

## Design of *Lancang Kuning* Boat Prototype (A case study in Bintan, Riau Islands Province)

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### Abstract

*The purpose of this study was to design a prototype of the Bintan Riau Archipelago Lancang Kuning boat. The Lancang Kuning boat is one of the traditional boats that has high historical value in the Bintan Malay culture. Until now, no physical prototype design of the boat has been found, especially in the Riau Islands Province. This research used a qualitative approach by conducting in-depth interviews with key informants who are determined purposively, then conducting a group discussion forum with several respondents as well as documentation of the 2017 report on the exploration of the Lancang Kuning boat, in Medan Sumatra Archaeological Agency. The results of the in-depth interviews, FGD, and documentation were then outlined in the form of a physical design for a prototype boat called Lancang Kuning. The material used is balsa wood which is designed into a boat shape and tested on the water. While the size of the boat, which includes the length, width, and height of the boat, is based on the measurements of the boat wreck from previous research. In conclusion, the Bintan version of the Lancang Kuning boat prototype shows a boat used by the king to move from one area to another. The yellow boat with yellow sails shows a symbol of greatness, glory, power, and heroism.*

**Keywords:** Design, prototype, Lancang Kuning boat

### 1. Introduction

The *Lancang Kuning* boat is one of 10 traditional boats in Indonesia. The yellow brave boat has a very high historical value in Malay culture both in the Riau province and the Riau Islands (Efendi, T., 2013). In some areas the traditional boat form still exists today; however, the *Lancang Kuning* boat has not been found in the Riau Archipelago by Malay community. Perahu *Lancang Kuning* is very urgent for the Riau Islands Province to explore the identity and symbol of the progress and glory of the Malay people of the Riau Islands Province.

The *Lancang Kuning* boat consists of a stern, mogan, cannon and rudder. The bow has an anchor, a cannon, and a sail that support the speed of the boat (Sumatra Archaeological Agency, 2017). The final output of this research is to produce a prototype of the *Lancang Kuning* boat in Bintan, Riau Islands. In principle, the *Lancang Kuning* boat still does not show its original form in the Riau Islands, so it is necessary to design and engineer a prototype like the original one. The design of the *Lancang Kuning* boat has been registered in the form of a simple patent with application number S00201911935 dated 17 December 2019 (Samin, R and Khodijah, 2019).

### 2. Method

#### 2.1. Time and Place

The *Lancang Kuning* boat wreck site is located on the north coast of Bintan Island in Sebung Lagoi Village, Teluk Sebung District, Bintan Regency, Riau Islands Province. The location is in the Nirwana Garden Resort in the Lagoi tourism area. The wreck of the boat

was buried in the sand one to two meters deep and was about 30 meters from the shoreline. The size of the wreck is at least 23.40 meters long and 7-7.5 meters wide by 4 meters high. The wreck of the boat no longer has the top. The two ends tend to be tapered.

## 2.2. Materials and tools for the *Lancang Kuning* boat prototype

Table 2.1 Materials and Tools Required

No	Materials and tools	Amount
1	Balsa wood 3,4,5 mm	25 pcs
2	Balsa Sticks 10 mm	5 Sets
3	Varnish (varnish)	1 tin of wood
4	G glue (devil glue)	30 pcs
5	Sandpaper 120	5 sheets
6	Sandpaper 240	5 sheets
7	Parachute cloth	1 meter
8	Crankcase knife	1 pcs
9	Crankcase blade	1 box

## 2.3. Work Procedures

### 2.3.1. The basic principles of technology are researched and reported

The main dimensions of the yellow boat with a scale of 1: 4.5 with the actual size of the ship are as follows:

LWL	= 53 cm
B	= 16.5 cm
H	= 8.5 cm

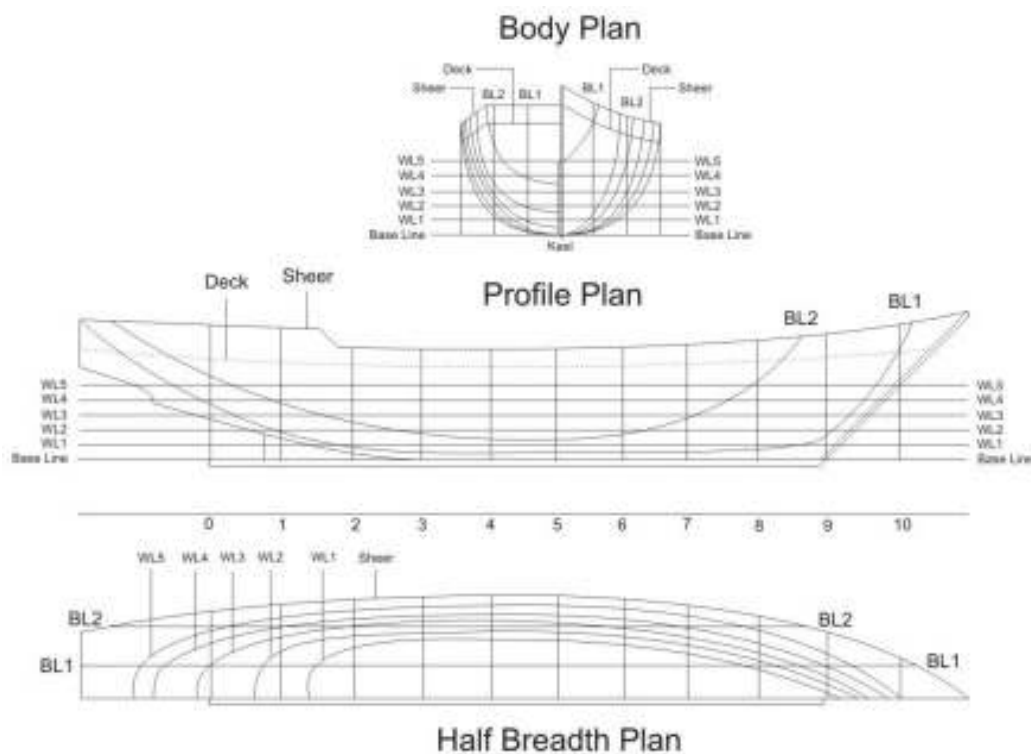
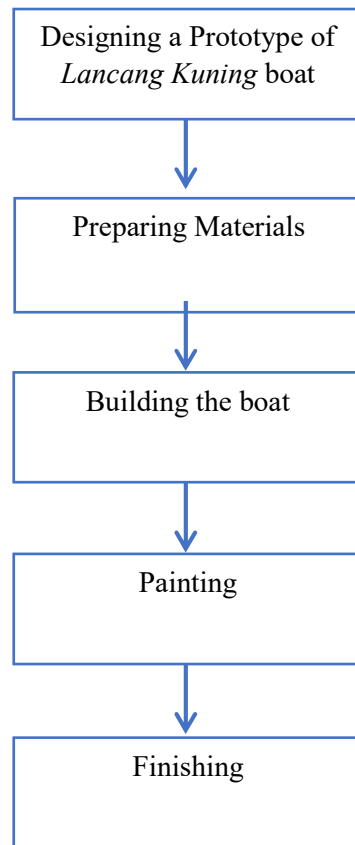


Figure 1. The prototype of the *Lancang Kuning* Boat

### 2.3.2. Concept formulation and/or formulation application.

The workflow is as follows:



**Figure 2.** Concept Formulation

### 3. Results and Discussion

First, the basic principles of technology were researched and reported as follows. Assumptions and the basis of the tools were made. The yellow boat was made from wood as the base material, and the cloth was for yellow brave sails which were equipped with various distinctive carvings. The stages of making the *Lancang Kuning* ship were; designing, selecting material, cutting the wood that had been formed, arranging each piece according to the pattern, installing the screen, and painting.

Second, the concept formulation and application were carried out as below. Materials and equipment according to the needs of the parts of the yellow brave boat were balsa wood and glue.

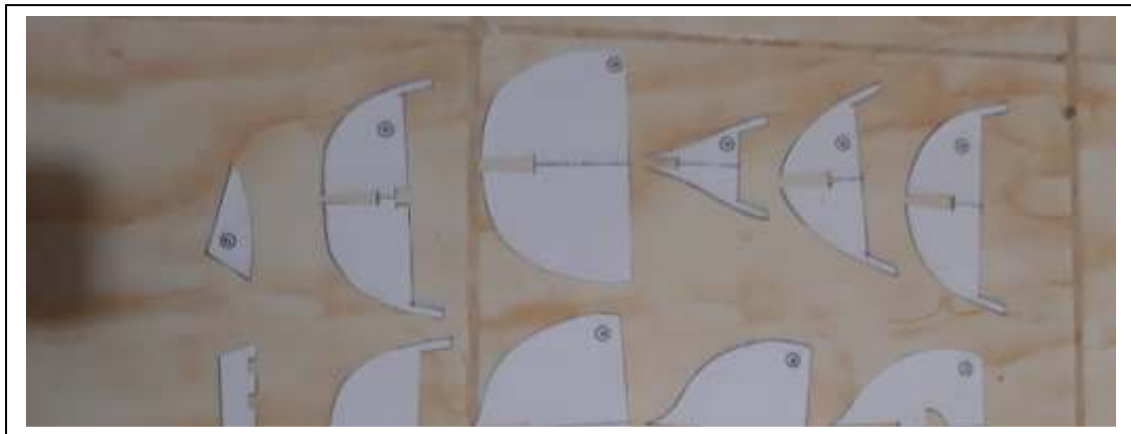


**Figure 3.** Balsa Wood

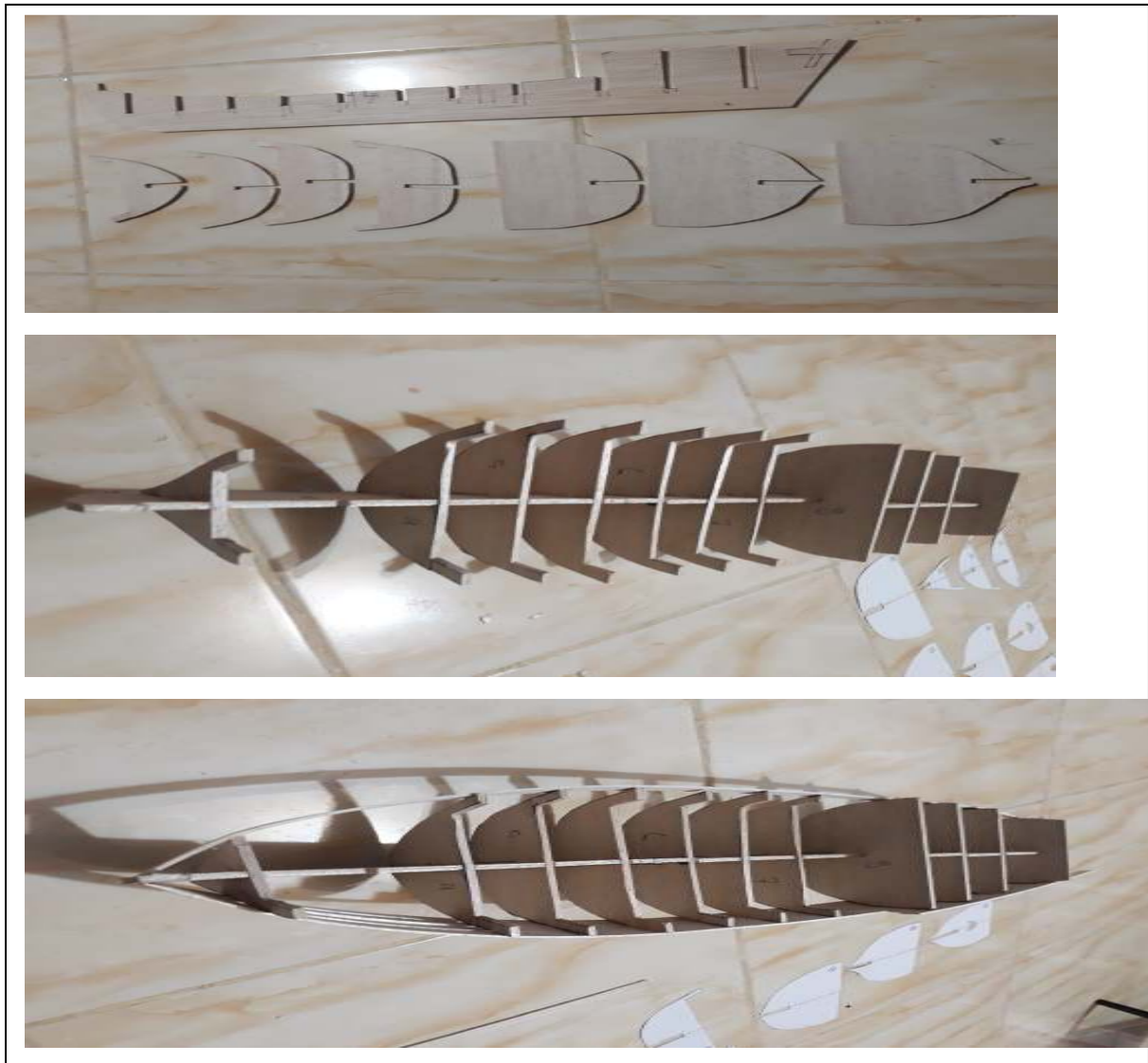


**Figure 4.** Glue

Later, the stages of making a yellow boat can be seen in figure 5, 6, 7 and 8.



**Figure 5.** Pattern making process



**Figure 6.** The process of cutting patterns with balsa wood



**Figure 7.** The process of assembling and forming a ship hull model



**Figure 8.** Prototype of *Lancang Kuning* Boat





**Figure 9.** Complete draft design

a) Preparation of initial production instructions (Low Rate Initial Production - LRIP):

1. The explanation of this prototype was made:  
It is started with the manufacture of the board, preparing the keel, preparing the boat body frame, installing the board on the boat body, preparing 9 pairs of oars, preparing the rudder, making mogans, preparing the masts, installing the sails.
2. Description of the part or component installed:  
It consists of a body, stern, bow, and bridge.
3. Description of the equipment used in the assembly:  
It should be strong boards, wooden poles, rigging, keels, and sails.
4. Explanation of component assembly stages:  
First, prepare materials in the form of boards, beloti, nails and sails.  
Second, assemble the planks on the keel frame, make the paddle stands, prepare the mogan, the bow, the mast, and install the sails.
5. Explanation of how to test the quality of the equipment (performance test):  
Test materials can be done in the laboratory or the sea or the pond.
6. Guide to explaining parts of the tools and their functions:  
The boat body should be designed in such a way as to have a lighter structure.  
The stern is the back of the boat which functions as a rest area and rudder. The bow of the ship was made in such a way that it had to withstand the waves and was also fitted with cannons. The platform is where the screen is installed and can view the surroundings safe from enemy prying eyes and storm forces.
7. Guide for how to operate the tool by the user:  
Make a Standard Operational Procedure (SOP) for all the tools used including a strong and non-slippery rope so that the boat can run according to the speed and strength of the wind.

The results of this research on the yellow sumptuous boat prototype are the result of in-depth interviews with key informants, FGD and documentation of the Medan Sumatra Archeology Agency in the form of an exploration report of the *Lancang Kuning* boat in 2017. This research is also a continuation of previous research that carried out

measurements of carbon to determine the age of the boat, the wreck. *Lancang Kuning*, a legacy of Malay history from Bintan, Riau Islands to get the length, width, and height of the boat.

## 4. Conclusions and Recommendations

### 4.1 Conclusions

- a. The Bintan version of the *Lancang Kuning* boat prototype shows a boat used by the king to move from one area to another. The yellow boat with yellow sails shows a symbol of greatness, glory, power, and heroism.
- b. The design of the yellow brave boat prototype is very useful in maintaining the sustainability of the historical value of Malay cultural work.
- c. The prototype of the brave yellow boat can be used as a reference in making a yellow sumptuous boat in its actual physical form.
- d. Collaboration on the use of technology in the manufacture of yellow brave boats is highly recommended and needs to be developed in further research.

### 4.2 Recommendations

- a. To Regional Government of the Riau Islands Province to immediately make yellow brave boats both for competition and for tourism activities. The *Lancang Kuning* boat is divided into two, namely the *Lancang Kuning Niaga* boat for trading and the yellow sumptuous boat for tours.
- b. Further research is needed by looking at the cost and quality aspects of the materials used in making yellow boats of *Lancang Kuning*.

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