

## Eco-Innovation for Strengthening Global Competitiveness and Building Capacity in Shipbuilding Industry in East Java to Support MP3EI Program Corridor Economic Java

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### ABSTRACT

*In mapping the Ministry of Industry, the shipbuilding industry has been defined as a core competency Jatim industrial world. Ministry of Industry data show that there are at least 27 shipbuilding companies in East Java, or 10.5 percent of the total national shipbuilding company. In Java there are at least 21 large companies that use the ship in the main activity of the business. In addition, there are 39 units' shipbuilding business people. Large shipbuilding companies, small and medium enterprises (SMEs) are at the core of the economy of East Java. The company-Vendor absorbs most of the labor force and is in the center of the development. Shipbuilding is also a major economic activity in Java Economic Corridor for MP3EI program.*

*With the aim of supporting MP3EI program in Java economic corridor and in accordance with the new paradigm for international competitiveness, this study aims to develop Green Business Model Innovation in the shipbuilding industry in East Java to reduce the inefficiency of resources and capacity building shipyards, through the green platform. In this study, also carried out the development of specific tools package to allow the involvement of SMEs in eco - innovation in the shipbuilding industry in East Java. This study uses a systematic, integrated, and involve a lot of tools in accordance with the method introduced by (OECD, 2010). With referred on eco-innovation methods of the Organization for Economic Co-operation and Development (OECD) this study is expected to produce output as: 1) End-of-pipe solutions for the shipbuilding industry in East Java, 2) optimization model to minimize resource and a model of environmental management systems for the shipbuilding industry in East Java, 3. Development toolbox for eco-innovation that enable the involvement of SMEs in Industrial Shipbuilding East Jaa (Gómez Navarro et al, 2005) as tools that exist today are relatively few that explicitly support eco-innovation activities in shipbuilding industry 4. Green Shipbuilding Design which enables the achievement of eco-efficiency and cleaner production in East Jawa Shipbuilding Industry.*

**Keywords:** Eco-innovation, green business model, a model eco-ship

### INTRODUCTION

In mapping the Ministry of Industry, the shipbuilding industry has been defined as a core competency (core competence) Jatim industrial world. Ministry of Industry data show that there are at least 27 shipping companies in East Java, or 10.5 percent of the total national shipping company. In Java there are at least 21 large companies that use the ship in the main activity of the business. In addition, there are 39 units' shipbuilding business people. Large shipbuilding companies, small and medium enterprises (SMEs) are at the core of the economy of East Java. These companies absorb most of the labor force and in the center of development. With strategic initiatives such as eco-innovation and green business model, the

shipbuilding industry in East Java, which is the main economic activity in the Java Economic Corridor in MP3EI program is expected to increase production capacity and competitiveness.

The aim of this study is:

1. Development of Green Business Model Innovation in the shipbuilding industry in East Java to reduce the inefficiency of resources and capacity building shipyards, through the green platform, to support MP3EI program in Java Economic .
2. Improve the competitive position of shipbuilding industry in East Java through the process of eco-innovative materials, products, processes, organizations, and institutions.
3. The planning and development of a model eco-ship design for the shipbuilding industry in East Java.
4. Development of special tools package to allow the involvement of SMEs in eco innovation in Shipbuilding Industrial in East Java.

The introduction of eco approach - innovation can provide several benefits to increasing the capacity and competitiveness of shipbuilding industry in East Java. Increased capacity and competitiveness of the shipbuilding industry will accelerate economic development in the area of East Java. These benefits can be defined in terms of the three pillars of sustainable development, namely social benefits, economic benefits and environmental benefits

1. The economic benefits that the optimization of production costs through more efficient use of resources and inputs, reduction in waste management costs, minimizing the cost of production and organizational processes, the development of a green image, new products, and the benefits of competitiveness.
2. The environmental benefits that the use of resources more efficient, minimizing the use of non-renewable resources, reduction of pollutant emissions, reduction of waste production, contributing to sustainable development in the area of East Java.
3. The social benefits that support sustainable social development.
5. Support the Master Plan for the Acceleration of Economic Development (MP3EI) in Java.
6. The political benefits are for justice resources and material security.

## **RESEARCH METHODS**

This study applied the method for the more integrated and systematic performance of eco-innovation that could provide a new basis for the business model in the shipbuilding industry in East Java. The research methodology is projected in Figure 1.

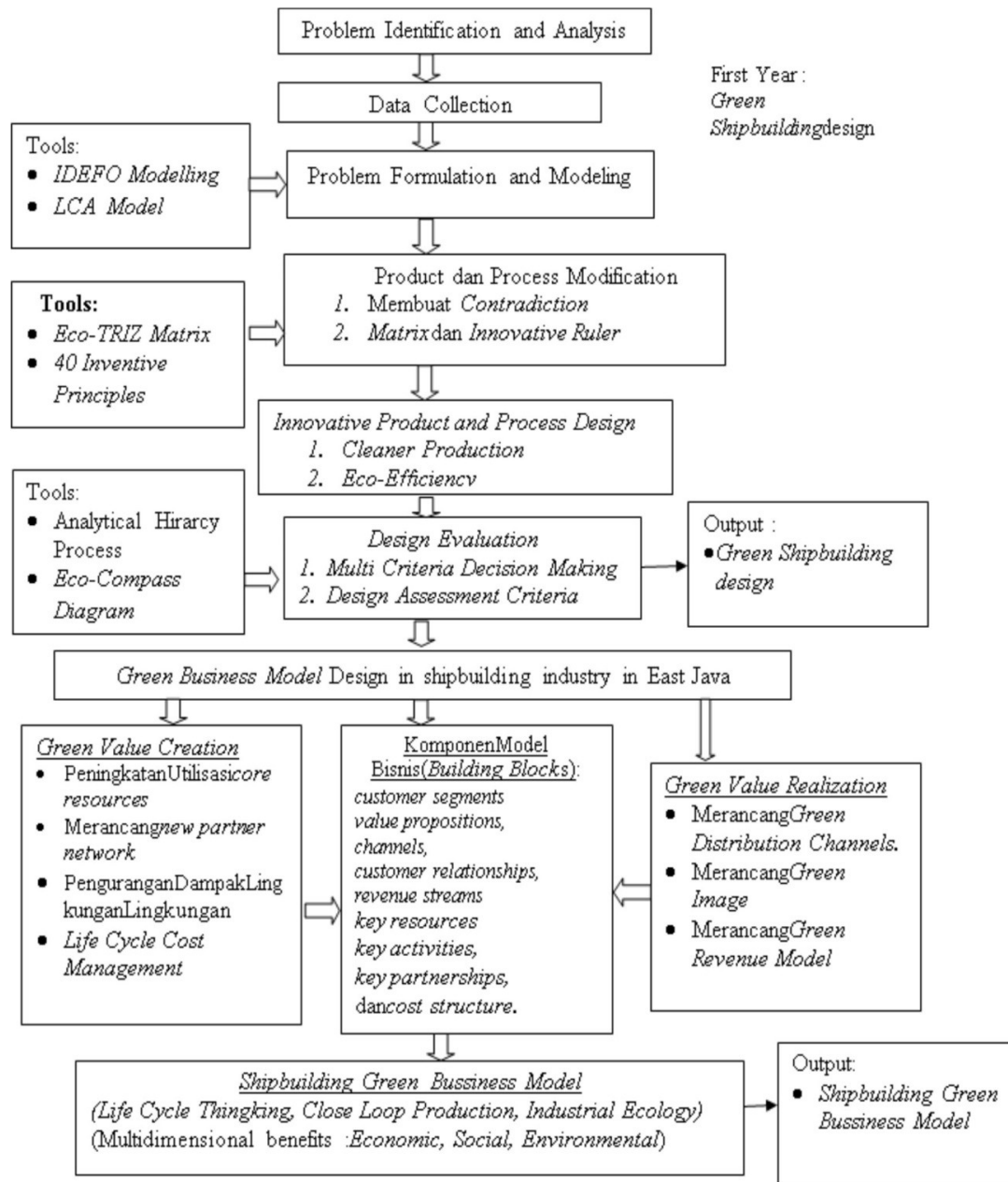


Figure 1. Gambar 2.1 Flow Chart of Research

### Activity Modeling in Shipbuilding with IDEF0

IDEF0 (Integration Definition Function Modeling) is a modeling language that uses images, accompanied by a comprehensive explanation to explain the stages / methodology development of a system. The system is modeled as a collection of functions that are interrelated to one another to form a primary function. These functions explain what is done by the system, so anything that control, processing, processed, and produced by the system can be known. Building blocks are components of the system are described in the model. There are two kinds of building blocks, namely:

1. Activity, which is a component of a system that is running or doing any act.
2. ICOM, which is a component of a system used by an activity.

ICOM is composed of:

- Input: something that is transformed by an activity.
- Control: something that determines how an activity going on but not transformed by it.
- Output: something produced by activity
- Mechanism: people, facilities, machinery, or other activities that run.

IDEF0 diagram for shipbuilding life cycle shows in figure 1.

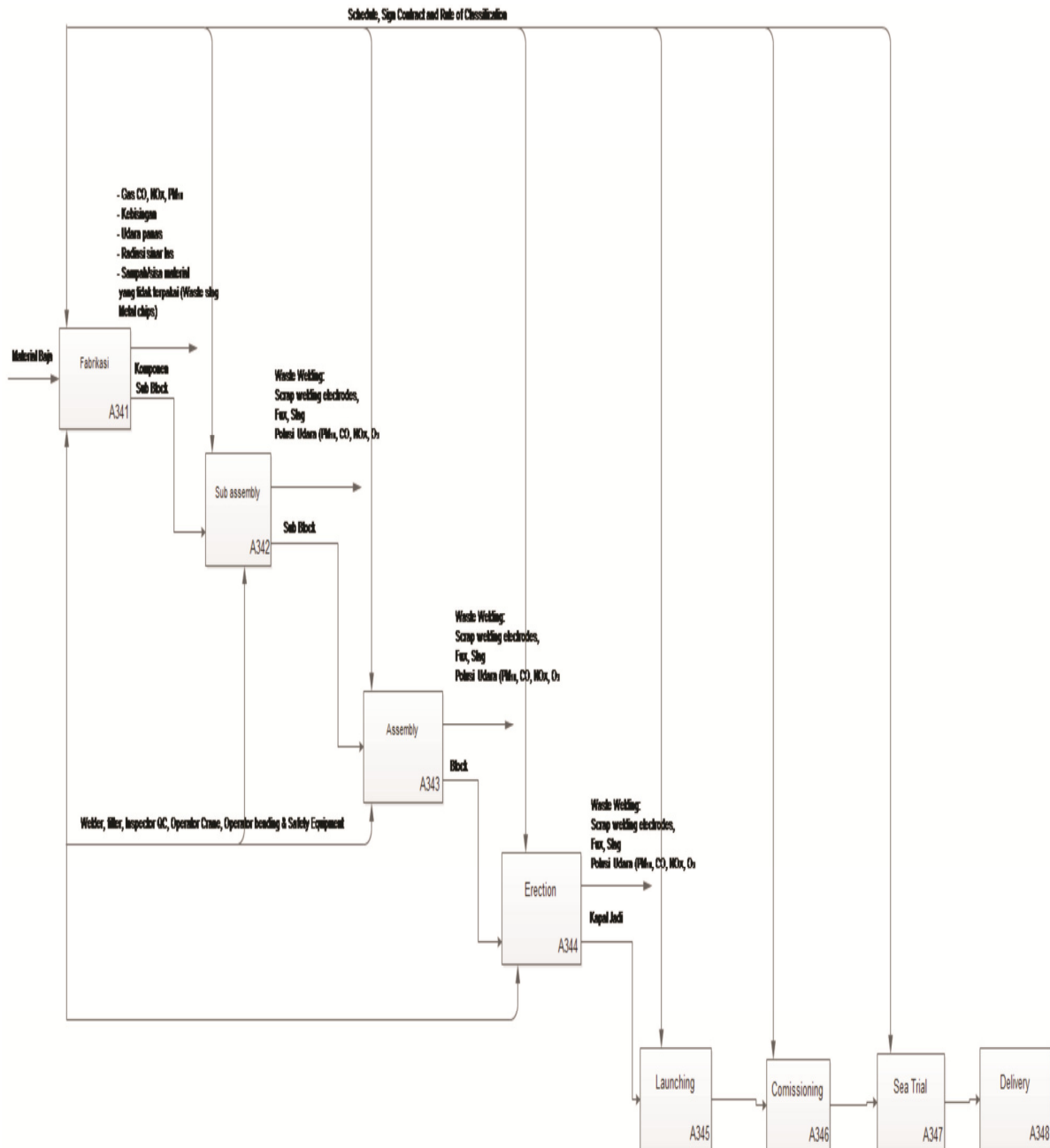


Figure 1. IDEF0 for Shipbuilding Life Cycle

IDEF0 for fabrication and Assembly Process in Shipbuilding Industry in East Java in figure 2.

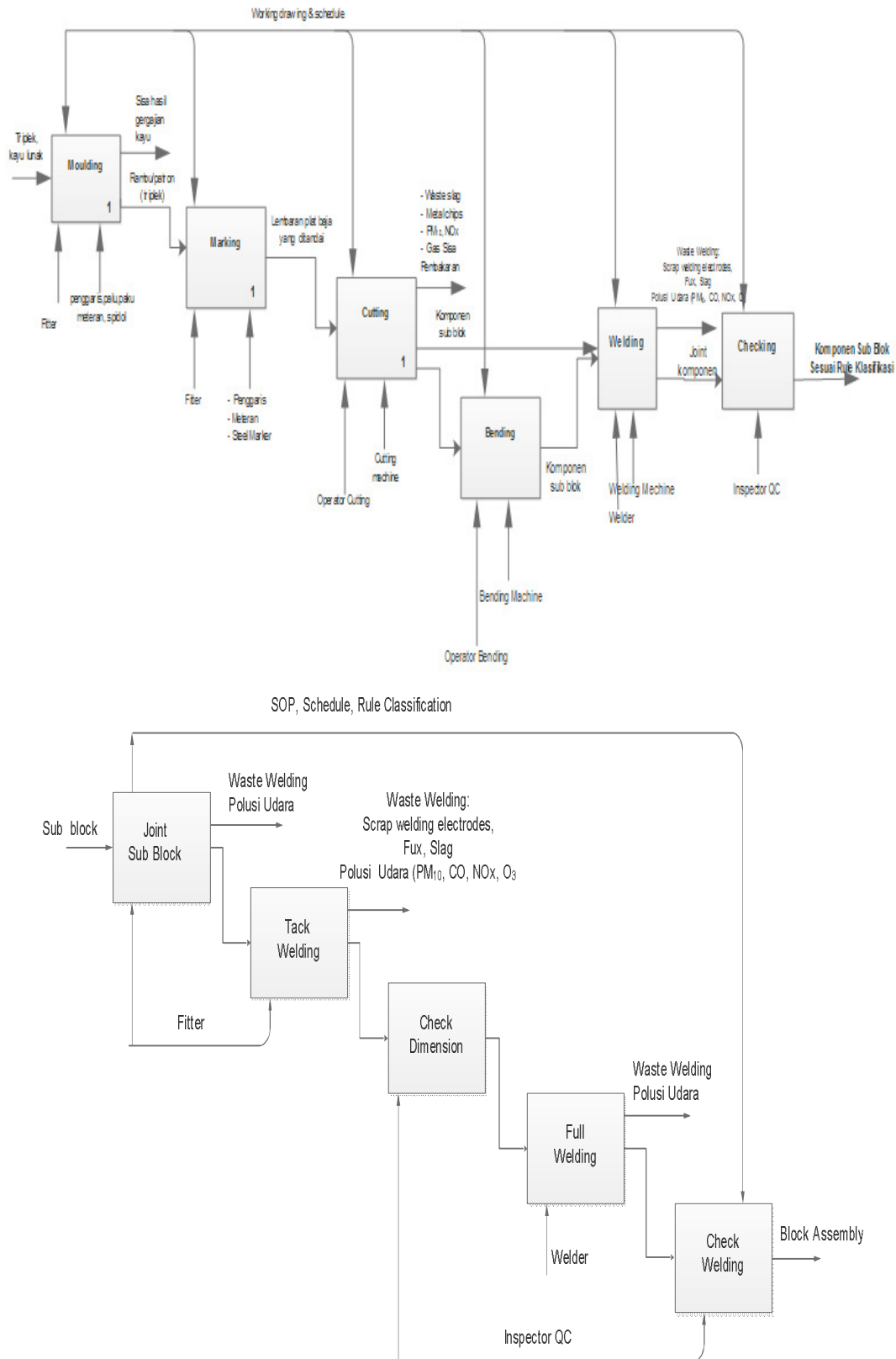


Figure 2. IDEF0 for fabrication and Assembly Process in Shipbuilding

## Eco-Ship Design

By integrating IDEF0, LCAModeling, methods of TRIZ, and Hirarchy Process Analytical methods, gained eco-ship design alternatives for the shipbuilding industry in Java Timur. Eco-innovation on the tanker carried out by: (1) adding the use of alternative energy, namely solar energy and LNG; (2) Design the bow-shaped hull; (3) double hull and triple bottom; (4) The advance-hull coatings etc. That eco-ship design have the environmental benefits that the use of resources more efficient, minimizing the use of non-renewable resources, reduction of pollutant emissions, reduction of waste production, contributing to sustainable development in the area of East Java.

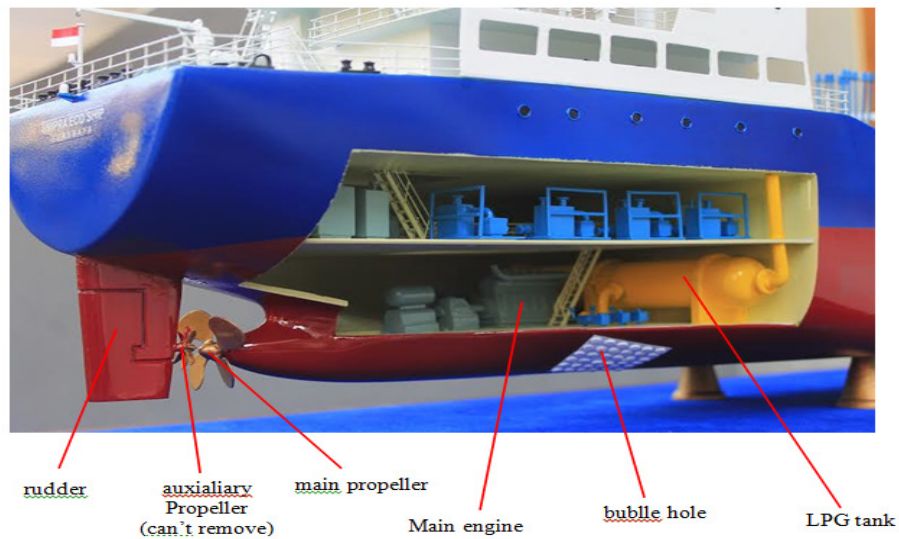


Figure 3. Engine Room Tanker 6500 DWT

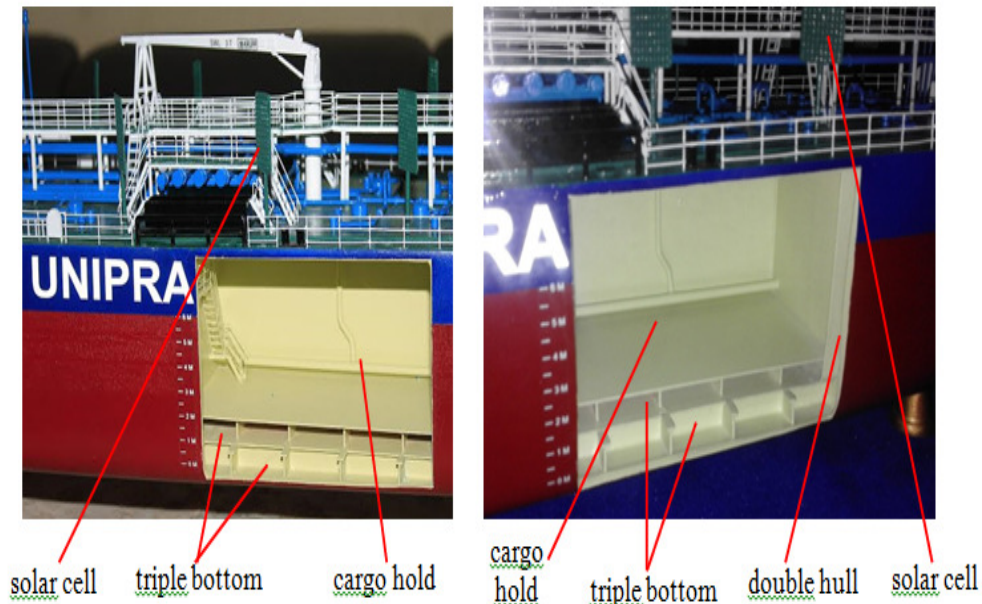


Figure 4. Hull Section of Tanker 6500 DWT



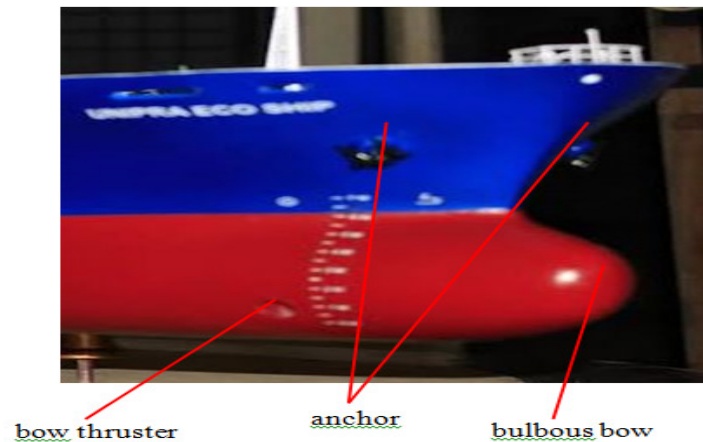


Figure 5. Bow of Tanker 6500 DWT



Figure 6. Tanker 6500 DWT – UNIPRA ECO SHIP

## SUMMARY

With the aim of supporting MP3EI program in Java economic corridor and in accordance with the new paradigm for international competitiveness, this study aims to develop eco-ship and Green Business Model Innovation in the shipbuilding industry in East Java to reduce the inefficiency of resources and capacity building shipyards, through the green platform. This study is expected to produce output as: 1) End-of-pipe solutions for the shipbuilding industry in East Java, 2) optimization model to minimize resource and a model of environmental management systems for the shipbuilding industry in East Java, 3. Development toolbox for eco-innovation that enable the involvement of SMEs in Industrial Shipbuilding East Jaa (. Gómez Navarro et al, 2005) as tools that exist today are relatively few that explicitly support eco-innovation activities in shipbuilding industry 4. Green Shipbuilding Design which enables the achievement of eco-efficiency and cleaner production in East Jawa Shipbuilding Industry.

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