

MAKING A PLYWOOD BOAT CATAMARANS MODEL FOR HANDLING OF FLOOD EMERGENCY IN AREAS OF DURI KEPA

Indra Gunara Rochyat, Asnawati, Wahyu Albin Tabrani
Product Design Department – Design & Creative Industry Faculty
Esa Unggul University
Jalan Arjuna Utara – Tol Tomang, Kebon jeruk – Jakarta 11510
indragunara@esaunggul.ac.id, asnaaw@gmail.com, wahyualbin@gmail.com

ABSTRACT

Rain with high intensity and very heavy can result in flooding in some flood-prone areas, especially in big cities are dense settlements and communities, such as Jakarta. The heavy rains that occur at the end of the year seems to be something that is feared by almost all citizens of Jakarta, especially in flood prone areas. Researchers focusing on the place where this research was conducted that is Patra Local Market, Duri Kepa, West Jakarta. The main problem facing is when the flood comes the access road to the site is disconnected. The purpose of this study is to create an emergency transportation for people in need at the time of flooding across the region and a use of alternative materials as material. The method used in this research product creation as one of the efforts that can be taken is to use transport boat made of plywood to replace the the rubber boat that is not owned by the local people. Transportation in the form of boat types of catamaran with plywood material of it seemed to be a considerable a good alternative in the flood hit area.

Key words: Flood, Boat, Water Transport, Jakarta

1. INTRODUCTION

Floods in the capital of the country is seemed to be something that is difficult to be remedied. So it often used as a candidate's a campaign theme of DKI Jakarta with promises to overcome the flood completely.

Factors causing in Jakarta flooded among them apart from heavy rainfall, since December 2012 in Jakarta has a poor drainage system is, the breakdown of the various dikes in Jakarta, as well as increased volume of 13 rivers across in Jakarta. Flooding also caused by people who are not balanced with good behaviors protecting the environment well, not littering and provides 2 types of trash cans, organic and inorganic as the example.

Rainfall in mid January 2013, in Jakarta was recorded at record for rainfall of up to 250-300 mm, exceeding the in Jakarta Flood conditions in 2002, which reached 200 mm, but there is still below the conditions of Jakarta Flood of 2007, which reached 340 mm. BPPT director, Tri Handoko Seto, stated that atmosphere of waves, monsoons, and the diurnal oscillations caused to high rainfall. Air masses from the

South China Sea and India moving south towards the low pressure center in Australia. These air mass is then subjected to deflection around Jakarta, as a result of low pressure in the Indonesian Ocean, in the southwest of Jakarta.

1.1. Problem Identification

Since end of the year, there have been some damage dikes, begins from the embankment in Kali Adem, Muara Angke, Penjaringan, North Jakarta, on December 13th, 2012. This dike damages caused 500 houses submerged in sea water, as well as the two residents swept away. Finally, hundreds of illegal huts was demolished to enables easy the entry of the machine to fix the dike. Lurah Pluit explained the pounding high tides which eroded dikes that caused this damage.

On the Date January 15, 2013, following a dike in South Kedoya, Kebun Jeruk, collapsed causing floods as high as two meters. This dike is also noted to have a bad of construction as it is only created of

sandbags, so it would not hold of water Pesanggrahan River. Residents were evacuated to the east rail Pesing, but most stay in their own homes.

a lot of people trapped in their own homes due to the floods that surrounds it, so they can not perform its activities. This situation is exacerbated by the increasing water level which requires them evacuate up to the top level of the 2nd floor and some have evacuate to the roof of the house. This situation can last long enough if rain does not subsided. This situation worsen the supply of food and clean water, so this situation and require immediate with quite seriously by the authorities.

1.2. Problems Formulation

- a) Whether the use of of plywood materials able to be used in an emergency situation?
- b) Whether local authorities in handling the the flood situation feel helped by the presence of emergency the boat based of plywood?

1.3. Design Purposes

- assist the authorities in the process of evacuation of flood victims in the area durikepa
- to accelerate the procurement process of rescue boats for flood victims
- to test of use the boat with the model catamaran model based on plywood
- recommending of use of plywood material within the structure of the boat builders for quick handling emergency response.

2. THEORETICAL BACKGROUND

2.1. Catamaran

A catamaran is a multi-hulled watercraft featuring two parallel hulls of equal size. It is a geometry-stabilized craft, deriving its stability from its wide beam, rather than from a ballasted keel as with a monohull sailboat. Being ballast-free and therefore lighter than a monohull, catamarans often have a shallower draft (draught) than comparably-sized monohulls. The two hulls combined also often have a smaller hydrodynamic resistance than comparable monohulls, requiring less propulsive power from either sails or motors. The catamaran's wider stance on the water can reduce both heeling and wave-induced motion, as compared with a monohull, and can give reduced wakes. Catamarans range in size from small (sailing or rowing vessels) to large (naval ships and car ferries). The structure connecting a catamaran's two hulls ranges from a simple frame strung with webbing to support the crew to a bridging superstructure incorporating extensive cabin and/or cargo space. Catamarans have two distinct primary performance characteristics that distinguish them from displacement monohull vessels: lower resistance to passage through the water and greater stability (initial resistance to capsize). Choosing between a monohull and catamaran configuration includes considerations of carrying capacity, speed, and efficiency. At low to moderate speeds, a lightweight catamaran hull experiences resistance to passage through water that is approximately proportional to the square of its speed. A displacement monohull, by comparison experiences resistance that is at least the cube of its speed. Catamarans rely primarily on form stability to resist heeling and capsize. (*Phipps, 1998*).

2.2. Wooden Boat

In a genuine wooden boat all pieces are of natural wood and all pieces are fastened to each other using mechanical fasteners. (*Ruhlman, 1987*).

2.3. Plywood Boat

For most amateurs, plywood is the material of choice. Plywood is one of the cheapest and easiest building materials, one that the average do-it-yourselfer is both familiar and comfortable with. Plywood is also, pound for pound, stronger than steel. Because of its high strength to weight, plywood construction yields a boat that is much lighter and performs better than a "chopper gun" fiberglass boat. Plywood boats are frequently built in school wood shops or by youth groups as individual or group projects. To take full advantage of the material, our Plans and Patterns detail simplified construction methods geared to the abilities of the amateur. No difficult woodworking procedures, such as steam bending, are ever required. (**Thomas,2001**)

3. RESEARCH METHOD

Phenomenological method is based on the empirical truth of, logic, ethics and transcendence, on the basis of this truth, phenomenology requires the unity of between the subjects researchers with supporting the object of research. The involvement of researchers in the field subject and appreciation of the phenomenon experienced to be one of the main characteristics.

Qualitative research is a research approach that is selected. Qualitative research, (**Creswell, 2008**) defines it as an approach or searches for exploring and understanding a central phenomenon.

To investigate the central phenomenon investigators interviewed of study participants or participants to ask questions that commonly and rather extensive. The information submitted by participants are collected. Such information is usually in the form of text and words. The data was then analyzed. The results of the analysis may be a portrayal or description or they can be in the form of topics. From the data the researchers interpret to catch the deepest meanings. After that researchers made a personal reflection (self-reflection) and translate it with studies of other scientists made earlier. (**Samiawan, 2010**)

In this study we search the data in the disaster area in durikepa

4. RESULT AND DISCUSSION

Land transportation is interrupted, many car or public transport, such as minibuses, or three-wheeler could not pass through the area, because the water level does not allow road vehicles can cross. Instead of being able to pass through, even many who try to force the vehicles passing through the flooded area it is sinking, the vehicle body partially submerged and then broke down the middle of the road, the engine in the vehicle entered a lot of water so that vehicles forced their way into even die unexpectedly.

The boat can be used by victims to transport all document-document or goods that they consider important.

Rubber boat was often used by the government to sent a rescue army and also just check the circumstances surrounding neighborhood affected areas. However transportation of rubber boats was not enough if only have had government, the government can have a variety of the boat with different materials and different models for the preparation help the flood victims.

The advantages and disadvantages of Use rubber boats:

Advantages :

- 1) Can be minimized to enables easy mobilization.
- 2) Easy operationalized.
- 3) Offers financed deliveries to the area because they can be folded

Disadvantages

- 1) Not so strong and impact resistant against sharp objects or easily damaged and leak when affected by sharp objects.
- 2) Have a technical life of about 5 years Not suitable for flood rescue in urban areas, many sharps.
- 3) If damage occurs a local artisan could not repair it.

To material itself, rubber material also has advantages and disadvantages of each, which is:

Advantages:

- 1) elastic or rubber has a good of resilience,
- 2) Rubber is a good plasticity, easy processing,
- 3) Rubber is not easy to wear (not easily exhausted due to friction), and not easy to heat.

Disadvantages:

If affected by the sun during the dry season, the rubber will shrink or shrivel.

However, in the passing area that rubber boats are not always safe. Many areas in the Jakarta area is quite dangerous rubber boats to get through the flooded area. TNI and the government could also use the boat with a wood material with a design or model using a single boat with catamaran hull modifications.

The documentation we do to make a mock-up the boat 1: 1 with the model catamaran based of plywood:



Making a Model
Figure 1

Many benefits to be gained than using a rubber boat, including:

- 1) Strong and impact resistant or sharp object. Durable when in put in the correct place.
- 2) Suitable for flood rescue in urban areas, a lot sharp object.
- 3) No leaking due to rat bite.
- 4) Aesthetically able to match the rubber boat, can be painted and labeled.

Besides, there are advantages there are also disadvantages of Use of wood or of plywood boat are:

- 1) There can be diminished to facilitate mobilization.
- 2) More expensive at the the cost of delivery to the area.
- 3) The termite wooden boats are vulnerable if stored in a place that is not right.

But we can explain not only about our boat material, here we will briefly describe about the design that we use for our boat, which is boat of plywood with a catamaran design.

Advantages of single hull boat design modifications with catamarans:

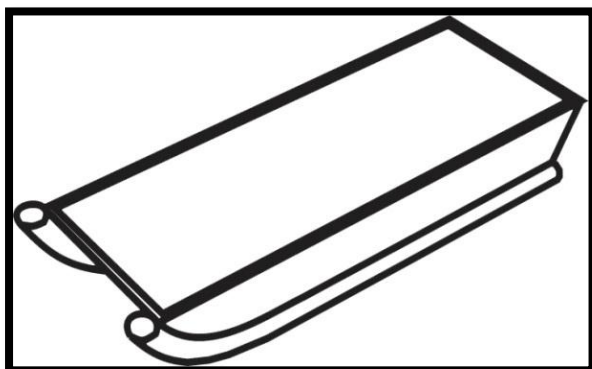
- 1) Catamaran ship design referred to as the best design for boats because it can accommodate the needs for speed, stability and large capacity in a ship.
- 2) The design concept was inspired by cano catamarans used by Polynesian society. They found that two pieces of wood logs are merged into one would not be reversed.
- 3) The concept was subsequently continued to evolve with broad application in modern shipbuilding.
- 4) Advantages of this model catamaran is faster than when conventional models. This design is also very stable when used in high speed.

5) Catamaran widely used in water sports, including the yacht race. Now this model of catamaran also used in the water mass transport, such as ferries and cargo ships.

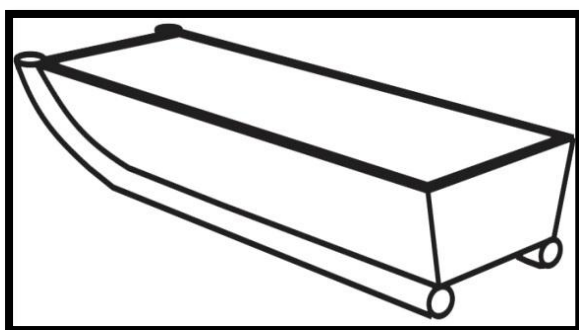
Disadvantages:

- 1) Due to its size fairly large, it takes enough room to put down the boat.
- 2) Ignorance of the community of flooding, especially in the capital about importance of having the boat or personal water transport that is based of plywood or wood
- 3) Cost to make a boat from of plywood material is quite expensive.

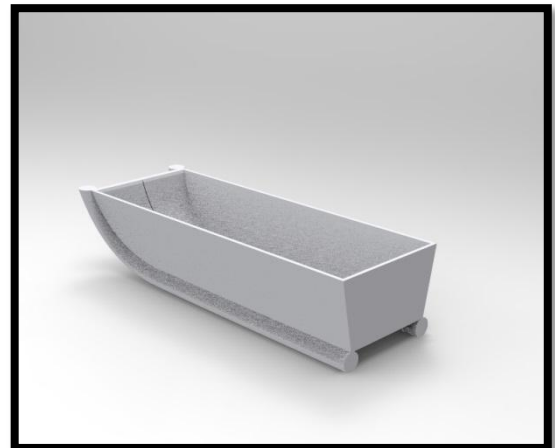
Not only form designs that we created, but we also thought about any color what will be used to better beautified the aesthetic in the manufacture of this boat. we use the color navy blue, yellow, gray and red. Each color has a different meaning course.



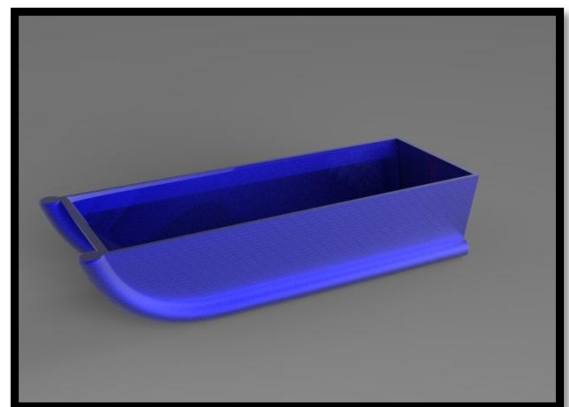
Final Sketch 1
Figure 2



Final Sketch 2
Figure 3



Form in Render
Figure 3



Rendering
Figure 4

5. CONCLUSION

Due to the frequent Duri Kepa regional areas affected by the floods, local residents are expected to have boat or personal water transportation, flood control at least for a while. Like having your own boat which can be made with materials that are made of wood or of plywood with the design of the catamaran under the boat. Due to the design of catamaran ship referred to as the the best design for the catamaran ship can accommodate the needs for speed, stability and large capacity in a ship.

- a) Whether the use of of plywood materials able to be used in an emergency situation?

Answer:

based on the results of the manufacturing-based boat catamaran based of plywood design that can be used in an emergency.

b) Whether local authorities in handling the the flood situation feel helped by the presence of emergency the boat based of plywood?

Answer:

Yes, they are very helped about the presence of this boat in their area of flooding

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AUTHOR BIOGRAPHIES

Indra Gunara Rochyat is a lecturer in Department of Interior Design, Faculty of Design and Creative Industry, Esa Unggul University, Jakarta. Received Master of Art and Art History from Senior University International in 2000. And received his second Master of Product Design from Trisakti University in 2016. My Research interests are in the area of Product Design specially Boat Design and Interior Design. Im a member of the Indonesian Ascociation and a Member of AMKRI, Indonesian Furniture Designer Ascociation. A Member of Design and Creative Industry Faculty at Esa Unggul University as Head of Interior Design Department ,email address is <indragunara@esaunggul.ac.id>