure)

A cross section is, 'The body plan, sometimes called the section plan, reveals the cross-sectional shapes of the hull as seen from afore or abaft' (Steffy, 1994, pp. 15).

A number of cross sections are more informative than one. It is usually recommended that a minimum of three need to be taken: at the bow, the midships and the stern.



Example of a plan view (bottom) and of a sheer plan (top). Boat No. 165, Eyemouth. © Alexandre Poudret-Barré/Charlotte Minh-Hà Pham

2.3 Time Frame: Making the Schedule

It is possible for one person to compile a drawing on site, but such a detailed measured drawing can take a very long time. Although as Anderson (2004) states, 'the level of detail to which a drawing set may go is heavily dependent on what is significant about a vessel and the goals of your project'. Selected measurements are usually recorded (including at least three transverse sections) that can be subsequently used off site, in conjunction with notes and photographs.

A team of two to three persons is ideal to record a boat. One person to take the measurements, one to draw, and a third to take pictures, record vocabulary, inquire about the construction sequence and to do alternate tasks. This third person can also concentrate on establishing the internal stratigraphy of the boat, so that the sequence of building can be deduced (McGrail, 2003, pp. 19).

The construction sequence should be documented or discussed by the three team members in order to provide the most complete sequence in the final report. With experience and an adapted work dynamic within the team, a skin boat could be documented in three hours. However, experience suggests that more time should be allowed to take into account of unavoidable logistical problems, for example, the lack of shade on the foreshore, the inevitable difficulties of having to work through an interpreter, missing or breaking equipment, datum line moving, etc. A two person team should generally allow five days to document an open boat in the tropics, while a three person team might take three and a half to four days, rather than five.

McGrail et al. propose the following recording schedule:

- **Day 1:** reconnaissance.
- **Day 2:** recording day.
- **Day 3:** recording day, to complete the recording, compile technical notes, complete the photographic record.
- **Day 4:** draw a fair version of plans and sections to identify what is missing, note anomalies, write a brief description of the boat and record any gaps in the narrative.
- **Day 5:** return to the site to record missing data and resolve anomalies.

Additional recording activities might be needed to compile a complete record of the boat tradition under study, such as the sea passage, an interview with the boat's crew, a visit to a boatyard and an interview with one builder can take a minimum of one day, even if the team splits in two groups. Dividing the group is seldom desirable, as extra auditors to an interview provide much needed crosschecks when an account of what was said is subsequently compiled.

Once all this has been done, the examination of similar and related boats need not take more than three or four days, depending on how extensive the survey is to be. This wider enquiry is probably best done in the following season of fieldwork, when the knowledge gained in the first survey has been assimilated, a draft of the reports has been written and a fair drawing of the archetype boat has been compiled (McGrail et al. 2003, pp. 23).

Materials Necessary for the Recording

- Drawing board
- Graph Mylar paper (polyethylene terephthalate (BOPET) polyester film). Mylar is moist resistant and very practical when working in the field. It is important that transfer paper, is not used, as humidity will make it wavy.
- Pencils, erasers and indelible markers
- Tape measures (at least one that is fixed during the whole recording process and is long enough to encompass the overall length of the boat (10 metres). Another two smaller tapes (3 metres) to take transverse measurements and heights. At least one tape should be able to be locked.

continued

- A plastic spirit level
- One or two line levels (a small level that can be hung on a datum line, tape measure or rope) to ensure that they are maintained horizontal
- A plumb bob to measure vertical offsets
- A set square
- Rulers (specifically 1 metre rigid rules)
- Large clips to tie the tapes and lines
- Nylon rope or synthetic line that can be tightly extended without stretching and slackening
- Stands to attach the tape measures and ropes
- Small paint brushes to clean the boat and specific features to be drawn
- Notebook to record construction sequence, vocabulary, etc.
- Pre-prepared recording forms
- Camera, photographic scale and photo log sheet
- Video to record the construction sequence
- Examples of previously made drawings for reference and to share with the boat builders, so that the aims of the present recording session can be explained
- Copies of pictures, paintings, carvings, drawings or ethnographic descriptions that depict the boat type, so that the current model can be compared with more ancient types
- Glossary of terms



Example of a stands system used to fix and keep level the baseline around the boat.
© Charlotte Minh-Hà Pham

Boat Tuong 14 with stands along which measure tapes and references can be strongly fixed. Mr. Toan Huyen's boat yard, Huong Hoc village, Quang Ninh province. © Charlotte Minh-Hà Pham



3 First Steps: Ethnographic Boat Recording Form

It is recommended that before starting the drawing, a 'reconnaissance' tour is made to compile general observations and to begin to formulate how the boat should be recorded.

Next, recording sheets need to be completed, overall dimensions taken and a rough sketch drawn. Some general and context photographs need to be taken and notes compiled on the main features to help familiarize the team with the boat.



First steps: the 'reconnaissance tour' and completing the Boat Recording Form. © Randall Sasaki

The following is an example of a recording form that needs to be partially filled in the field and then completed with additional data gathered by each of team members. The outlined categories are by no means exhaustive and are simple aids to remember certain types of information that need to be complied while in the field. Before starting the practical recording, it is essential to identify the research questions that will need to be asked, the details that will require specific attention, etc.

4 Drawing and Taking the Measurements

Once the first reconnaissance visit is complete and the recording form is filled in, the drawing can begin. There are specific differences between a sketch and a drawing:

Sketch: rough outline, may be drawn freehand or with straight edges and is usually not drawn to an accurate scale. A sketch is usually good enough for small subjects; it can form the basis for a more technical drawing. It is important to provide a quick overall view and to understand the subject under study.

Drawing: picture or likeness of a subject drawn to accurate scale with pencil, ink or computer driven printer devices. It is useful for conceptual ideas, plans and technical projects. A drawing usually depicts different perspectives of the same subject.



Making a line drawing of a boat based on measurements. © Charlotte Minh-Hà Pham

4.1 Preparation of the Recording Paper

Always indicate on the graph paper:

- Name of the boat/identification number of the archetype/reference name
- Date
- Name of each of the team members (initials)
- Location
- Overall dimensions
- Scale
- Key to features coding

It is important to first establish a system to code the different features that will be recorded on the drawing. All planks, timbers and fittings will need to be identified and given a codename. For example, strakes may be labelled P1 to Pn to port, and S1 to Sn to starboard, from the keel or foundation plank outwards. Framing timbers may be similarly labelled F1 to Fn, while beams can be labelled B1 to Bn, from bow to stern

These codes then can be related to all photographs, drawings and notes.

4.2 Scale for the Drawing

The whole drawing process needs to be thoroughly planned before starting in order to select the appropriate size of paper, the appropriate scale and to plan the drawings and the measurements.

For boats up to approximately 12 metres in length, a scale of 1:10 results in a drawing of manageable size, but still with well defined features (McGrail et al. 2003, pp. 19).

The scale enables the recreation of large objects on paper or computer aided design (CAD) system on a computer, respecting their relative sizes. Measurements are scaled down to fit on the page and the scale uses a ratio to show how the size of the real object compares to the size of the same object on the paper. The ratio is very important to note and there is a specific convention to note it down:

Scale of a drawing = drawing length : actual length

Examples:

- If 1cm equals 1m in reality, the scale is 1:100, i.e.

$$\begin{aligned} 1\text{cm to } 1\text{m} &= 1\text{ cm}:1\text{m} \\ &= 1\text{ cm}:100\text{ cm} \\ &= \mathbf{1:100} \end{aligned}$$

- If 5 mm equals 1 m in reality, the scale is 1:200, i.e.

$$\begin{aligned} 5\text{ mm to } 1\text{ m} &= 5\text{ mm}:1\text{ m} \\ &= 5\text{ mm}:100\text{ cm} \\ &= 5\text{ mm}:1000\text{ mm} \\ &= 1\text{ mm}:200\text{ mm} \\ &= \mathbf{1:200} \end{aligned}$$

- If 2 mm equals 1 mm in reality, the scale is 2:1, i.e.

$$\begin{aligned} 2\text{ mm to } 1\text{ mm} &= 2\text{ mm}:1\text{ mm} \\ &= \mathbf{2:1} \end{aligned}$$

The drawing is double size, two times larger than in reality

- If 1 cm equals 1cm in reality, the scale is 1:1, i.e.

$$\begin{aligned} 1\text{ cm to } 1\text{ cm} &= 1\text{ cm}:1\text{ cm} \\ &= \mathbf{1:1} \end{aligned}$$

The drawing is the exact same size as in reality

- If 1 cm equals 2 cm in reality, the scale is 1:2, i.e.

$$\begin{aligned} 1\text{ cm to } 2\text{ cm} &= 1\text{ cm}:2\text{ cm} \\ &= \mathbf{1:2} \end{aligned}$$

The drawing is half the size as in reality

Usually, there is a scale of 1:10 or 1:20 or 1:25 for boats of about 10 metres on A3 paper

$$1\text{ metre equals } 5\text{ cm} = 5:100 = 1:20$$

$$1\text{ metre equals } 4\text{ cm} = 4:100 = 1:25$$

$$1\text{ metre equals } 10\text{ cm} = 10:100 = 1:10$$

4.3 Setting the Boat and the Baseline

If possible, the boat should be positioned at a location where it will be easy to work on (preferably in the shade, in a quiet location and with enough room to manoeuvre around).

Ideally, the boat should be level athwartships, not heeled, tilted to one side or on a slope, and above all it should not be moved during the whole recording process.

Once the working space is determined and the boat is stable and upright, the baseline (also known as datum line) needs to be rigged. The closer the line is set to the sheer line, the easier it is to draw. This baseline is very important since it is the line from which all the measurements will be taken. The base-

line needs to be horizontal and levelled with a line level, as it will become the reference line that will be plotted on the drawing.

The line has to be extended (as tightly as possible to reduce slack in the line) between the stem and stern posts. If this is not possible, then the line should be extended between two stands, chairs, poles or any steady device. Ideally, the main reference line should be attached to the boat, as if it is necessary to go back to verify measurements, it is less difficult than trying to recreate the same baseline.

Like the vessel, it is imperative that this main reference baseline does not move a centimetre during the recording process and its position should be checked periodically to ensure it is still level.

A nylon or synthetic line which is pale in colour (so that reference points can be marked on it with a pen) should be set up between the two fixed points (often called datum or control points). A measuring tape needs to be pulled tight, (but not stretched) and carefully attached alongside this line. A tape cannot always be adequately positioned, so should not be used as the main reference line.

Before starting to draw the plan view, the location of the control point (datum point) must be determined and plotted on the graph paper. Once the baseline has been drawn on the graph at an appropriate scale, the measuring of the outline of the hull can begin.



The baseline needs to be firmly fixed in place and kept level.
© Charlotte Minh-Hà Pham

4.4 Taking Measurements with Offsets

In order to produce the plan view, the longitudinal section, additional cross sections and offsets are used. From a horizontal baseline the plan view can be created with offsets, while accurate height measurements taken from a vertical baseline (or plumb bob) can be recorded.

An offset is a measurement at a right angle between a point (significant feature on your boat) and the baseline. The offset measurement can be taken using a measuring tape or a rigid ruler. The distance along the baseline (where the offset measurement 'cuts' the baseline) from the zero point also needs to be recorded.

The accuracy of this method relies on judging right angles. The most accurate way is to hold the tape on the point to be plotted and move the other end along the baseline, until the shortest distance is noted, thus giving a line perpendicular (90°) to the baseline. To check the right angle, place a recording board (if it is rectangular) or a set square in the angle created by the offset measurement and the baseline.

Offsets must be taken in the horizontal plane. The horizontal distance is measured at a right angle from the baseline, to a vertical line that is dropped to the point to be measured. The horizontal offsets of the sheer line cannot be measured directly from the centre line reference, as it will almost always be higher, so verticals have to be dropped from it.

When taking a measurement, an easier option than trying to hold a tape in position while taking a measurement, is to use an indelible marker to mark the baseline.



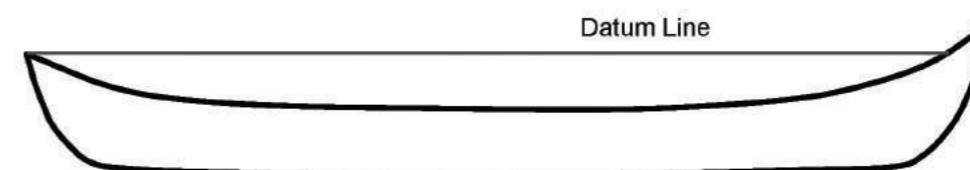
Example of how to measure offsets from the baseline, creating the plan view. The middle line corresponds to the main baseline and the left line helps to keep reference while measuring at right angle. Mr. Toan Huyen's boatyard, Huang Hoc village, Quang Ninh province. © Jun Kimura

To measure heights down to the object to be documented, (e.g. the cross sections), use a plumb bob and a ruler dropped from the baseline at chosen points along the reference tape. This method will provide the measurements for the inside of the boat, the sheer line (longitudinal plan) and the hull shape (cross sections).

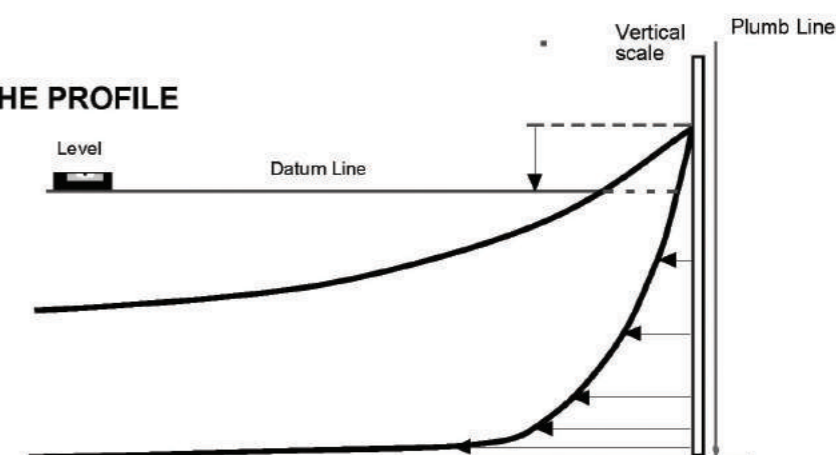
By using a plumb bob, a straight line can be followed from the baseline to the point, to gather the most accurate measurement. It is not recommended to measure heights with a set square due to the impracticalities of working around the boats fixtures and fittings.

RECORDING A TRADITIONAL BOAT

SETTING UP CENTRELINE BASELINE OR DATUM LINE



MEASURING THE PROFILE



MEASURING A SECTION AND THE SHEER

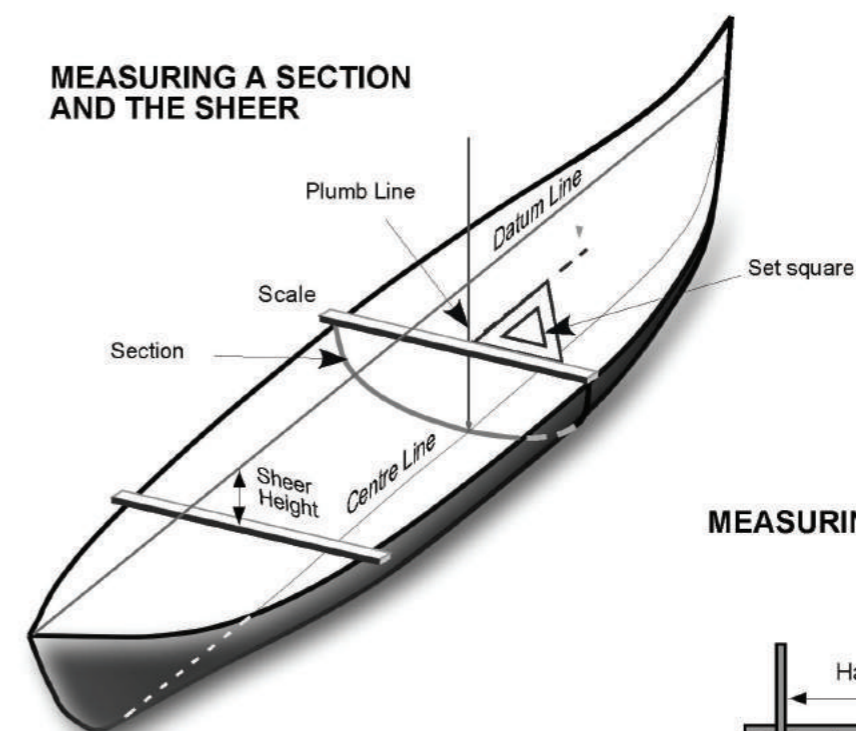
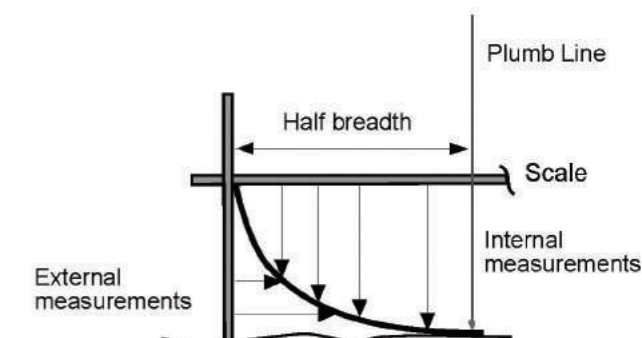


Diagram to illustrate the standard method of recording information for a measured drawing of a traditional boat. © Colin Palmer

MEASURING SECTION OFFSETS



4.5 Drawing the Plan View

To start creating the plan view, horizontal offsets are taken from the baseline. When recording the outline, make sure the distances between the reference line and the points on the sheer, are always measured using the same side of the tape (i.e. the side of the incremental marks). Measure to the port side and then, from the same point on the tape to the starboard side. This is to avoid accidentally increasing the breadth of the boat by at least a centimetre (if the tape is 1 cm wide).

Offsets should be taken every 10 cm when there is rapid change (bow and stern). If there is not a rapid change, an offset every 30 cm or 50 cm should be adequate.

Start with the outline of the boat (including bow and stern) and then record the transverse elements (frames, thwarts, cross-beams, etc.). Finally, the remaining elements should be recorded, such as plank runs, mast step, oar ports, etc.

4.6 Drawing the Longitudinal Section

For the longitudinal section, vertical measurements down to the sheer line and then to the inside of the hull are taken from the baseline. This allows you to draw the bottom line, as well as the gunwale.

Start by marking out the sheer line, by measuring its height from the baseline, every 30 cm, reducing to every 10 cm when there is rapid change. As the baseline is situated over the centre of the boat, a simple way of measuring the heights of the sheer line is to lay a batten across the vessel (transversally) at regular intervals. Measure from the baseline down to the batten, taking into account, the batten's thickness. You can also stretch a string line across the vessel and plot the sheer line by measuring the distance between it and the baseline.

Next, the bottom line of the hull and the inside curve of the bow and stern are recorded. Measurements are taken down from the baseline using the plumb bob.

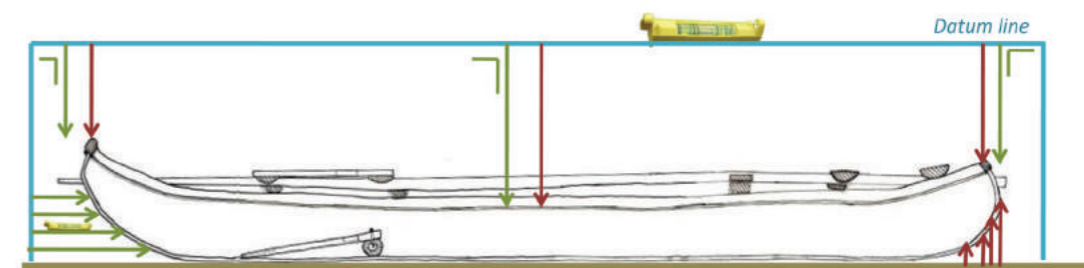
To draw the outer contour of the bow and stern, a measuring tape can be fixed along stands. Longitudinal measurements can then be taken from the stand to the boat, every 10 or 15 cm. The stand needs to be perfectly vertical and a spirit level needs to be used to make sure the offsets are horizontal. Heights can also be taken from the ground up. Having a horizontal batten on the ground is helpful to measure if the ground is uneven.

Internal elements can then be added to the longitudinal plan (i.e. the crossbeams or frames). Sometimes, the surface on which the boat is lying is sloping (such as a slipway or shore) and this can affect the drawing of the longitudinal plan, as the plumb bob responds to gravity.

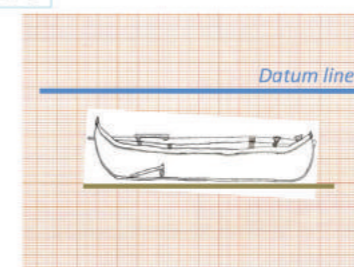
IDEAL SITUATION

Boat on flat surface with levelled horizontal datum line

Measuring the sheer line on a flat surface.
© Charlotte Minh-Hà Pham



RESULTING DRAWING



Measurement with a plumb bob, following the gravity centre
Measurement with a hard ruler, set at right angle (90°)

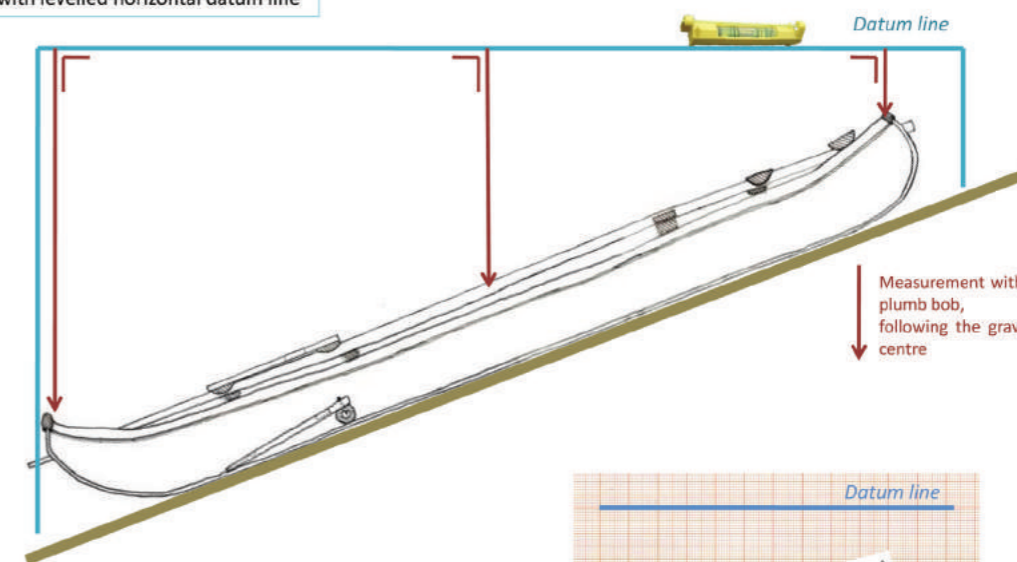
While in the field, there is no easy practical and efficient solution to this. The simplest approach is to the set a levelled baseline externally to the boat, to produce a tilted drawing on the graph paper. Later, by means of rotating the drawing under tracing paper or through computer software, align the longitudinal plan to the plan view for the final report.

Alternatively, if the boat lies on a substantial slope, the reference line should not be horizontal, but set in line with the slope itself. The line should be stretched over the boat, between two stands that are at

OPTION 1

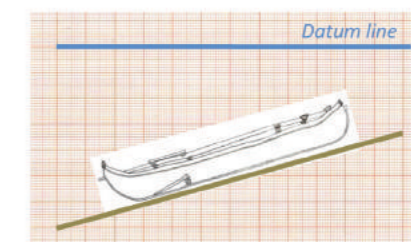
Boat on sloping surface with levelled horizontal datum line

Option 1. The baseline is levelled. © Charlotte Minh-Hà Pham



RESULTING DRAWING

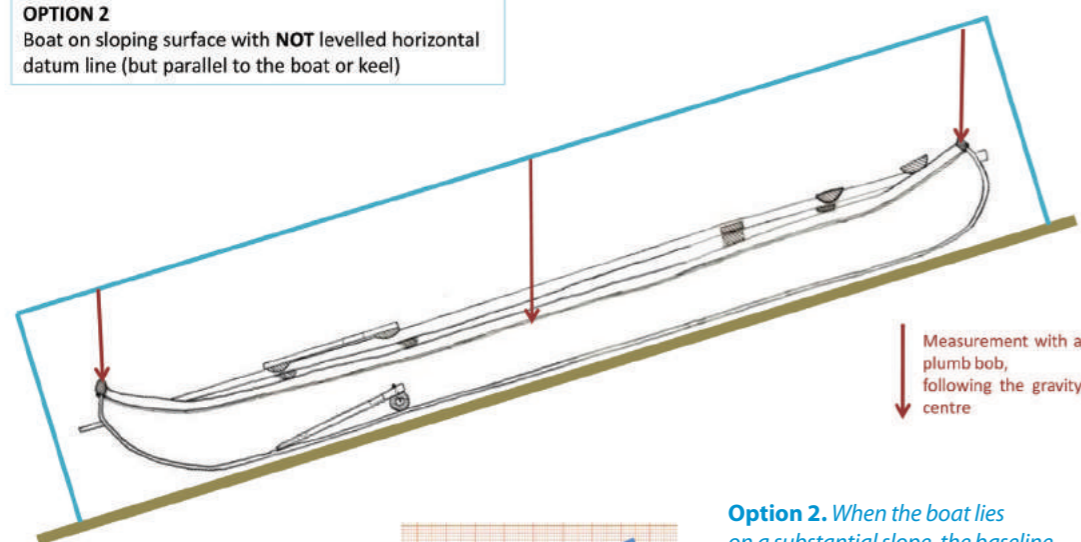
The resulting drawing is tilted and needs to be realigned (computer software or rotate the drawings under tracing paper)



the same height or directly attached to stem and sternpost. In that way, the baseline is set according to the keel (if there is one) or to the plan of the boat itself.

The direct lines taken with the plumb bob will not fall perpendicular to the reference line. Do not be tempted to use a ruler set at 90 degrees, instead of a plumb bob and the spirit level, as mentioned previously, this method is not accurate and will inevitably produce errors.

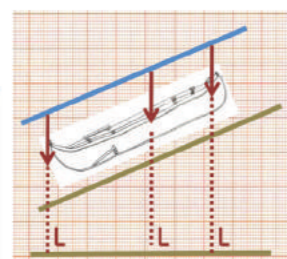
OPTION 2
Boat on sloping surface with **NOT** levelled horizontal datum line (but parallel to the boat or keel)



Measurement with a plumb bob, following the gravity centre

Option 2. When the boat lies on a substantial slope, the baseline can be set parallel to the keel
© Charlotte Minh-Hà Pham

RESULTING DRAWING
The resulting drawing is tilted and needs to be realigned (computer software or rotate the drawings under tracing paper)
And first, the datum line needs to be set with the correct slope inclination



Once the slope is recorded, the baseline can be drawn on the graph with an accurate gradient. The result of this method is also a tilted drawing that needs to be realigned with the other views for the final report.

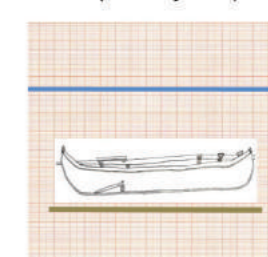
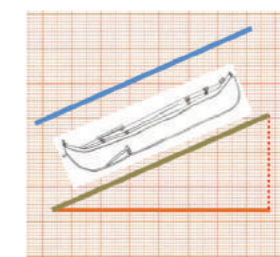
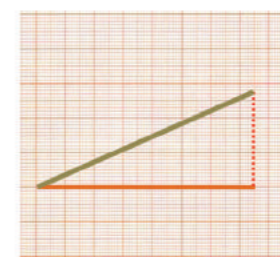
Recording the datum (baseline) and the slope on the graph paper. © Charlotte Minh-Hà Pham

Measure the slope and report the datum line on the graph

1. Along the slope, set a ruler (of fixed length) with a line level
2. Bring the ruler to level
3. Measure the vertical height



4. Report these measurements on the graph (according to scale)
5. Then you have the slope
6. Then set the datum line
7. Draw the boat
8. Then do a translation (or tilt the drawing with computer software)



4.7 Starting the Drawing: The Cross Sections

To begin to create the cross sections, their location needs to be marked both along the baseline and on the graph paper.

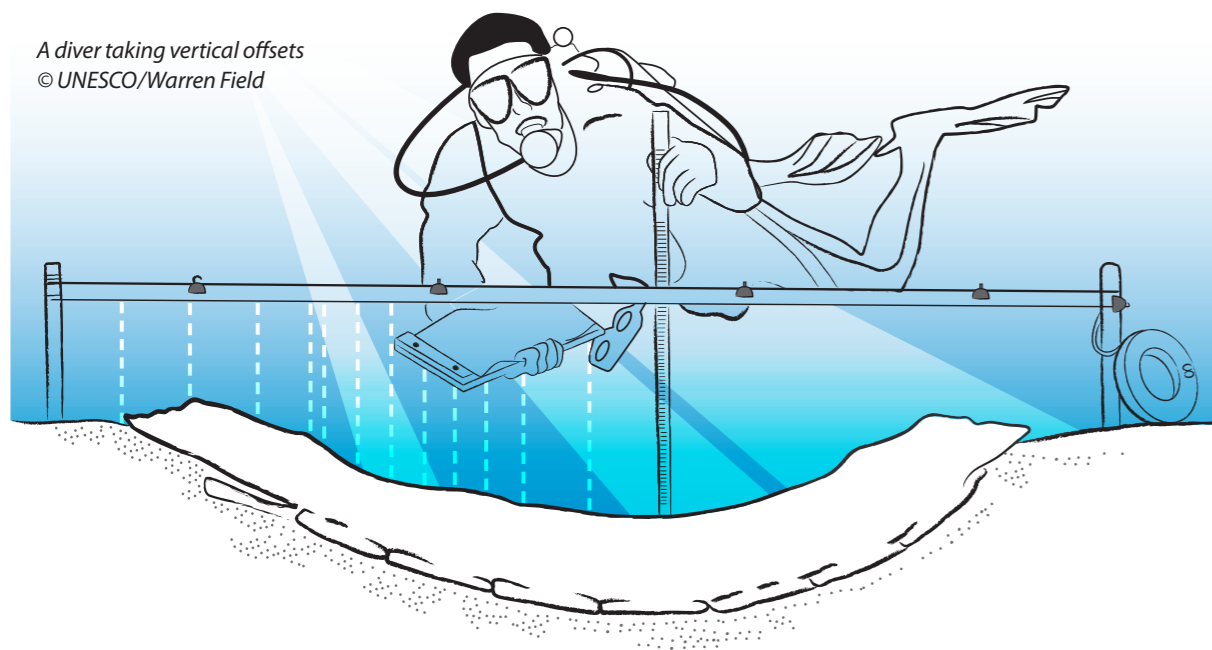
Vertical heights are then taken from transverse data lines that need to be fixed at these points. Battens, a solid bar with graduations or a calibrated stick can be laid athwartships. Measurements are then taken using a plumb bob.

Some of these points should coincide with frames and some should be located in between frames. Where the shape of the boat changes rapidly, such as towards the bow, points should be placed closer together than elsewhere.

Boats are usually symmetrical, so only a little more than half of each section needs to be recorded, unless asymmetric fittings or features have been identified. If time allows, it is worth recording both sides of a boat to provide the most accurate form of the hull at different locations.

A minimum of three cross sections are necessary (near the bow, midship and the stern) and if possible, they can be taken at thwarts, cross-beams or at the mast step to show the relationship between these elements.

A diver taking vertical offsets
© UNESCO/Warren Field



There are a few rules to respect when planning to draw these three different, yet complementary views:

- All plans show the same side
- All plans show the hull shape to the inside of the planking. As hulls can vary in thickness and there can be various external attachments, it can be often difficult, to express external hull shapes in the form of free flowing lines. The inside surfaces of planking are usually smooth, but to find the extreme dimensions of a portion of the hull, the planking thickness must be added at that location.
- All plans are to the same scale

As Steffy (1994, pp. 17) explains, 'The beauty of all this is that each plan serves as a check on the accuracy of the other two'.

4.8 Taking Additional Direct Measurements

Some additional direct measurements for the dimensions of some features and fittings that are especially important have to be recorded, such as the thickness of planking, moulded and sided dimensions of key timbers, spacing (centre to centre) of fastenings and of frames.

Scarves, other joints and the details of fastening methods are also best recorded in a diagram which includes measurements.

4.9 Recording Propulsion and Steering

Certain aspects of the propulsion and steering arrangements should appear on the hull drawing, such as the mast step or the pivots for the oars. It will also be necessary to draw and photograph the mast, yard, sail, rudder and oars. Diagrams with measurements should be made of the rowing geometry and of the rigging.

5 Inking Up

The US National Park Service's guidelines for Recording Historic Ships are as follows (Anderson, 2004):

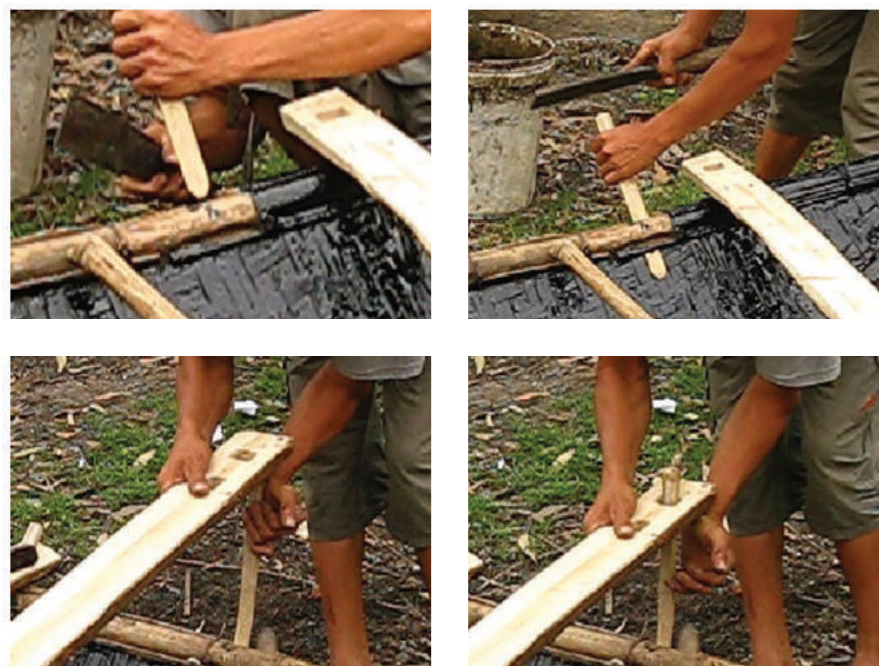
- Organize a drawing set into a progression of similar views: line plans, deck plans, profiles, sections, details, exploded views, process diagrams and schematics
 - Lay out drawings with distinguishable zones for line work, scales, labels and verbal annotations
 - Use proper line widths to emphasize major components of the vessel and delineate fine details
 - Use appropriate rendering symbols and techniques to indicate and distinguish different materials in the vessel in plan, profile and section
 - Use drawing scales appropriate to the size and significance of vessel being recorded
 - Use lettering sizes and styles that are easily legible in the full size drawing or in reduction to 25 per cent of full size
 - Use verbal annotations to provide information not readily presentable or discernable in a drawing, e.g. names of spaces, parts; historical data important to interpreting a drawing; significant field or documentary data affecting a drawing's content or accuracy; labels for match lines, baseline, etc.
 - Use number keys (or tags) with arrows to annotate features which are too close together or in spaces too confined by significant line work to annotate directly with labels
 - Cite and explain anything in drawings which differs from the condition of the vessel
 - Include graphic scales to indicate actual dimensions of the recorded vessel
- Lettering**
- Use neat, printed lettering
 - Upper case
 - Use light horizontal lettering guides (trace lines) to assist with lettering

6 Ethnographic Recording

6.1 Documenting the Sequence of Construction

If it is possible, visit a boatyard to observe the boat being constructed. Try to understand the sequence of construction, identifying the key moments in the process, for example: the setting of the stem and sternpost, the laying of the first strakes, the fitting of the ribs, the fastening of the planking, caulking phase, etc.

Take note of all of the different phases of building, identify each essential move and finally, make sure to compile pictures to illustrate each event for the final report.



Example of a construction sequence documented step by step. Mr. Toan Huyen's boatyard, Huong Hoc village, Quang Ninh province. © Charlotte Minh-Hà Pham

6.2 Recording the Vocabulary

Anderson (2004) explains,

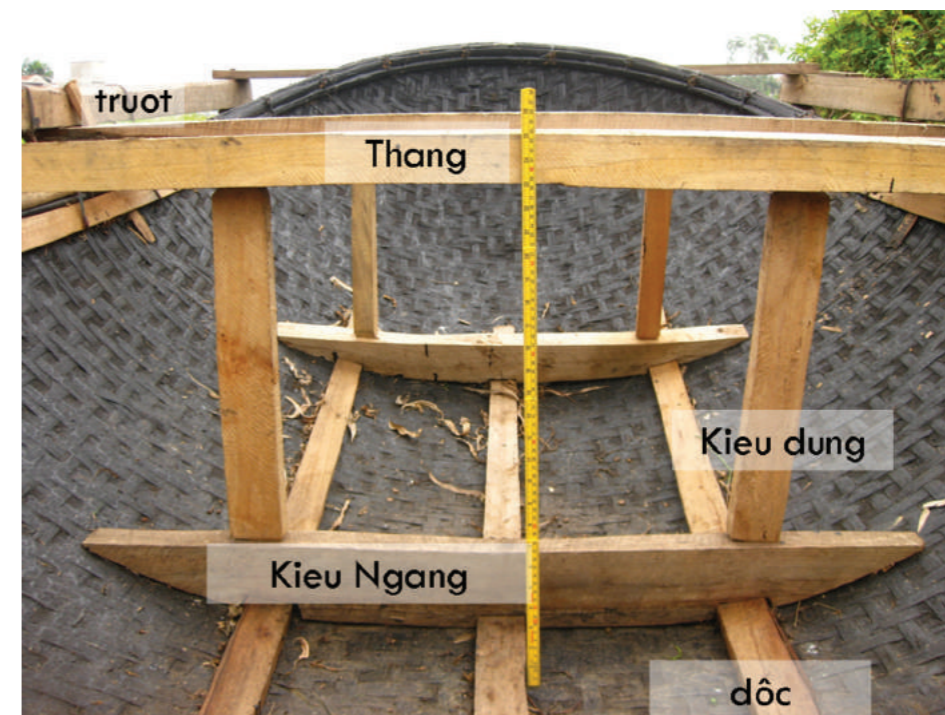
Ship (nautical) terminology may seem to be a world unto itself, especially when you begin to encounter the details of construction, rigging, etc. If you do not know what something is called, or if you do not understand what a new term refers to, ask. Be prepared for local variations in meaning, pronunciation, spelling, etc., and be diligent about recording these terms in your field notes. Eventually, sea terms will come easily, and you will need to know them in order to make sense of records, drawings, shipwrights' explanations, and the like without wasting time. Be prepared to encounter local variations, and be sure to keep a more extensive glossary handy for further details. Local terms must be shown on final drawings, and where they vary from more generally used terms, the general terms must also be given in parentheses. A European glossary may be needed for European-built vessels.

6.3 Interviewing the Boat Builder

In comparison to an archaeologist studying an excavated boat, the individual who records traditional boats has several advantages, not least that the representative nature of a particular boat can be determined, that the boat structure is generally complete and that the uses of the boat can be established. The greatest advantage is that the owners of the boat and often also the builder can be questioned.

Questions to be asked include:

- How do you handle the sails when tacking/wearing?
- How deep do you load the boat?
- What types of fish do you catch?
- How do you keep your reckoning when out of sight of land?
- What is the function of that notch on the inner face of the stem?
- Why was this boat given that shape of a bow?
- Why was reverse clinker planking used and not some other form of planking?



Detail of the internal structure of a basket boat and the related vocabulary. Mr. Toan Huyen's boatyard, Huong Hoc village, Quang Ninh province. © Charlotte Minh-Hà Pham

An experienced recorder can build up a comprehensive picture of the boat building process, from felling the trees to launching and her uses and operational performance. This is a picture which archaeologists working within their own domain perceive only dimly, but this perception can often be improved by using comparative data derived from traditional rafts and boats (McGrail et al., 2003, pp. 17).

Ideally, several builders involved in the construction of the boat being documented should be interviewed. The aim should be to discuss the design of the boat and the building process, alongside studying the boatyard for clues, such as the tools and techniques used. Moreover, incomplete boats will reveal details of hull structures that cannot be seen on a working boat (McGrail et al., 2003, pp. 21).

The features of the landing place from which the boat generally operates should also be discussed and documented: landward access, nature of beach, aspect, predominant winds, tidal pattern, offshore hazards, etc.

It is important that a journey on the boat is recorded, so that the way the boat is handled and other aspects of life on the water can be observed. These observations can then form the basis for an interview with the crew after returning to the landing place. If a voyage is not possible, then a demonstration by the builders or owners can be the next best option.

In 1948, Jean Poujade developed an initial questionnaire to address boat traditions. In addition to sections relative to hull shape (Section 1), propulsion (Section 2) which includes navigation features and specific recorded vocabulary (Section 5), Poujade suggested two other sections that are worth outlining here:

Section 3: Life and Personality of the Boat

Life on board:

- *Material life: social and economic status of the owner, settling of the crew, wives and children on board, family life on board. If the vessel is a boat house, the kitchen, hearth, water, food storage, type of navigation, trajectories, maritime routes, night or day navigation, length of travels should also be examined*
- *Spiritual life: superstitions, cults, altar, statues, etc.*

At mooring and on land:

- *Mooring and anchorage devices*
- *Dry docking*
- *Boat shelters*

Boatyards:

- *Beginning of construction to launching*
- *Work conditions, temporary or fixed staff, itinerant builders, organization, sequence of construction, system for fixing the first elements, the opening and closing ceremonies*
- *Refitting in the dry dock*

Personality of the boat:

- *Gender and name*
- *The eyes and other decorations: description of shape and size, direction of the gaze, material, proportions in comparisons with the rest of the boat, colours, who 'opens the eyes' the builder, a shaman or the owner? Is the eye related to a mythological figure?)*

Section 4: Role of Boats in the Culture and Life of the Community under Study, Nautical and Solar Myths.

Boat representations in art:

- *This can relate to temple reliefs, etc. Who are the artists who depict them? What are the related myths?*

7 Report Write Up

Based on the papers of Blue, Kentley and McGrail (1997, 1998) we can identify the various sections that need to be included in a report, so that each of the different aspects of a boat are addressed.

1. Introduction and research background
2. Environmental background (weather, climate, monsoon, currents, winds, etc.)
3. Maritime history of the coast or locality (ancient ports and harbours, boatyards, trade, etc.)
4. Evidences, previous works and references
5. Field work (details, locations, people, duration, etc.)
6. Distribution of the boat
7. Sizes and shapes
8. Building the boat
 - *Design*
 - *Building sequence*
 - *Backbone*
 - *Planking*
 - *Framing, cross-beams, top strake*
 - *Decking*
 - *Other equipment (outrigger, balance board, leeboards, etc.)*
 - *Caulking*
 - *Decoration and ritual*
9. Other types
10. Boat operation:
 - *Sailing the vessel*
 - *The crew*
 - *Under oars*
 - *Under sail (masts, fastening points, standing rigging)*
 - *Towing*
 - *Steering*
 - *Mooring*
 - *Fishing*
11. Social and technological context
12. Discussion about boat type or construction, potential comparisons or comments about technological evolution
13. Conclusion, future work, boat recording and maritime archaeology

8 Example of an Ethnographic Boat Recording Form

| | |
|----------|------------|
| | |
| Location | Field crew |

General Information

| | |
|-----------------------|--|
| Name of the boat | |
| Identification number | |
| Local name | |
| Type of boat | |
| Condition of boat | |

| | |
|-------------------------|--|
| Overall dimensions | |
| Length | |
| Max breadth at bow | |
| Max breadth at midships | |
| Max breadth at stern | |
| Depth | |
| Tonnage | |

| |
|--------------------|
| Preliminary sketch |
|--------------------|

General Description

| Picture | Boat type (use) | | Comments (Reference to picture/drawing, small sketch, description, etc.) |
|---------|--|--|---|
| | Construction type e.g. shell first/frame first | | |
| | Fastenings e.g. iron nails, treenails, lashings, etc. | | |
| | Hull shape and overall hull structure e.g. V-bottom, sharp deadrise, round bottom, flat bottom, flat floored, etc. Mid-section, horizontal plan, differences or similarities between bow and stern. | | |
| | Longitudinal structure e.g. keel, bottom plank, etc. and number of strakes, dimensions. | | |
| | Transversal structure e.g. beam, ribs, bulkheads, frames (numbers and spacing, etc.) | | |
| | Bow and stern structural information e.g. how are they fitted, sizes, decorations, etc. | | |
| | Thickness of planking | | |
| | Steering e.g. type of rudder, location. | | |
| | Additional anti-leeway devices? e.g. centreboard or outriggers, balance boards, etc | | |

| | | | |
|--|--|--|--|
| | Propulsion e.g. oar, paddle, describe their fittings, shapes and sizes | | |
| | Rigging e.g. type and materials | | |

Additional Features

| Picture | | | Comments |
|---------|--|--|----------|
| | | | |
| | | | |
| | | | |
| | | | |

Materials

| | Material Type e.g. wood, bamboo, iron, etc. | Material Details e.g. species, amount of material required, lengths, quantities, etc. |
|------------|---|---|
| Hull | | |
| Frames | | |
| Crossbeams | | |
| Fittings | | |
| Tree nails | | |
| Caulking | | |

Important Questions Arising

Supporting Documents

This should include a list of pictures (photographs or drawn images), the storage location of relevant documents, who did what, etc.

| | |
|--------------------|--|
| Photographs | |
| Videos | |
| Drawings | Plan Longitudinal profile Cross sections |

Boat History

| | |
|---|--|
| Local Name | |
| Date of construction (if known) | |
| Origin/provenance e.g. if different from the present location | |
| Story of that boat e.g. if relevant, where it comes from, used for what, age, number of repairs. | |
| Informants Location (Full address for future re-contact) Details each individual involved in the construction or who can provide information about the boat use and construction (Name, age, contact details if possible) | |

Construction Phases

(Ensure a photograph or video is taken of each single phase of the construction)

| | Brief name | Brief description | Photo | Video |
|---------|------------|-------------------|-------|-------|
| Phase A | | | | |
| Phase B | | | | |
| Phase C | | | | |
| Phase D | | | | |
| Phase E | | | | |
| Phase F | | | | |
| Phase G | | | | |
| Phase H | | | | |
| Phase I | | | | |

Vocabulary and Details

| Word (English) | Word (Local language) | Description |
|----------------|-----------------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Type of Environment for Boat Use

| |
|--|
| |
|--|

Social Aspects

| | |
|--|--|
| Ceremonies | |
| Prices e.g. for selling, for materials, etc. | |
| Life span of the boat e.g. how and when to replace certain parts, painting, caulking, etc. | |
| Resale process e.g. about the boat builder, the boat user, etc. | |
| Boat uses | |
| Construction time | |
| Construction and distribution e.g. how many boats are constructed and sold per year? | |
| Number of workers required to build the boat and task repartition | |
| Education, passing of knowledge and tradition. e.g. where did the builder learn to build the boat? | |
| Conception of the boat e.g. blue prints, drawings, discussion, concept and how to apprehend changes. | |
| Tradition in the region e.g. how long has this tradition been followed here and why specifically here? | |

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Appendix Summary

The aim of this practicum is to demonstrate how simple it can be to start building knowledge of boat traditions, when there is very little preliminary documentation or evidence available. However, an ethnographic recording is not just about producing a drawing, it also involves further in depth research and data gathering on not just boat features, but the whole maritime tradition.

Maritime ethnography consists of systematically taking measurements, photographs and noting the main features and specific details regarding a boat. This information is then complemented by additional interviews with the boat builders and owners about the tools, materials, use, cargo types, distances, navigation capabilities, design and concepts (McGrail et al., 2003).

When financial support or specific training is not available to conduct underwater excavations or surveys, it is still possible to build knowledge of boat traditions and develop an understanding of the maritime aspects of culture through the practice of maritime ethnography. This approach can be a stepping stone in the development of maritime archaeology in regions where the discipline is not yet practiced to its full potential. When done accurately, maritime ethnography can be a powerful research tool to complement our understanding of the role of boats and boat building in a historical, political, economical, environmental and cultural context.

In this appendix the definition, potential and advantages of maritime ethnography are discussed, as well as its practical application and preparation. Although a full record of a boat cannot be conducted during this practicum (which would include recording a full construction sequence, specific vocabulary or interviewing the boat builder or boat owner), it addresses the practical aspects of preparing a systematic recording, and teaches students the essential steps required to produce an accurate drawing.



Experiencing the boat use under oars. © Nguyen Thi Mai Huong

Suggested Timetable

Day One

| | |
|----------|---|
| 60 mins | Introducing Maritime Ethnography |
| | Break |
| | Transfer to the location of the practical session |
| 90 mins | Practical session - Reconnaissance tour and completing the recording form - Photograph the boat and complete the photographic log - Set up the boat and fix the baseline - Prepare for the drawing task |
| | Break |
| 120 mins | Complete plan view drawing Start longitudinal view drawing |
| | Break |
| 120 mins | Complete longitudinal view drawing |

Day Two

| | |
|---------|--|
| 90 mins | Start series of three cross section drawings |
| | Break |
| 90 mins | Complete three cross section drawings |
| 30 mins | Concluding Remarks and Closure |

Teaching Suggestions

It is recommended that trainers schedule one day to prepare for the lecture and practical recording sessions. Trainers need to select the different boats to be recorded by the students, organize, clean and position the boats at the chosen location and ensure that all the materials and equipment are ready. Always brief the location staff (i.e. boat or property owner) regarding the structure of the practical sessions, prior to the training day.

The introductory lecture should be divided into two, the first half introducing students to maritime ethnography, its advantages and the scope of an ethnological study and the second, an introduction to preparing a boat recording session.

Alongside the information covered in the appendix it is important to emphasize to students that recording sessions can be useful to document boat traditions and maritime culture in their respective countries. Even using only a small number of recording sessions conducted with tight budget, an insightful article can be put compiled and submitted to international journals, so bringing the boat traditions of the student's country to the maritime archaeology community.

When presenting how to prepare the boat recording session, it is useful to provide example of the kinds of drawings that will need to be produced and the type of information that could be gathered during the field work. Trainers should provide a clear idea of time frames required for making a good recording, the necessary materials and a guide to what to consider before getting into field, e.g. preparing the interview, choosing the boat, etc.

Trainers should carefully demonstrate how to draw and taking the measurements of each part of a boat, step by step. Be sure to review with students how to choose the most appropriate scale and how to measure it.

The accurate completion of the ethnographic boat recording form is the most crucial important step in the recording process. Not only does it enable to familiarize oneself with the boat to record, but also to apprehend the whole drawing process and plan the different steps. During the lecture, trainers should read through each of the different sections that need to be filled in when on site, emphasizing the importance of conducting interviews and gathering as much data as possible in a short time.

Facilitating the Practical Session

Trainers should ensure that they have all the equipment required to facilitate the practical session, including A3 white boards, graph paper and print outs of the recording form. It can also be helpful to have additional print outs of general boat terms to help students identify parts of the boat. A full day and a half should be sufficient time for students to draw a small (4 metre) boat.

Trainers should divide the students into small groups and ensure that every student take turns with the tasks. Groups should not exceed four to five students in size. This is the maximum number needed to produce a clear and accurate drawing and to develop an efficient measurement system. Two persons can draw simultaneously the same boat, but on two different drawings so to compare the result, while two other team members (three maximum) take the measurements to be plotted on the drawings.

Ideally working groups should be situated near to each other, so that problems can be discussed and solutions shared. The boats should be selected carefully so that they present a challenge to the students. Dugouts, for example, are of simple design and can be too easy to draw. As the students have produced relatively coherent quality drawings and recording forms, it is suggested that during each training course, different boats are recorded, so over time it is possible to build a database of regional boat traditions.

Trainers should emphasize the importance of choosing the appropriate scale for the drawing and carefully identify location and sizes of the drawings that need to be produced, according to the size of the boat.

Once each group has been allocated a boat, the students need to begin their 'reconnaissance tour'. Each student must complete their own recording form and take photographs using a photographic scale (as an exercise for potential report). Trainers should ensure that the photographs provide a clear image of each section, details and boat as a whole.

Trainers should:

- Discuss the scale with the students and select the one most appropriate.
- Help the students set up the baseline
- Start students drawing the plan view (first the shape and then the internal elements)
- Then draw the longitudinal view. Offsets from baseline to the inside contour, then the sheer line, then setting a vertical offset line to take outer contour, and finally, setting a baseline on the floor to take the outside contour.
- Tackle the cross sections last. Remember to ask students add the direction of the view
- Ensure the name, location, date, etc. are clearly printed on the drawing
- Once the practical session is complete, ensure that the students have scanned and distributed their drawings to the rest of the group. Each member of each group should have a copy of their drawing. It is useful, however, for students to have all the drawings so that they can compare and contrast the details in each.

Equipment Required for Practical Session (per group)

- Two A3 plastic drawing boards
- A3 graph paper (or smaller sheets and sticky tape!)
- A 15 m tape (to use as datum line)
- Rope (to use as datum line)
- Clips to fix the datum line
- A plumb bob
- Two metal measuring tapes
- Pencils and erasers
- Two chairs or net posts or stands to fix the datum line
- Photographic scale

Suggested Reading: Full List

- Adams, J. 2001. *Ships and Boats as Archaeological Source Material*. *World Archaeology*, Vol. 32, No. 3, pp. 292-310.
- Anderson Jr., R. K. 2004. *Guidelines for Recording Historic Ships*. Washington, National Park Service, US Department of the Interior.
- Blue, L. 2003. Maritime Ethnography: the Reality of Analogy. *Boats, Ships and Shipyards: Proceedings of the Ninth International Symposium on Boat and Ship Archaeology ISBSA*, Venice, 2000. Beltram, C. (ed.). Oxford, Oxbow, pp. 334-338.
- Blue, L., Kentley, E. and S., Mcgrail. 1997. A Case Study in Ethno-archaeology: the Patia Fishing Boat of Orissa. *South Asian Studies*, Vol. 13, pp. 189-207.
- Blue, L., Kentley, E. and S., Mcgrail. 1998. The Vattai Fishing Boat and Related Frame-first Vessels of Tamil Nadu. *South Asian Studies*, Vol. 14, pp. 41-74.
- Blue, L. and Palmer, C. 2010. Country Boats of the Ganges Delta – an Ethnographic Study of Inland Navigation. *Between The Seas: Transfer and Exchange in Nautical Technology: Proceedings of the 11th ISBSA Mainz 2006*. Bockius, R. (ed.). Römisch-Germanischen Zentralmuseums, Schnell & Steiner, pp. 479-488.
- Chilton, E. S. 1999. Material Meanings and Meaningful Materials, an Introduction. *Material Meanings: Critical Approaches to the Interpretation of Material Culture*. Chilton, E. S. (ed.). Salt Lake City, Utah, University of Utah Press, pp. 1-6.
- Hasslöf, O. 1972. Main Principles in the Technology of Ship-building; Ships & Shipyards – Sailors and Fishermen. *Introduction to Maritime Ethnology*. Hasslöf, O., Henningsen, H. and A. E. Jr., Christensen (eds.). Copenhagen, Rosenkilde & Bagger, pp. 27-72.
- Hasslöf, O., Henningsen, H. and Christensen, A. E. (eds.) 1972. *Ships & Shipyards – Sailors and Fishermen. Introduction to Maritime Ethnology*. Copenhagen, Rosenkilde & Bagger.
- Greenhill, B. 1957. Boats of East Pakistan. *Mariner's Mirror*, Vol. 43, pp. 106-134; 203-215.
- Greenhill, B. 1966. *Boats of Pakistan*. London, Society for Nautical Research.
- Greenhill, B. 1971. *Boats and Boatmen of Pakistan*. Newton Abbot, David & Charles.
- Greenhill, B. 1995. The Evolution of Sailing Ships 1250-1580. *Keynotes Studies from the Mariner's Mirror*. London, Conway Maritime Press.
- Greenhill, B. 2000. The Mysterious Hulc. *The Mariner's Mirror*, Vol. 86, pp. 3-18.
- Jansen, E. G., Dolman, A. J., Jerve, A. M. and Rahman, N. 1989. *The Country Boats of Bangladesh*. Dhaka, The University Press.
- Kapitän, G. 2009. *Records of Traditional Watercraft from South and West Sri Lanka*. London, British Archaeological Reports.
- Kentley, E., Mcgrail, S. and L. Blue. 1999. Further Notes on Patia Fishing Boats in the Bay of Bengal. *South Asian Studies*, Vol. 15, No. 151-158.
- Kentley, E., Mcgrail, S. and L. Blue. 2000. Further Notes on the Frame-first Vessels of Tamil Nadu. *South Asian Studies*, Vol. 16, No. 1, pp. 143-148.
- Kramer, C. (ed.). 1979. *Ethnoarchaeology: Implications of Ethnography for Archaeology*. New York, Columbia University Press.
- Mcgrail, S. 2001. *Boats of the World: from the Stone Age to Medieval Times*. Oxford, Oxford University Press.
- Mcgrail, S., Blue, L., Kentley, E. and C. Palmer. 2003. *Boats of South Asia*. London, Routledge Cruzon.
- Mckee, E. 1997. *Working Boats of Britain*. London, Conway Maritime Press.
- Pham, C. M. H. 2009. A Glance at Boat building Traditions in Vietnam and Their Potential Study. *Of Ships and Men: Proceedings of the International Conference on New Comparative Approaches in Asian Maritime History and Archaeology*, November 2009. Calanca, P., Rieth, E. and P.-Y. Manguin(eds.). Beijing, CNRS/EFEO.

- Pujade, J. 1948. Collection de Documents D'ethnographie Navale, D'archéologie Navale, D'ethnographie Terrestre, D'archéologie Terrestre: Fascicule Introductif Exposant les idées Générales de Cette Collection et Contenant la Fiche Signalétique et le Questionnaire Ethnographique du Bateau, la Ré-édition des Planches. No. 18, 19, 20, 22, et 23. *La table générale des Souvenirs de Marine Conservés de l'Amiral Pâris*. Paris, Gauthier-Villars.
- Steffy, R. 1994. *Wooden Ship Building and the Interpretation of Shipwrecks*. College Station, Texas A&M University Press.
- Stenross, K. 2010. *Madurese Seafarers Prahus, Timber and Illegality on the Margins of the Indonesian State*. Singapore, NUS Press.
- Vosmer, T. 1992. *A Survey of Traditional Vessels of the Sultanate of Oman (The Omani Dhow Recording Project Field Research 1992)*. Department of Maritime Archaeology, Western Australia Maritime Museum, Vol. No. 69.
- Vosmer, T. 1997. Indigenous Fishing Craft of Oman. *International Journal of Nautical Archaeology*, Vol. 26, pp. 217-235.
- Wylie, A. 1985. The Reaction Against Analogy. *Advances in Archaeological Method and Theory*, Vol. 8, pp. 63-111.