



FSN-FM 0004

**DEVELOPMENT OF 4.78M LOA FISHING BOAT (PUNT) FOR ARTISANAL FISHERY****ABUBAKAR .S AND A. IBRAHIM.**

Federal College of Freshwater Fisheries Technology, New Bussa, Niger State

Copyright 2010, Fisheries Society of Nigeria.

This paper was prepared for presentation at the 25<sup>th</sup> Annual International Conference and Exhibition in Administrative Staff College of Nigeria (ASCON), Topo-Badagry, Lagos, Nigeria, 25<sup>th</sup> – 29<sup>th</sup> October, 2010.

This paper was selected for presentation by an FISON Program Committee following review of information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by the Fisheries Society of Nigeria and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Fisheries Society of Nigeria, its officers, or members. Papers presented at FISON meetings are subject to publication review by Editorial Committees of the Fisheries Society of Nigeria. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the Fisheries Society of Nigeria is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgement of where and by whom the paper was presented. Write Librarian, Fisheries Society of Nigeria (FISON), P. O. Box 2607 Apapa, Lagos.

**ABSTRACT**

*A 4.78 M length overall (LOA) flat bottom modern fishing boat (punt), was designed and constructed using locally available materials. The boat features include easy construction, stability, and high capacity to carry load. Other features include: least cost, light weight, shallow draft, and easy maneuverability. The light displacement (weight empty) was 202.24kg, which was lighter than a local boats of same size. When placed on water a draft of 5cm. The capacity of the boat was 715kg (11 prs), and the total production cost of N39,000.00, which was not beyond the reach of an average fisher folks, or fish farmer. The punt can easily be maneuvered when propelled with 5hp out board engine as it floats at a shallow draft (10cm); this makes it adequate for fishing activities on shallow water bodies. The craft, because of its easy maneuverability, can also be used on shallow water bodies for recreational activities such as, sport fishing.*

**INTRODUCTION**

The demand for fresh fish is increasing rapidly throughout the world. Bulk of the domestic fish production in Nigeria comes

from the inland capture fisheries, dominated by the artisanal fisheries sub-sector. Out of the 511,720 tones of fish production in 2002, the artisanal fisheries accounted for 88.13% of the production (Eyo and Ahmed, 2005). A Fishing craft can be described as a floating plat-form used to transport the crew, gear, and cargo to and from the fishing ground and to support the crew and equipment during fishing operation (NRC, 1988).

Abubakar (2006) quoting Omorodion, (1983) stated that flat bottom boats are the easiest and cheapest to design and construct, and they are also best for use on calm or peaceful and shallow waters. The cost advantage of timber versus other materials is still sufficient to ensure that it will remain the dominant boat building material for a long time to come in developing countries. The objectives of this work are: To produce a modern fishing boat that is light, cheap and easy to construct, increase fish production through artisanal fisheries and add to the existing list of boats constructed at the FCFFT boat building section.

**MATERIALS AND MATHODS**

The design was achieved with the aid of the following materials: Drawing-board, a HB pencil, a T square about 90mm long, a set square, a pair of dividers with plain and pencil points, several curve battens of various sizes, a drawing paper, and metre rule. Drawing weights and pins, were also needed to fasten the paper to the board. Other materials used were eraser, razor blade, and a desk top computer. The materials used for the construction of the

punt include: Hard wood, plywood, fastening glue, wire nail, sanding disc and paints. while power tools, power machines and basic carpentry tools such as hand saw, chisel, smooth planer, measuring tape, spirit level, try square and bevel square were used for the construction work. The design data, was obtained as the free hand sketch of the boat was drawn with a HB pencil, putting in place all the required design lines and making all necessary adjustments. The specifications were obtained by the use of metre rule to measure the free hand sketch. This is in accordance with Love (1979), The freehand sketch data was used to draw the boat to scale (1:20) using drawing instruments.

The design guidelines according to Abubakar (2006) were adopted to achieve the design. The boat's layout was drawn on 4 sheets of plywood placed together on the floor, maintaining the required sizes and shape of each part that needed to be put together to make the complete punt.

The construction procedure was in accordance with Spira (2006). A handy Jig saw was used to cut along the lines. The strips were rearranged, on the floor. The 4 strips 2 each for a full side strips were joined at the middle with glue and screw. The plywood parts were then ready to be assembled. 3 frames were constructed for positions A, B and C, then the 2 transoms were reinforced with 25mm thick wood. The joints were made water tight with the aid of top bond glue and screws of varying sizes. These frames were erected evenly and vertically on a floor building jig with the use of a spirit level along a common centerline and waterline. The stem and transom were then fixed in place secured with the chine battens. The sides and bottom were then faired. The side strips were fixed then followed by the bottom strips after proper fairing. The entire body was sanded; while

the false keel, sheer, and chine rubbers were secured with glue and screws. The boat was then turned over for the interior fittings, which includes the coaming, capping, fore deck and fore and aft fishing platform.

#### **Determination of specifications.**

The light displacement (weight empty) was determined by direct measurement of weight of the punt after construction using a spring weighing balance. The capacity of the boat was determined by direct addition of weights to the center, it while floating on water until it carried the maximum weight it could carry. Displacement was determined according to Abubakar and Ibrahim (2007).

#### **COST ESTIMATE**

The cost of the fishing boat was estimated based on the local market cost of materials used for the construction in respect of their sizes and specifications.

#### **TESTING THE CANOE**

The completed boat was gently placed on water then allowed to float empty, while being observed for leakage, stability, and draft. The capacity was then tested for by allowing one person at a time, until it carried the maximum weight it could carry.

#### **RESULTS AND DISCUSSION**

The design sketch of the boat obtained from the free-hand sketch of the boat is shown in figure 1. The layout design of the components on 4 sheets of ply wood is shown in figure 2. Table 1 shows the specifications of the design obtained from the scale drawing. Plate 1, shows the mark layout on the plywood sheets cut out and The steps followed in constructing the boat are presented in plates 2 and 3. The detailed specifications of the completed boat are shown in table 2, while table 3 shows the scantling materials and cost of construction. When the boat empty was placed on water,

it floated at a draft of 10cm with a stable equilibrium. The draft was 13cm while carrying five and a draft of 21cm was achieved while carrying the maximum load it could carry. The boat carried a maximum of 11 persons (plate 4) about 65kg average weight.

The specifications of the boat indicates that the breadth overall (BOA) is 1.60metre which is about 33% of the length overall (4.78m), while the depth was 0.56metre about 35% of the BOA. These specifications are within the range of design guidelines according to Abubakar, (2006). The construction resulted to the production of a boat that has both fore and aft transom. The boat is light in weight (202.24kg) in relation to its size. The light weight gives the punt increased dead weight, as it floats at

a shallow draft leaving greater part of the hull above the water line as free board, thereby increasing its capacity to carry more load. The construction process utilized 4 sheets of ply wood leaving no leftovers, so the work achieved maximum utilization of materials.

The cost of construction was N39, 000, which is affordable in relation to the cost of local canoe of same size based on the national survey of fishing crafts (NIFFR, 2002).

The boat was easy to maneuver when propelled with 5 HP out board motor and by paddling as it floated at a shallow draft; this makes the boat adequate for fishing on shallow water bodies such as rivers, reservoirs and lakes.

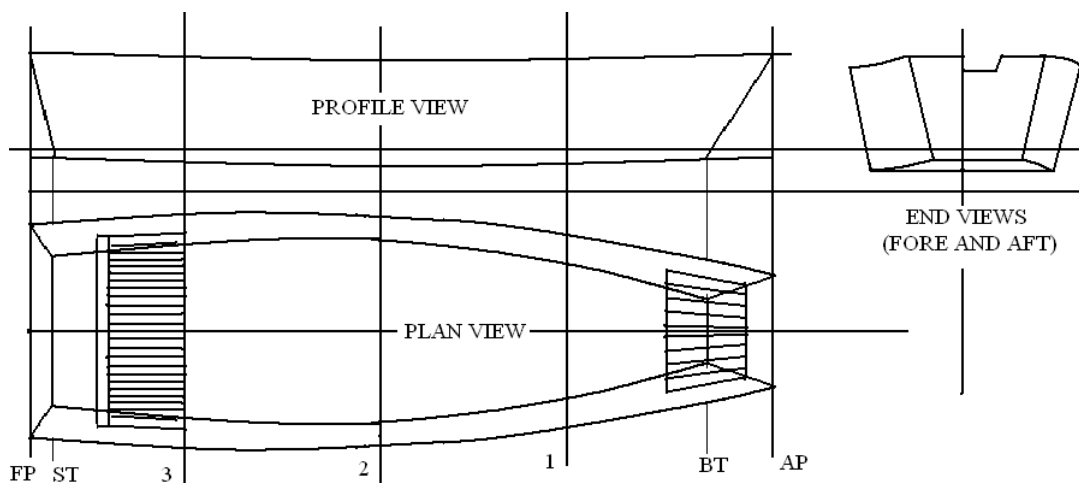


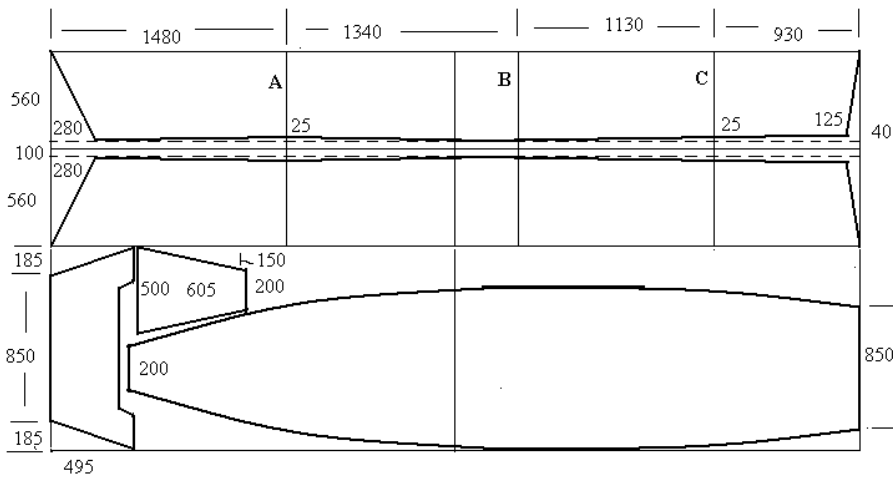
FIGURE 1: BOAT DESIGN SKETCH

**Table 1: Design data(m)**

Design ordinates	FP	1	2	3
AP				
Keel/chine HA/B	0.32	0.24	0.22	0.20
0.20				
Chine H/B	0.14	0.22	0.45	0.42
0.40				
Sheer HA/B	0.62	0.61	0.60	0.60
0.60				
Sheer H/B	0.24	0.45	0.80	0.64
0.55				

**Table3: Scantling sizes and cost**

Material	Size	Quantity	Unit	Unit price	Amount
Plywood	12mm	4	Sht	2,800.00	1,200.00
Hardwood	25X25mm	6	No	800.00	4,800.00
Screw	35mm	4	pkt	300.00	1200.00
Screw	45mm	4	pkt	350.00	1,400.00
Wire nail	Assorted	14	lb	200.00	2800.00
Glue	1kg	4	kg	400.00	1,600.00
Paint brush	4"	2	No	150.00	300.00
Primer paint	4lt	1	lit	1000.00	700.00
Gloss paint	4lt	4	lit	2000.00	8000.00
Labour cost					9000.00
<b>Total</b>					<b>N39,000</b>



**FIGURE 2: Design layout**

**Table 2: Specifications of the boat**

Length overall (LOA)	4.78m
Breadth overall (BOA)	1.60m
Moulded depth	0.56m
Draft	10cm
Lightdisplacement	202.24kg
Displacement	917.24kg
Deadweight (capacity)	715kg (11 prs)
Scale	1:45



Plate 1: marked layout cut to pieces



Plate 3: completed boat hull sanding

Plate 2: frames set on building jig



Plate 4: completed boat with 11 persons on board during boat testing.

## CONCLUSION RECOMMENDATION

AND

## Conclusion

The fishing craft have light weight, least cost, ability to float at a Shallow draft,

adequate stability and easy maneuverability as its attributes. These important qualities are adequate for a craft needed for artisanal fishing activities on inland water bodies.

### Recommendations

This craft is recommended for use on less turbulent inland water bodies, hence it can be introduced to fishermen operating on calm water bodies as a replacement of the locally built canoes that are characterized by short lifespan and low capacities. It is also recommended that same technology be introduced to local boat builders to construct larger craft for transportation and fishing.

### REFERENCES

- Abubakar. S (2006). Design and construction of an improved Flat bottom fishing Canoe. Paper presented at 21<sup>st</sup> annual conference of FISON, calaber 2006.
- Abubakar. S and A. Ibrahim (2007) Design of double chine flat bottom canoe for lake fishery (2007), Paper presented at 22<sup>nd</sup> annual conference of FISON, Kebbi 2007.
- Eyo, A. A and Ahmed Y.B. (2005) Management of inland capture fisheries and challenges to fish production in Nigeria. P.A Arawoyen (ed.) Proceeding of the 19th Annual conference of FISON, 29th-3rd Dec.2004. Ilorin, Nigeria pp.624-636
- FAO, (1978). Nepal boat building programme. *A report prepared for the Integrated Fishery and Fish Culture Development Project.* One of a Series of reports prepared during the course of the UNDP.FAO, Rome 1978.
- Love G. (1979) The theory and practice of woodwork. Longman publishers London, 4th ed. 156p.
- National Institute for Freshwater Fisheries Research (2002), National survey of Fishing gears and Crafts on Nigerian Inland Water Bodies. *National Institute for Freshwater Fisheries Research Occasional paper No: 4.* New-Bussa, Nigeria.
- National Research Council (1988) Fisheries technology for developing countries *Report of an ad-hoc panel of the board for science and technology for international development National Research. Council Washington DC.*168p
- Spira .J( 2006), Everything You Ever Wanted to Know About Boat Building, e-book published by Spira International, Inc. Huntington Beach, California, U.S.A 22p <http://www.SpiraInternational.com>