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Review Report

Date: **26-February-2019**

Title: **INVESTIGATION OF STABILITY CRITERIA OF BATANG TYPE TRADITIONAL FISHING BOAT UNDER 25 M FOR SAFETY AT SEA**

Authors: **Imam Pujo Mulyatno, Kiryanto and Deddy Chrismianto**

Evaluation	Poor	Fair	Good	Very Good	Outstanding
Originality					√
Innovation				√	
Technical merit					√
Applicability					√
Presentation and English					√
Match to Journal Topic					√

Recommendation to Chief Editors

	Strongly Reject	Reject	Marginally Accept	Accept	Strongly Accept
Recommendation					√

Review Comments: In this paper will be analyzed regarding the stability of the Batang type traditional fishing boat under 25 m is widely available in Indonesia already meet safety requirements seagoing or not, given the fishing boat of this type was developed traditionally by fishermen, where the resulting design is not planning through design phase, so often a ship that has been made does not have a reliable technical specifications. **Analytical study.** **Paper Accepted for publication in IJMET.**

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INVESTIGATION OF STABILITY CRITERIA OF BATANG TYPE TRADITIONAL FISHING BOAT UNDER 25 M FOR SAFETY AT SEA

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ABSTRACT

In this study, will be analyzed regarding the stability of the Batang type traditional fishing boat under 25 m is widely available in Indonesia already meet safety requirements seagoing or not, given the fishing boat of this type was developed traditionally by fishermen, where the resulting design is not planning through design phase, so often a ship that has been made does not have a reliable technical specifications. To solve this problem, the survey to retrieve data from 5(five) different types of traditional fishing boat below 25 m at Kabupaten Batang are carried out, then do redrawing of the existing ship, and finally the technical analysis of the design of the traditional fishing vessel for stability criteria is done. The recommendations for the design of traditional fishing boat under 25 m are given in this study corresponding safety criteria seagoing so beneficial to the safety of fishermen doing fish catching in the sea.

Key words: Ship stability, traditional fishing boat, safety criteria.

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1. INTRODUCTION

With these conditions, it would require a lot more fishing boats to catch it. While in Indonesia the average small size of the fishing boats under 25 m, and still is developed traditionally by the craftsmen of traditional vessels that have recognized expertise and experience in building a ship. However, because in terms of ship design that still rely on intuition, then design produced not through planning and calculation of a comprehensive picture, which often occurs ships that have been made do not have a reliable technical specifications and safety seagoing not be protected properly.

A study of the safety of sailing and efficiency of fishing boat states that the average fishing boats often have impaired at sea, be it damage even drowned because stability is not good, and only a few fishing boats that managed to take a trip with a success each year, Peyelesaian key issue here is the need for a competent technical attention to design [1]. At this time most small

boats operating waterline has a very small, even the International Load Line Convention allows value-waterline is very small. But the reality for fishing vessels this can lead ship be sunk because stability is not good when people engage in fishing operations, especially in bad weather [2].

Based on the description above, the problem needs to be resolved is whether the design of fishing boats traditional fishing with a length below 25 m it meets safety criteria seagoing terms of value stability, and how much the minimum value waterline allowed for the design of fishing boats traditional fishing meets seagoing safety criteria. Building of traditional fishing boat with a length below 25 m was made in conventional as well as deficiencies in the absence of an design drawing so that this research needs to be done redraw the fishing boat existing traditional, then doing the analysis of the characteristics of the ship.

2. REVIEW OF THE LITERATURE

On fishing boats, the location and the type of gear and fishing equipment major effect on the location of point G (center of gravity), thus affecting also the magnitude of GZ.

There are several important points to note [3]:

1. Points weight of liquid cargo in the tank to be determined, although the amount of cargo tank is small relative to the total weight of the whole ship.
2. Amendments to the free surface of the tank main issue is the stability calculations are very difficult, so it is recommended to simplify the calculation, though a safe way to increase the size of KG on the ship is corrected initial free surface.
3. Number and KG of fish cargo should be determined with more precision, especially for ships carrying large amounts of fish in relation to the total weight of the ship. In this case, or numerical integration methods should be used to determine the hydrostatic curve of load space volume of fish.
4. The density of the catch is very difficult to ascertain, so worn forecasts. Where to fish in the ice box has $\rho = 0.4$ t / m3.
5. For smaller boats, a designer must use his knowledge of fishing boat, the rate of catch and vessel operations in general, and especially in the current condition GZ minimum value. Some conditions require attention, namely:

a. Arrival at the capture site (fishing ground), and the contents of the tank was reduced to 90%.
b. At the moment the possibility of catching the largest single use of fishing gear on deck, load space is empty of fish, and the contents of the tank was reduced to 90%.
c. Arrival at the port, a full charge, including existing cargo deck, while the contents of the tank reduced by 50%.

3. METHOD OF RESEARCH

In general, the methodology employed in this study consisted of three (3) stages, namely:

1. The first stage, research activities are focused on the field of study. Implementation of field studies conducted to retrieve data about the size of a traditional fishing fishing boats with a length of under 25 m, which are then classified according to type of fishing gear (Figure 1).

Figure 1. Survey and Measuring of Batang type Traditional Fishing Boat

2. The second stage, at this stage of the second group of boats further studied is then carried redrawn (redrawing) as in Figure 2, it is given that the traditional boats are still made based on experience and intuition, so no pictures of the design.

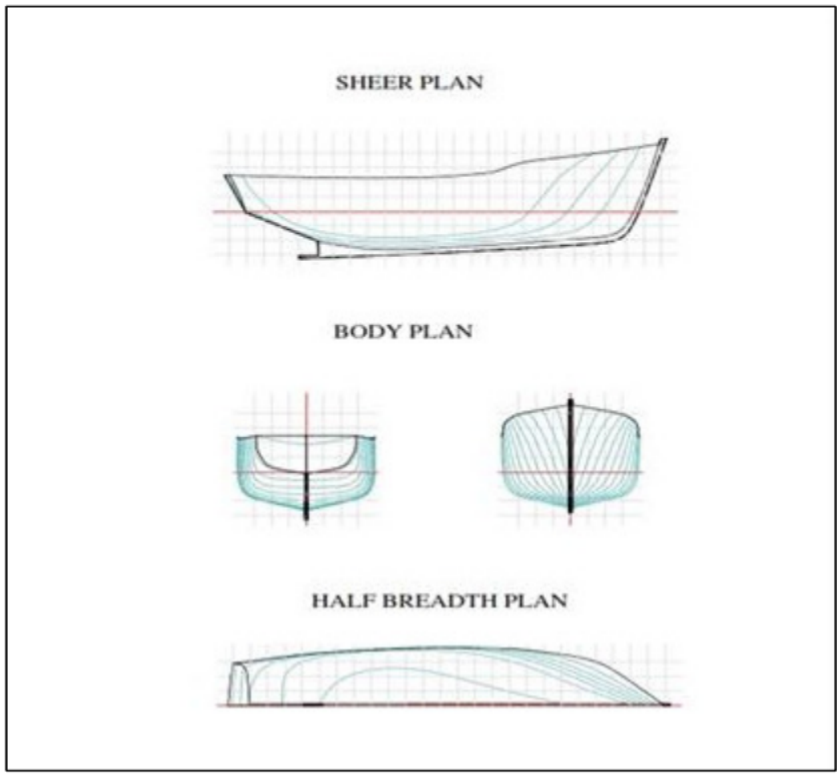

Figure 2. Redrawing of Batang Type Traditional Fishing Boat

3. The third stage, the research will focus on the analysis of the design of the traditional fishing boats fish refers to the safety criteria sailing at sea, so at this stage of analysis used are: analysis of the value of the stability of the ship. Then from the analysis of the stability of the ship and waterline obtained verification with the safety regulations of international (IMO Rules), and ultimately, make recommendations on the design of fishing boats traditional fishing with a length below 25 m, making it beneficial to the interests of fishermen and shipbuilders traditional fishing boat [4, 5].

4. CALCULATION AND ANALYSIS

From the results of the field survey obtained 5 (five) type of Batang fishing boats with different ship's main dimensions. The size of the five main types of Batang fishing boats are as follows:.

1. Traditional fishing boat 1

LOA 12,85 m
B : 4,00 m
H : 2,70 m
T : 1,60 m
Cb : 0,376

2. Traditional fishing boat 2

LOA : 17,41 m
B : 3,84 m
H : 1,80 m
T : 1,12 m
Cb : 0,376

3. Traditional fishing boat 3

LOA : 19,95 m
B : 6,40 m
H : 3,50 m
T : 2,92 m
Cb : 0,337

4. Traditional fishing boat 4

LOA 18,54 m
B : 5,19 m
H : 3,60 m
T : 1,59 m
Cb : 0,400

5. Traditional fishing boat 5

LOA 22,70 m
B : 6,41 m
H : 4,44 m
T : 2,50 m
Cb : 0,399

Then hydrostatic and stability analysis are calculated and the result below:

1. Traditional fishing boat 1; GMt = 0,781 m, GML = 8,622 m, maximum GZ departure to fishing ground = 0,49 m, maximum GZ arrive at port = 0,415 m, meets the safety standard of IMO.
2. Traditional fishing boat 2; GMt = 1,314 m, GML = 23,686 m, maximum GZ departure to fishing ground = 0,571 m, maximum GZ arrive at port = 0,45 m, meets the safety standard of IMO.
3. Traditional fishing boat 3; GMt = 1,151 m, GML = 16,653 m, maximum GZ departure to fishing ground = 0,706 m, maximum GZ arrive at port = 0,694 m, meets the safety standard of IMO.
4. Traditional fishing boat 4; GMt = 0,355 m, GML = 16,115 m, maximum GZ departure to fishing ground = 0,469 m, maximum GZ arrive at port = 0,305 m, no meets the safety standard of IMO.

5. Traditional fishing boat 5; GMt = 1,282 m, GML = 19,898 m, maximum GZ departure to fishing ground = 0,815 m, maximum GZ arrive at port = 0,768 m, meets the safety standard of IMO.

From the analysis above, the actual value of the traditional type of vessel stability purse seine fishing was good, as can be seen from the value of its GML and GMT which has a positive value, as well as the stability of the arm (GZ) value also is positive.

However, when compared between the actual analysis results with international safety regulations sail at sea, particularly referring to the rule IMO (International Maritime Organisation), The comparison between the traditional fishing vessel no. 4 with international safety regulations IMO in terms of stability of the ship for three (3) kinds of conditions the loadcase meet all the requirements permitted by these regulations. But the condition of loadcase 3 turns out there are some requirements that have not been in accordance with the IMO. So it can be said that a fishing boat traditional purse seine which has a primary measure such as the traditional fishing vessel no.4 was necessary design improvements because the conditions of loadcase 3, when the ship went to fishing ground, stability is not subject to some requirements of IMO, especially when heel angle between 00-300. While traditional fishing vessel no.1, 2, 3, and 4 have to sail worthiness

5. CONCLUSION

The Batang type traditional fishing boats are investigated regarding to stabilty criteria in which majority of boats meet the safety standard of IMO excluding Traditional fishing boat 4. Traditional fishing boat 1 meets the safety standard of IMO; GMt = 0,781 m, GML = 8,622 m, maximum GZ departure to fishing ground = 0,49 m, maximum GZ arrive at port = 0,415 m. Traditional fishing boat 2 meets the safety standard of IMO; GMt = 1,314 m, GML = 23,686 m, maximum GZ departure to fishing ground = 0,571 m, maximum GZ arrive at port = 0,45 m. Traditional fishing boat 3 meets the safety standard of IMO ; GMt = 1,151 m, GML = 16,653 m, maximum GZ departure to fishing ground = 0,706 m, maximum GZ arrive at port = 0,694 m. Traditional fishing boat meets the safety standard of IMO 5 ; GMt = 1,282 m, GML = 19,898 m, maximum GZ departure to fishing ground = 0,815 m, maximum GZ arrive at port = 0,768 m.

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REFERENCES

[1] Hind, J. A. Stability and Trim of Fishing Vesels and Other Small Ships, Second Edition. England: Fishing News Book Ltd, 1982, pp. 103.

[2] Derrett, D. R. Ship Stability for Masters and Mates, Fifth Edition. Melbourne New Delhi: Butterworth-Heinemann Publishing Ltd, 2001, pp. 124.

[3] Fyson, J. Design of Small Fishing Vessels, Food and Agriculture Organization of the United Nations. England: Fishing News Books Ltd,1985, pp. 106.

[4] Chrismianto, D., Manik, P. and Good, R. Study Comparative of Stability Performance Between PVC Fishing Boat and Wooden Traditional Fishing Boat. *IOP Conference Series: Materials Science and Engineering*, **403**(012002), 2018, pp. 1-6.

[5] Kiryanto, Ridwan, M., Adietya, B. A. And Chrismianto, D. Stability Analysis of Trawls Type Traditional Fishing Boat with Modification of Eco-Friendly Fishing Gear on the North Coast of Central Java. *IOP Conference Series: Materials Science and Engineering*, **403**(012052), 2018, pp. 1-8.