BACHELOR THESIS & COLLOQUIUM – ME184841

Identification of Ferry Vessels Vulnerability Towards Fire Caused Accidents in Indonesia: Based on Actual Survey

Putu Gede Andhika Nidyatama
NRP. 04211541000051

SUPERVISOR :
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Ir. Hari Prastowo, M.Sc.

DOUBLE DEGREE PROGRAM
DEPARTMENT OF MARINE ENGINEERING
FACULTY OF MARINE TECHNOLOGY
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TUGAS AKHIR– ME184841

IDENTIFIKASI KERENTANAN KAPAL FERRY TERHADAP KEBAKARAN: BERDASARKAN SURVEY

Putu Gede Andhika Nidyatama
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INSTITUT TEKNOLOGI SEPULUH NOPEMBER
SURABAYA
2019

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APPROVAL FORM

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BACHELOR THESIS

Submitted to Comply One of the Requirements to Obtain Bachelor Engineering Degree

on

Marine Operational and Maintenance (MOM)
Bachelor Program Department of Marine Engineering
Faculty of Marine Technology
Institut Teknologi Sepuluh Nopember

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DECLARATION OF HONOR

I hereby who signed below declare that:

This bachelor thesis has written and developed independently without any plagiarism act. All contents and ideas drawn directly from internal and external sources are indicated such as cited sources, literatures and other professional sources.

Name	: Putu Gede Andhika Nidyatama
NRP	: 04211541000051
Bachelor Thesis Title	: Identification of Ferry Vessels Vulnerability Towards Fire Caused Accidents: Based on Actual Survey
Department	: Marine Engineering

If there is plagiarism act in the future, I will responsible and receive the penalty given by ITS according to the regulation applied.

Surabaya, July 2019

Putu Gede Andhika Nidyatama

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IDENTIFICATION OF FERRY VESSELS' VULNERABILITY TOWARDS FIRE CAUSED ACCIDENTS IN INDONESIA: BASED ON ACTUAL SURVEY

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ABSTRACT

Safe sea transportation has always been a major issue in Indonesia, with 14 fire accident occurred in 2017, an instrument to conduct vulnerability assessment is required. This research assess ferry vessel vulnerability towards fire by using Analytic Hierarchy Process (AHP). By using 7 criteria and 29 sub-criteria, a questionnaire has been distributed among the experts in sea transportation. A fire safety checklist is used to assess the ferry and ro-ro. The weight determination of each element has been determined, and it has been discovered that crew condition is the most important aspect. A ro-ro vessel observed in this research manage to score 0.765 out of 0 to 1 scale. The instrument in this research can be used to conduct an assessment towards a ferry vessel safety against fire before operating.

Keywords: Ferry, Fire, Vulnerability, Safety

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IDENTIFIKASI KERENTANAN KAPAL FERRY TERHADAP KEBAKARAN: BERDASARKAN SURVEY

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ABSTRAK

Transportasi laut yang aman selalu menjadi masalah utama di Indonesia, dengan 14 kecelakaan kebakaran pada tahun 2017, diperlukan instrumen untuk melakukan penilaian kerentanan. Penelitian ini adalah tentang menggunakan Analytic Hierarchy Process (AHP). Dengan menggunakan 7 kriteria dan 29 sub-kriteria, kuesioner telah didistribusikan di antara para ahli dalam transportasi laut. Daftar periksa keselamatan kebakaran digunakan untuk menilai feri dan ro-ro. Bobot tiap elemen telah ditentukan, dan kondisi kru adalah aspek yang paling penting. Sebuah kapal ro-ro yang diamati dalam penelitian ini berhasil mendapatkan skor 0,765 dari skala 0 hingga 1. Instrumen yang terdapat dalam penelitian ini dapat digunakan sebagai penilaian kerentanan kapal ferry terhadap api sebelom beroperasi.

Kata kunci: Ferry, Kebakaran, Keselamatan, Kerentanan

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PREFACE

First of all, I would like praise into the presence of God Almighty, which provided His grace so that the author can complete this bachelor thesis titled "Identification of Fery Vessels' Vulnerability Towards Fire Caused Accident: Based on Actual Survey". This bachelor thesis is written to fulfill the requirement to achieve Bachelor of Engineering Degree in Marine Engineering Department, Faculty of Marine Technology, Institut Teknologi Sepuluh Nopember and Hochschule Wismar.

There are many obstacles faced in completing this research. Comes also with a lot of experience and knowledge. This bachelor thesis teaches the author to have patience in a facing a lot of problem at the same time and believe that it can be completed with enough consistency. However, there are many inseperable factors in finishing this bachelor thesis. Therefore, the author would like to express the gratitude to:

1. Author's beloved parents and brothers for the unlimited support and funding.
2. Dr. Eng. M. Badrus Zaman, S.T., MT. as Head of Marine Engineering Department.
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13. Every former Double Degree Marine Engineering batch 2015 as fellow classmates during college.

14. Danika Clarafitri H., Arya Dwi Pamungkas, and Fauzan Rachmatullah who always accompany author during the ups and downs condition.
15. Luh Putu Anggita Baruna P as author's personal motivator and supporter.

The author would like to apologize for the imperfection of this thesis. Author hopes this thesis would provide knowledge and contributes more for every reader in scope of marine safety, most importantly ferry safety.

Surabaya, 31st July 2018

Author

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CHAPTER I
INTRODUCTION

1.1 Background Overview

Indonesia, the 4th world's most populated country is an archipelago with almost 260 million populations. With almost 17.000 island spread across the nation, sea transportation plays a major role in transporting passengers between the islands. **Figure 1** shows that the amount of passengers departing from 5 major ports in Indonesia from 2006 – 2018. Makassar port was the highest port with the number of departed passengers. While Tanjung Perak was the 2nd port that have the highest amount of departure. This means that quite amount of ferry has been entering and exiting the port. This makes Tanjung Perak an ideal survey location based on the number of ferry traffic.

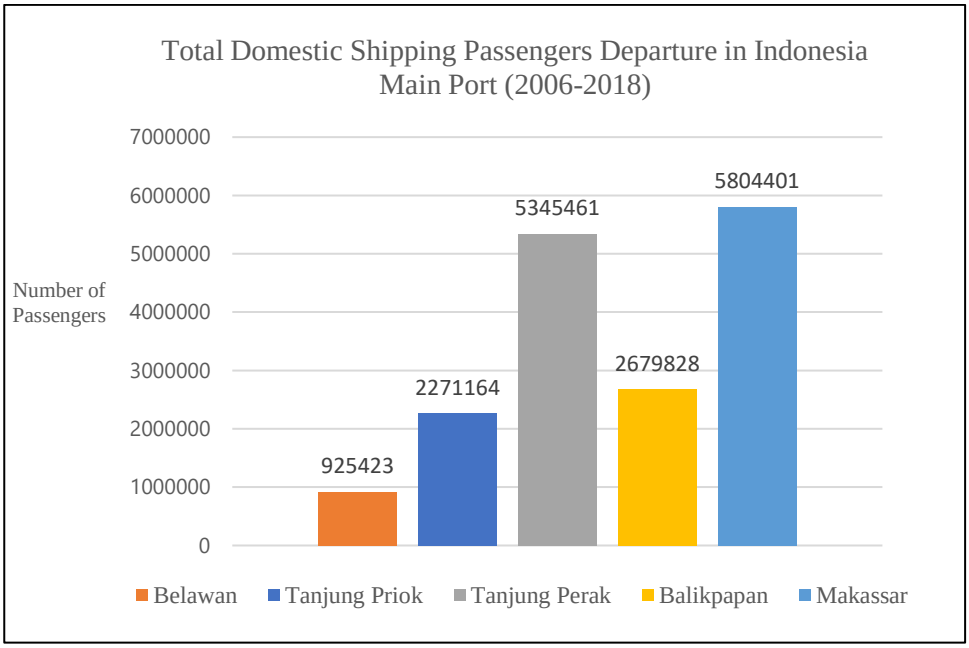

Figure 1.1.1 Domestic Shipping Passengers Departure in Indonesia Main Port

In **Figure 2,** shows that the amount of ferry accidents occurred in Indonesia. Fire-based accidents contribute the most among other type of accidents. While in 2017, 50% of fire-based accidents occurred on ferry vessels. These condition will rise up public opinion regarding the safety of ferry vessel in Indonesia. If this condition continues to persists, the passenger's life will be in immediate danger and this may tarnish Indonesia's name as a maritime country.

Table 1.1.1 KNKT Sea Transportation Accident Data 2012 - 2017

Year	Type of Accident					Total Accidents
	Sinking	Fire	Collision	Grounding	Others	
2012	0	2	2	0	0	4
2013	2	2	2	0	0	6
2014	2	3	2	0	0	7
2015	3	4	3	1	0	11
2016	6	4	3	3	2	18
2017	6	14	6	6	2	34
Total	19	29	18	10	4	80

As of early 2019, there is already a ferry fire accident happened in Indonesia waters. Precisely, near Merak Port. With the investigation still proceeding, many sea transportations passengers' life is at stake, and an immediate preventive action is required. There must be an assessment or audit taken to verify ferry vessels' vulnerability towards fire-based accidents to prevent ferry accidents from happening again in Indonesia.

1.2 Research Problems

Based on the background above, the problems are:

a. How to determine and measure ferry vessels' vulnerability towards fire-based accidents?
b. How much impact does each safety measures items has on the ferry vessels ability to deal with fire-based accidents?
c. How to assess the risk of fire in ferry vessels?

1.3 Research Limitations

These final project limitations are:

a. The weather and environment caused accidents will not be in this research consideration.
b. The research object is limited into ferry and ro-ro passenger vessels.
c. Guidelines used in this research will be SOLAS and IMDG Code.
d. The passengers' behaviour will not be in this research consideration.

1.4 Research Objectives

Based on the problems mentioned above, the objectives of this final project are:

a. To determine and measure ferry vessel's vulnerability towards fire-based accidents.
b. To determine the impact of each safety measures items has on the ferry vessels ability to deal with fire-based accidents.

c. To create an instrument to assess the risk of fire in ferry vessels.

1.5 Research Benefits

The final project is expected to give benefits for the various kind of parties. The benefits that can be obtained are:

a. Provides an instrument which can be used to assess ferry vessels vulnerability towards fire-based accidents.
b. Provides a knowledge of the impact in every safety measures items on a ferry vessels ability to deal with fire-based accidents.
c. Provides an information on which party are liable for ferry vessels fire accidents.

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CHAPTER II
LITERATURE STUDY

2.1 Problem Overview

In **Figure 2.1.1**, it shows the fire accidents location in Indonesia. It is mainly located in eastern and middle side of Indonesia. The cause of the fire will be listed in the table below, as well as the most updated investigation report.

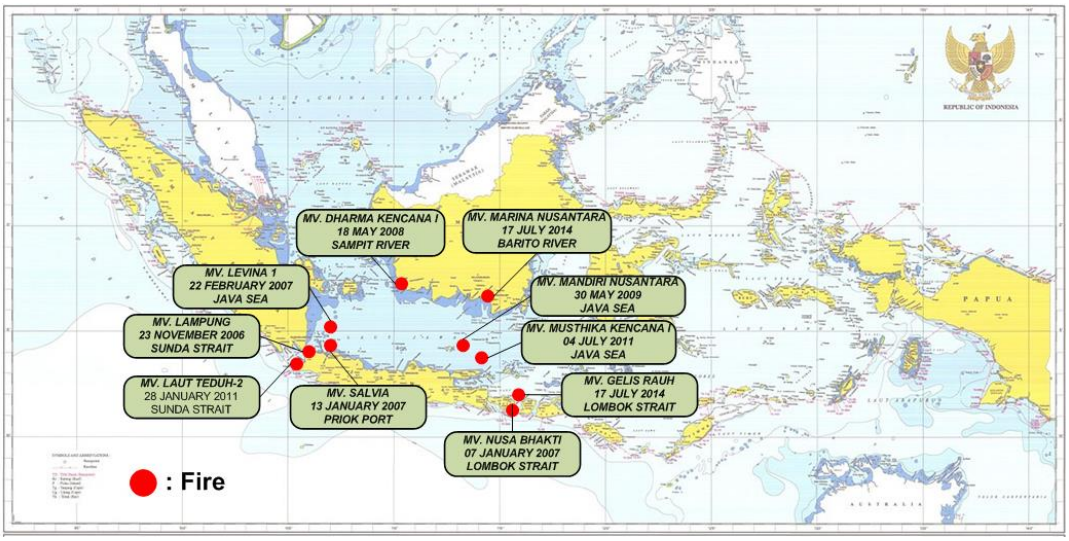

Figure 2.1.1 Cases of Fire On Board Ferry Ropax in Indonesia (2006-2014)
(Source: Aleik Nurwahyudy, 2015)

Table 2.1.1 Summary of Ferry Vessel Fire Accident in Indonesia

No.	Date of Occurrences	Vessel Name	Location	Cause
1	13 January 2007	KMP. Nusa Bhakti	5.25 mile from Padang Bai (Bali)	Short Circuit Connection in Engine Room and non-marine cable usage. Supported by dysfunction of safety fuse which burns fuel filter and indicator panel in M/E no. 2 at starboard.
2	22 February 2007	KM. LEVINA	40 mile from Tanjung Priok (Jakarta)	There is a fire spark which comes from a passenger who smoke and lit the dangerous goods on the truck
3	18 May 2008	KMP. Dharma Kencana	Sungai Mentaya Hilir	The fire and smoke in rolls in windlass start spreading into the floor of the passenger's deck which was covered by vinyl, carpet and wood for the passenger's bed.
4	29 October 2017	Dharma Kencana II	Java Sea	There is a possibility that a truck with license plate 1610 starts the fire. The inspection couldn't be done due to the vessel has sink and there are some nonconformity between the ocean freight forwarding and the manifest on-board.

No.	Date of Occurrences	Vessel Name	Location	Cause
5	17 July 2014	Gelis Rauh	Lombok Straits	The fire starts from a cargo inside a truck. Distance between each vehicle was too narrow so the crew cannot reach the source of fire. There is also a case where the height of the vehicle blocks the sprinkle's work.
6	04 July 2011	Mustika Kencana II	45 mile off Masalembo Besar Island	Fire spreads out from a refrigerated truck. The number of truck crossing from Tanjung Perak Port was over volume. The trucks mostly have over mounted which potentially leads to overload. These condition makes the car deck really crowded and tight. The sprinkle will not be effective due to the height of the over mounted trucks.
7	05 May 2017	KM. Asia Prima I	Nilam Barat, Tanjung Perak Surabaya	There is a cracked fuel valve that causes a fuel leak to become gas on the port side of the ship and, the gas filled the junction box that is placed on top of fuel tank
8	12 July 2017	Pekan Fajar	28 miles of Laut Selatan Bawean, Jawa Timur	There is leakage of exhaust gas flange pipe which caused thermal oil bursts and hit on the surface of the exhaust gas pipe which is not covered by heat resistant
9	13 July 2017	Amelia	Around Paotter Port	The fire spark caused by short circuit connection between battery polar that connected when the port generator started, and burning combustible material around of port generator
10	11 April 2010	KM. Gemilang Ex. MV. Shinko Maru No.5	Dermaga Kade 103 pelabuhan Sukarno Hatta, Makassar	The accumulation of saturated gas which is a mixture of fuel evaporation in the floor of the engine room with LPG gas then triggered by cigarette lighters held crew members working at the scene.
11	21 February 2017	KMP. Caitlyn ex Super Shuttle Ferry 25	Area labuh jangkar Pelabuhan Merak	The electrical sockets on the electric griddle (which allegedly contained cooking oil) were attached to a power outlet, where the electric griddle was not equipped with a safety temperature, so the temperature in the electric griddle was higher so that it reached its own flash point and then struck the surrounding area on the ship
12	01 January 2017	KM. Zahro Express	sekitar perairan Utara Teluk Jakarta atau sekitar 3 mil dari dermaga Muara Angke	The existence of heat arising from the condition of the generator that is not operating properly and the exposure of the remnants of fuel in the engine room results in a fire which because there is no adequate prevention and fire suppression system, the fire enlarges and burns the ship.

No.	Date of Occurrences	Vessel Name	Location	Cause
13	14 March 2017	KM. Cantika Lestari 77	Di Sekitar Perairan Galangan Kapal PT. SPAS, Bitung, Sulawesi Utara	The presence of heat arising from a spark in the process of cutting the extension plate of the deck 2 port side that has been porous by using a gas cutter combination of oxygen and LPG gas from KM. Geovani who entered through the side scuttle that was open on the side of the ship's hull between frame spacing number 62-63 on the starboard side so that it hit the stack of mattresses on the bed in the right main deck accommodation room
14	15 September 2016	Gili Cat II	Sekitar Padangbai, Karang Asem, Bali	There is saturated gas from the fuel that leaked through the fuel outlet. Poorly maintained outlet conditions and cracks in the joints cause leaks that consistently flow up to the room under the deck. The composition of the saturated gas is formed so as to create an environment with a high potential for fire.
15	15 October 2016	SB Bintang Fajar	Dermaga Jailolo, Halmahera Barat, Maluku Utara	The burning of outboard engine number two, where the fire that arises is most likely due to a premium fuel leak on the engine when pumped manually. As a result of the leak, the premium will quickly turn into gasoline vapour which then mixes with the air. The gasoline vapour which has been mixed with the air is burned after being ignited by the fire spark when the engine starts.
16	07 August 2018	Molise	Perairan P. Padar	The explosion of the portside outboard motor engine of Molise was caused by hot-fuelled steam ignited by heat. Steam fuel comes out of the fuel duct system due to a gap between the hose and the connecting pipe.
17	25 May 2018	SPOB Srikandi 511	Pelabuhan Kuin, Terminal BBM Jetty III Pertamina, Banjarmasin	The fire that occurred on the river surface due to the gasoline type spill. The blazing fire on the surface of the water spreads to Jetty III Pertamina and burned the SPOB Srikandi ship 511 and 6 (six) other ships including local residents traditional ships
18	22 August 2013	KM. Express Bahari 8C	Perairan Selat Nasik	There was an open fire in the form of cigarette butts that hit a pile of chicks loaded in the stern of the upper deck.
19	08 February 2011	KM. SALVIA	Perairan Sekitar P. Damar, Kep. Seribu, Jakarta	There is a leak in the exhaust gas manifold connection as the lighter of fuel saturated gas produced from a high-pressure fuel pipe leak around the cylinder no. 1 and 2 portside main engine

No.	Date of Occurrences	Vessel Name	Location	Cause
20	28 January 2011	KMP. LAUT TEDUH-2	Perairan Sekitar P. Tempurung, Selat Sunda, Banten	The fire starts from a vehicle in one of the buses on the Lower Car deck. It is indicated that the fire was triggered from a short circuit in the bus electrical system and air conditioning system when the bus engine was on. Then it starts the fire on the bus and spread to other vehicles that were on the lower car deck.
21	30 May 2009	KM. Mandiri Nusantara	Perairan Keramian, Bawean	The occurrence of fire is made possible by external sources and the presence of combustible loads that are in a tarp-covered vehicle. This fire may be triggered by an external source as well as sparks of short electrical connections or cigarette butts.

Table 2.1.1 points out most ferry vessel fire accidents occurred in Indonesia since 2007. All of the data summarized are taken from Indonesia KNKT Final Investigation Reports. Among 21 cases, there are 9 cases which happens due to machinery failure, 5 cases due to inappropriate human behaviour, 5 cases happens because of vehicle in terms of goods and vehicle failures, while the other 2 happens due to other reasons.

2.2 Fire Theory

2.2.1 Fire Triangle

There are 3 elements which must be present at the same time in order for a fire to start. These 3 elements are:

1. Fire
   Any combustible material (liquids, solids, and flammable gas). Most solids and liquids will vaporize before they will burn.
2. Oxygen
   Sufficient oxygen must be present in the atmosphere surrounding the fuel for fire to burn. This oxygen must be present in the air, or may come in oxidising substances.
3. Heat
   Sufficient heat energy such as hot surfaces, electrical equipment, smoking or naked lights must be applied to raise the fuel to its ignition temperature.

Figure 2.2.1 Illustration of Theory of Fire
(source: www.fireriskuk.com)

Fire is a chemical reaction involving rapid oxidation (burning) of fuel. The combination of these three elements is commonly known as "fire triangle". Any removal of these elements will be an extinguishers or even no fire at all. Fire extinguishers may remove one or more elements of the fire elements. **Figure 1** shows that the 3 elements that starts a fire.

2.2.2 Tetrahedron Theory

In further research of fire theory, it is determined that a fourth element, a chemical chain reaction was an important element of fire. It can be described as a pyramid which have a solid four plane faces.

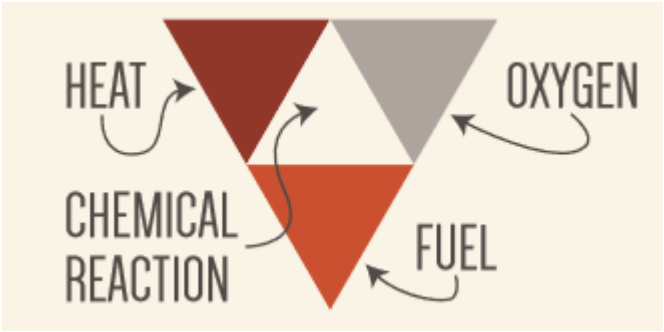

Figure 2.2.2 The Fire Tetrahedron
(Source: Fire Safety Infographic by PEC Safety)

As in **Figure 2**, the all four elements must be present for fire to occur. Any removal of these elements will result in fire being extinguished. The four elements has its own function such as:

1. Oxygen to sustain combustion.
2. Heat to raise the material to its ignition temperature.
3. Fuel or combustible material
4. Exothermic chemical reaction.

Theoretically, fire extinguishers may put out fire by taking away one or more elements of the fire tetrahedron.

2.2.3 Stages of Fire

In International Fire Service Training Association (IFSTA) there are 4 stages of fire. These stages will be described in Figure 3.

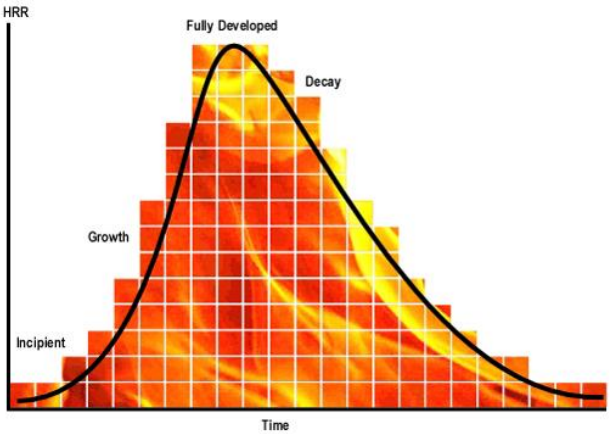

Figure 2.2.3 Stages of Fire
(Source: www.journeytofirefighter.com)

1. Incipient
   The first stage begins when heat, oxygen, and fuel source combined and begin having a chemical reaction. This phase is commonly known as “ignition”. It is represented in a very small fire, which usually goes out on its own before any following stages are reached. This stage of fire provides the best chance at suppression.
2. Growth
   The growth stage is when the structure fire load and oxygen are used as fuel for the fire. There are numerous factor affecting the growth of fire. It is during this stage where a deadly flashover may occur. Either trapping, injuring or killing the firefighters.
3. Fully Developed
   This stage occurs when the growth stage has reach its max and all combustible materials have been ignited. This stage is the hottest phase of a fire and most dangerous for anybody trapped within.
4. Decay
   Decay is the longest stage of fire. This stage can be determined when a significant decrease of oxygen or fuel. Two common dangers during this stage are first, the existence of non-flaming combustibles, which can potentially ignite a new fire if not fully extinguished. Second, the danger of a backdraft when oxygen is reintroduced to a volatile, confined space.

2.2.4 Fire Classifications

Fire classifications commonly indicated as A, B, C, D and F (or K). According to IMO, there are currently two standards which may define classes of fires according to the nature of the material undergoing combustion, as follows:

Table 2.2.1 Comparison between ISO 3941 and NFPA 10

International Organization for Standardization (ISO Standard 3941)	National Fire Protection Association (NFPA 10)
Class A: Fires involving solid materials, organic nature	Class A: Fires in ordinary combustible materials (e.g wood, cloth, paper, rubber and many plastics)
Class B: Fires involving liquids or liquefiable solids	Class B: Fires in flammable liquids, oils, greases, tars, oil base paints, lacquers and flammable gases
Class C: Fires involving gases	Class C: Fires which involve energized electrical equipment where the electrical non-conductivity of the extinguishing medium is of importance.
Class D: Fires involving metals	Class D: Fires in combustible metals (magnesium, titanium, zirconium, sodium, lithium and potassium)
Class F: Fires involving cooking oils	Class E: Fires involving cooking grease, fats and oils

2.2.5 Fire Extinguishers

Table 2.2.2 Types of Fire Extinguishers

Extinguisher Type	Type of Fire				
	Solids (wood, paper, cloth, etc.)	Flammable Liquids	Flammable Glasses	Electrical Equipment	Cooking Oils & Fats
Water	Yes	No	No	No	No
Foam	Yes	Yes	No	No	Yes
Dry Powder	Yes	Yes	Yes	Yes	No
Carbon Dioxide	No	Yes	No	Yes	Yes

2.3 Safety of Life at Sea (SOLAS)

Safety of Life at Sea has its own purpose of regulating fire safety. The objectives are:

1. Prevent the occurrence of fire and explosion
2. Reduce the risk to life caused by fire
3. Reduce the risk of damage caused by fire to the ship, cargo, and the environment
4. Contain, control and suppress fire and explosion in the compartment of origin
5. Provide adequate and readily accessible means of escape for passengers and crew.

2.4 The International Code for Fire Safety System (FSS Code)

The purpose of this Code is to provide international standards of specific engineering specifications for fire safety system required by chapter II-2 of the International Convention for the safety of Life at Sea (SOLAS) 1974, as amended. This chapter will discussed and explain every standards required.

2.4.1 International Shore Connection

This chapter details the specification for international shore connections. The standard dimensions of flanges for the international shore connection are shown in **Table 2.2.3.**

Table 2.4.1 Standard dimensions for international shore connections

Description	Dimension
Outside diameter	178 mm
Inside diameter	64 mm
Bolt circle diameter	132 mm
Slots in flange	4 holes, 19 mm in diameter
Flange thickness	14.5 mm (minimum)
Bolts and nuts	4, each of 16mm diameter, 50mm in length

For the materials, international shore connections shall be of steel or equivalent material and designed for $1N/mm^3$ services. It is also mandatory to be attached to a coupling that will fit the ship's hydrant and hose.

2.4.2 Personnel Protection

This chapter details the specification for personnel protection as required by chapter II-2 of the convention.

2.4.2.1 Fire-fighter's outfit

Personal equipment shall consists of the following:

1. Protective clothing of material to protect the skin from the heat radiating from the fire and from burns and scalding the steam. The outer surface shall be water-resistant.
2. Boots of rubber or other electrically non-conducting material
3. Rigid helmet providing effective protection against impact
4. Electric safety lamp of an approve type with a minimum burning period of 3 hours.
5. Axe with a handle provided with high-voltage insulation

2.4.2.2 Breathing Apparatus

The volume of air contained in the cylinders shall be at least 1,200 *l.* or shall be capable of functioning for at least 30 minutes. All air cylinders for breathing apparatus shall be interchangeable.

2.4.2.3 Emergency escape breathing devices (EEBD)

EEBD can only be used to escape from a compartment that has a hazardous atmosphere and shall be of an approved type. It shall must not be used for fighting fires, entering oxygen voids or tanks, or worn by firefighters.

It is also mandatory to have a service duration of at least 10 minutes. The EEBD shall consists of a hood of full face piece, to protect eyes, nose and mouth during escape.

2.4.3 Fire Extinguisher

All fire extinguishers shall be of approved types and designs based on the guidelines developed by the Organization.

2.4.3.1 Fire Extinguisher

Powder or carbon dioxide extinguisher must have at least 5 kg and each foam extinguisher must have at least 9 *l* capacity. The mass of all portable fire extinguishers must not exceed 23 kg and have a fire-extinguishing capability at least equivalent to that of a 9 *l* fluid extinguisher.

2.4.3.2 Carbon dioxide systems

For machinery spaces the quantity of carbon dioxide shall be sufficient to give a minimum volume of free gas equal to the larger of the following volumes, either:

1. 40% of the gross volume of the largest machinery space so protected, the volume to exclude that part of the casing above the level at which the horizontal area of the casing is 40% or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casing
2. 35% of the gross volume of the largest machinery space, including the casing

For the controls, carbon dioxide systems shall comply with the following requirements:

1. Two separate controls shall be provided for releasing the carbon dioxide into a protected space and to ensure the activation of the alarm. One control shall be used for opening the valve of the piping which conveys the gas into the protected space and a second control shall be used to discharge the gas from its storage containers.
2. The two controls shall be located inside a release box clearly identified for the particular space. If the box containing the controls is to be locked, a key to the box shall be in a break glass-type enclosure conspicuously located adjacent to the box.

2.4.4 Automatic Sprinkler, Fire Detection and Fire Alarm Systems

There shall be not less than two sources of power supply for the sea water pump and automatic alarm and detection system. Where the sources of power for the pump are electrical, these shall be a main generator and an emergency source of power.

2.4.4.1 Sprinkles

Sprinkles shall be grouped into separate sections. In passenger ships, any section of sprinkles shall not serve more than two decks and shall not be situated in more than one main vertical

zone. A test valve must be provided to test the automatic alarm for each section of sprinkles by a discharge water equivalent to the operation of one sprinkler. The test valve for each section shall be situated near the stop-valve for that section.

The sprinkler system must have a connection from the ship's fire main by way of a lockable screw down non-return valve at the connection which will prevent a backflow from the sprinkler system to the fire main.

Sprinkles shall be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 51/m^2/min over the nominal area covered by the sprinkles.

2.4.5 Fixed Emergency Fire Pumps

The emergency fire pump shall be of a fixed independently driven power operated pump. The capacity of the pump shall not be less than 40% of the total capacity of the fire pumps required by regulation II-2/10.2.2.4.1 of the Convention and in any case not less than 1000 gross tonnage for passenger ships.

Any diesel-driven power source for the pump shall be capable of being readily started in its cold condition down to the temperature of 0°C by hand (manual) cranking. If hand (manual) starting is impracticable, the Administration may permit other means of starting. These means shall be such as to enable the diesel-driven power source to be started at least six times within a period of 30 minutes at least twice within the first 10 minutes.

2.4.6 Fire Suppression

The first thing to do before suppressing a fire is to detect a fire. In that way, this regulation marks to detect a fire in the space of origin and to provide alarms for safe escape and firefighting activity. As such, a fixed fire detection and fire alarm system shall be installed in machinery spaces and main sources of electrical power for the protection of machinery spaces.

Smoke detectors shall be installed in all stairways, corridors, and escape routes within the accommodation spaces. In passenger ship carrying more than 36 passengers, a fixed fire detection and fire alarm system shall be so installed and arranged in service spaces, control stations and accommodation spaces. Smoke detectors doesn't need to be installed on spaces having little or no fire risks such as voids, public toilet, carbon dioxide room or even galleys.

2.5 Survey

An actual survey will be conducted to support this research. Actual survey will be able to determine the real condition on the ferry port. The ideal way of loading and unloading vehicles into a ferry shall be as in the Figure below.

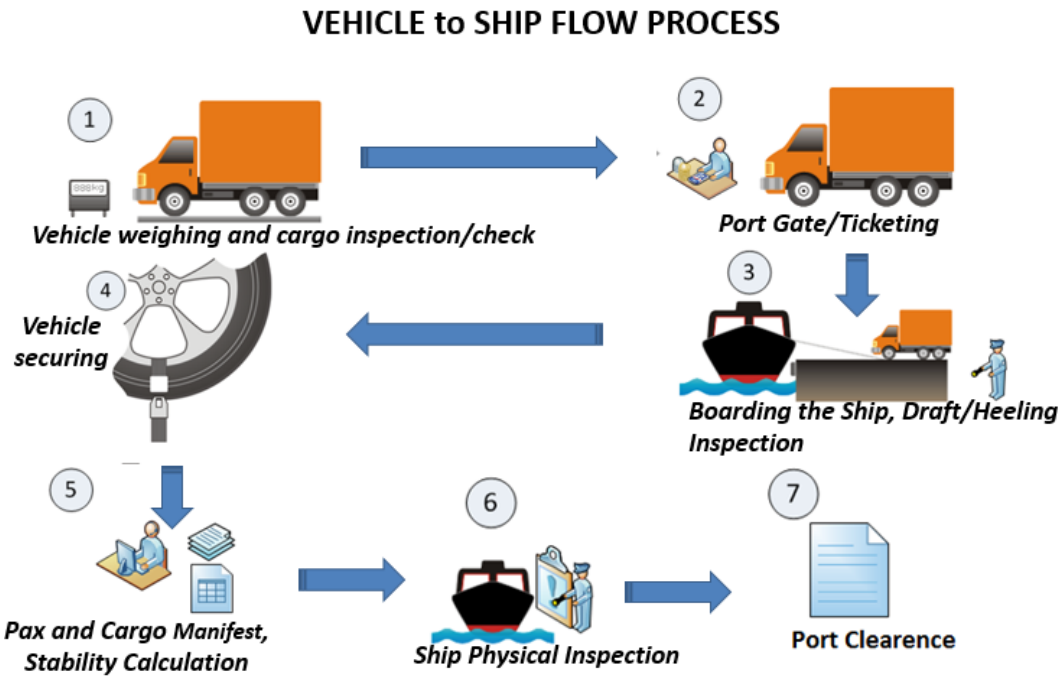

Table 2.5.1 Ideal Vehicle to Ship Flow Process
(Source: Aleik Nurwahyudy, 2015)

2.5.1 Survey Location

The survey location will take place in Tanjung Perak Port. The information regarding Tanjung Perak Port may be seen as below.

Table 2.5.2 Tanjung Perak Port Map
(Source: www.pelindo.co.id)

Tanjung Perak Port is located in Surabaya, East Java. With a port size approximately 1574 Ha, and 545 Ha land area, Tanjung Perak Port become the 2nd highest port traffic in Indonesia after Port of Tanjung Priok Jakarta.

2.6 Analytic Hierarchy Process

Analytic Hierarchy Process is a general theory of measurement. It is used to derive ratio scales from both discrete and continuous paired comparisons. The AHP has a special concern with departure from consistency, its measurement and on dependence within and between the groups of elements of its structure. It has found its widest applications in multi-criteria decision making, planning and resource allocation. In 1987, Saaty R. W. introduced a paper called “The Analytic Hierarchy Process – What it is and how it is used”.

AHP uses judgement of decision makers to form a decomposition of problems into hierarchies. Problem complexity is represented by the number of levels in the hierarchy which combine with the decisions-makers model of the problem to be solved. The hierarchy is used to derive ratio scaled measures for decisions alternatives and the relative value that alternative against goals and project risks. AHP uses matrix algebra to sort out factors to arrive at a mathematically optimal solution.

AHP is one of the most inclusive system is considered to make decisions with multiple criteria because this method gives to formulate the problem as a hierarchical and believe a mixture of quantitative and qualitative criteria as well.

In 2018, Ping P., Wang K., Kong D., and Chen G., discuss about estimating probability of success of escape, evacuation, and rescue (EER) on the offshore platform by integrating Bayesian Network and Fuzzy AHP. In this paper, the quantitative analysis model is proposed by integrating FTA and BN with Fuzzy AHP to estimate the probability of success of EER in offshore platform accidents.

In making a decision, the decisions must be decomposed into several steps, which are:

1. Define the problem and determine the knowledge
2. Structure the decision hierarchy from the top with the goal of the decision, then the objectives from a broad perspective, through the intermediate levels
3. Make a set of pairwise comparison matrices. Each element in an upper level is used to compare the elements in the level immediately below with respect to it
4. Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below

To develop comparisons, a scale of number is needed to indicate how many times each elements are more important than one element with respect to the criterion or to which they are compared. **Table 2.6.1** explains the scale.

Table 2.6.1 The fundamental scale of absolute numbers

Intensity of Importance	Definition	Explanation
1	Equal Importance	Two elements contributes equally to the objective
3	Moderate Importance	Experience and judgement slightly favor one element over another
5	Strong Importance	Experience and judgement strongly favor one element over another
7	Very Strong Importance	An element is favored very strongly over another, its dominance demonstrated in practice
9	Extreme Importance	The evidence favoring on element over another is of the highest possible order affirmation

2.6.1 Develop Analytic Hierarchy Process Structure

Structuring the decision hierarchy will help the process of decision making which covers most of almost every elements involved in a system. A hierarchy in AHP is a set of elements which are formed into levels. **Figure 2.6.1** will determine the AHP structure.

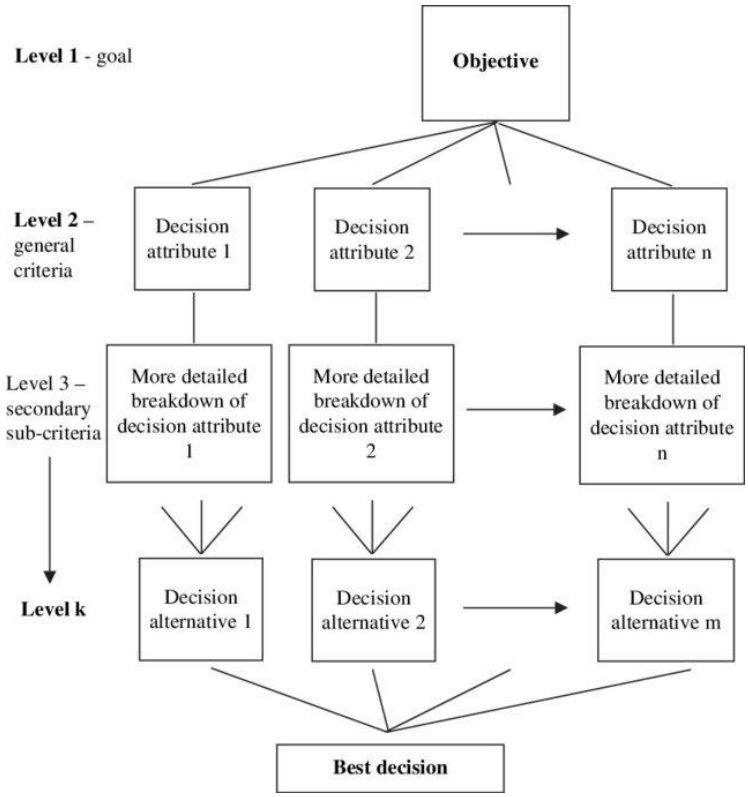

Figure 2.6.1 Typical AHP Structure
(Source: Gabriel Jacobs, 2005)

2.6.2 Develop Priorities

Every elements in AHP needs their relative weight be between one another. The objective is to determine the level of importance between the involving elements in the criteria, the structure or the whole system.

The first step conducted is to develop a pairwise comparison for all the criteria, or the sub-criteria. The comparison is then transformed into a matrix so a mathematical analysis can be done. An example of a pairwise comparison matrix can be seen in Table XX.

Table 2.6.2 Pairwise Comparison Matrix

Goals				
Criteria	A	B	C	D
A				
B				
C				
D				

2.6.3 Group Decision Making

Analytic Hierarchy Process (AHP) can also be distributed into a group of experts or professionals. More insight and knowledge may lead to a new understanding towards a problem with different point of view.

By using AHP in a group, every group member may define the opinion and decision by filling a questionnaire distributed to each of the group member. The final outcome may be determined by calculating the geometric mean. To calculate the geometric mean, each of the value must be multiplied, and the result will be square rooted depending on the number of respondents. The equation can be seen below.

$$G = \sqrt[n]{X_1 \times X_2 \times X_3 \dots X_n} \tag{2.1}$$

Where:
G = Geometric Mean
X_1, X_2, X_3, X_n = Respondent answer no. 1, 2, 3 … n
n = Number of Respondents

CHAPTER III
METHODOLOGY

3.1 Methodology Flow Chart

The methodology flow chart shows all the steps for this final project research. The steps for this methodology are shown in Figure 3.1.1.

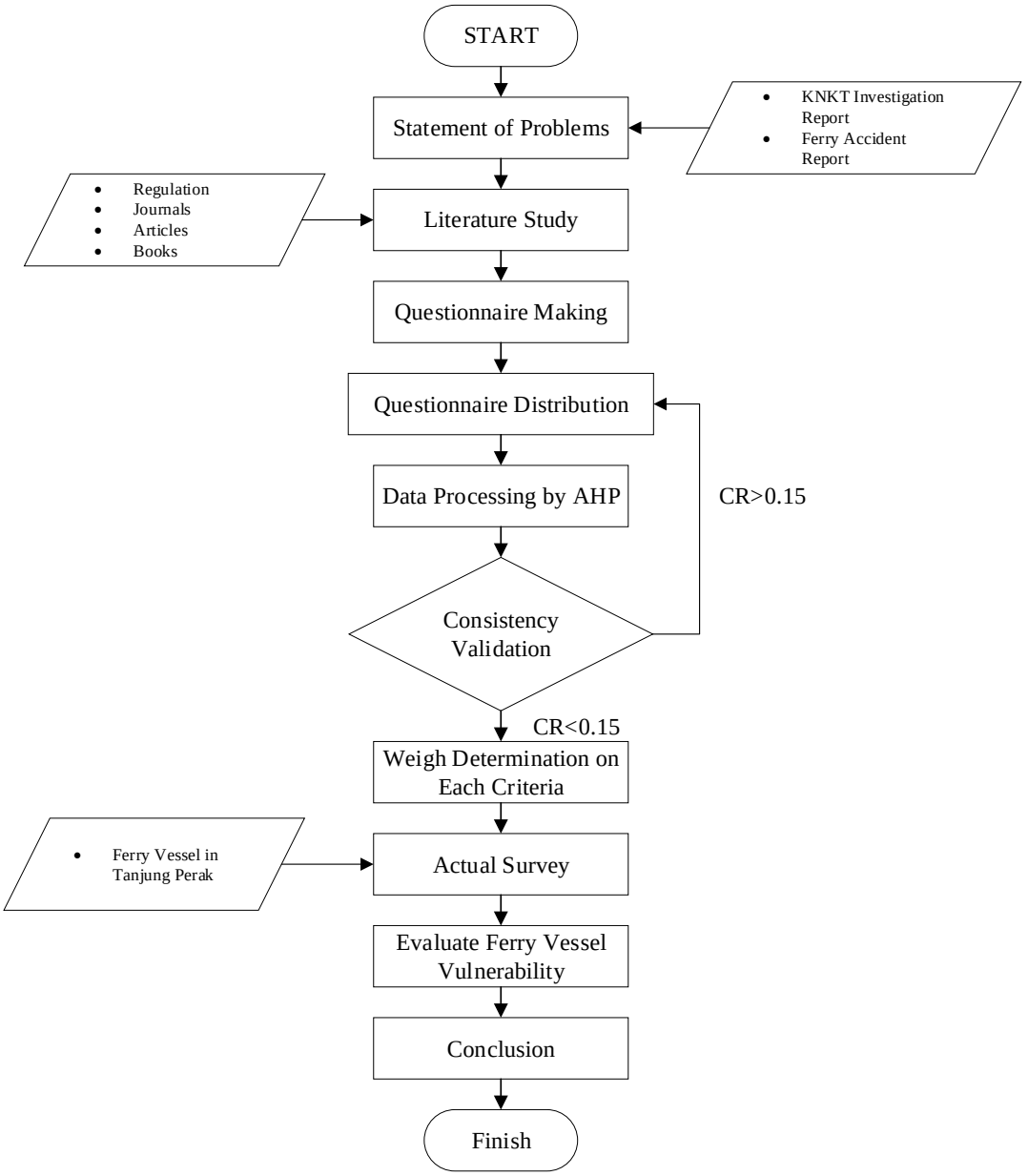

Figure 3.1.1 Methodology Flowchart

3.2 Statement of Problems

The first step of methodology used in this final project is to define the problems regarding the fire accidents of ferry vessels in Indonesia. This research will focus on ferry and ro-ro passenger vessels. This will allow a better assessment in finding the vulnerability of ferry vessel towards fire-based accidents.

In this final project, the ferry vessel will be surveyed and its vulnerability towards fire accidents will be measured.

3.3 Literature Study

The literature study step is to explain and gain knowledge from basic theories until experimental references and information regarding this research. The literature collected are mainly from:

1. SOLAS 74/78
2. International Journals
3. KNKT Final Investigation Report
4. FSS Code

3.4 Questionnaire Making

Questionnaire making process is the key to define the relative weight of each criteria and sub-criteria. The questionnaire will consist of 7 criteria and 26 sub-criteria. This is to support the input of AHP method.

3.5 Questionnaire Distribution

The next step after the questionnaire has been finalized is to distribute the questionnaire to parties that are reliable regarding marine transportation safety, which is: The Indonesia National Transportation Safety Committee, Maritime Department.

3.6 Data Processing by AHP

After the questionnaire has been distributed among the professionals, it is stated before that each criteria and sub-criteria has its own scale. The average value of the response from the questionnaires will be calculated by calculating the geometric mean because a number of professionals are involved in determining the relative weight of each criterion. From the result of the questionnaire data processing.

3.7 Consistency Validation

Analytical Hierarchy Process measures the overall consistency of the input from a lot of considerations by determining the consistency ratio (CR). The value of consistency ratio (CR) must be lower than 0.1.

3.8 Weight Determination on Each Criteria

In this step, the result of AHP method will form a score sheet with each criterion have its own weight over one another.

3.9 Actual Survey

Actual survey will be conducted in Tanjung Perak Port, for domestic departures ferries. The actual survey will examine based on the score sheet developed.

3.10 Evaluate Ferry Vessel Vulnerability

Ferries that was surveyed will be taken for vulnerability assessment. The vulnerability assessment will determine each ferries scores against one another by comparing the result of the actual survey and the weight determination from the AHP method earlier.

3.11 Conclusion

In the end of this final project, a conclusion will be made from every steps that was conducted. The conclusion was reformed as an answer to every problem stated in this final project and a conclusion to every process and data processing done in this final project. A suggestion will also be mentioned in this step as an advice for any projects in the future, or as a solution to any existing problems.

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CHAPTER IV
RESULT AND DISCUSSION

In this chapter, the result will be analyse and discussed. The first thing which will be discussed is the determination of criteria and sub criteria. After the criteria and sub-criteria, the ahp structure will be explained. Then calculating the weight determination of each criteria and sub-criteria. The calculation of weight determination will involve the Expert Choice software. The output of the software will defined the weight determination which will be used to calculate the vulnerability analysis in an actual survey on a ferry and ro-ro vessel taken as a sample. A survey result will also be discussed in this chapter.

4.1 Criteria and Sub Criteria Determination

Determining the criteria is done by evaluating the Indonesia's National Transportation Safety Committee investigation on ferry vessel accidents and by the Fire Safety application from LR – UK P&I application. The criteria and sub-criteria are:

1. Crew
   Crew is one of the most valuable resource a company must have. Aside from operating vessel, crew are also responsible for the safety of the passenger. From some investigation reports, it is indicated that crew plays a major role in transportation. In this criteria, it can be described into 4 sub-criteria which are:
   a. Crew Training
   b. Crew Patrol
   c. Crew Background
   d. Crew Condition
2. Fire Extinction
   Fire extinction is a criteria which develops due to the number of deficiencies found by Port State Control officers during the period 2006 – 2008 classed by Lloyd's Register. It consists of 4 sub-criteria which are:
   a. Fire Pump
   b. Fire Hydrant
   c. Portable Fire Extinguisher
   d. Fixed Fire Extinguisher
3. Safe Operation
   Due to the number of accidents caused by vehicles, goods, and passenger from the investigation report, this criteria is determined by:
   a. Vehicle Placement
   b. Goods Management
   c. Passenger Behaviour
4. Fire Detection

Fire detection is a criteria which develops due to the number of deficiencies found by Port State Control officers during the period 2006 – 2008 classed by Lloyd's Register. It consists of 4 sub-criteria which are:

a. Smoke Detectors
b. Sprinkles
c. Fire Alarms
d. CCTV

5. Fire-Fighting Apparatus
   Fire-fighting apparatus or known as personal equipment are also found in the fire safety deficiencies done by Port State Control officers, this criteria consists of:
   a. Fire-Fighting Outfit
   b. Self-Contained Breathing Apparatus (SCBA)
   c. Emergency Escape Breathing Devices (EEBD)
6. Emergency, Escape and Rescue
   Emergency, escape and rescue is criteria which develops due to the investigation reports done by Indonesia's National Transportation Safety Committee. This criteria consists of:
   a. Search and Rescue (SAR)
   b. Port Fire Fighting
   c. Emergency Preparedness
   d. Means of Escape
   e. Muster List
7. Documents and Certificates
   Documents and certificates are mandatory for a ship, but in some investigation cases, most documents and certificates are outdated and some are even not available. This criteria consists of:
   a. Passenger Ship Certificate
   b. Fire Extinguisher Certificate
   c. Fire Control Plan
   d. Breathing Apparatus Certificate
   e. Records of Maintenance, Inspection, Testing and Drills
   f. Records of Crew Familiarisation with Fire
   g. Breathing Apparatus Certificate

In **Figure 4.1.1**, it is shown that the number of deficiencies found by Port State Control during 2006-2008 from ship classed by Lloyd's Register. It can be seen that most deficiencies happens in ventilation, fire-dampers, valves quick closing devices and means of control with 287 cases. Followed by fire-fighting equipment and appliances at 169 cases. Emergency fire pump with 138 cases. Fire prevention 116 cases, and other deficiencies with lower than 100 cases.

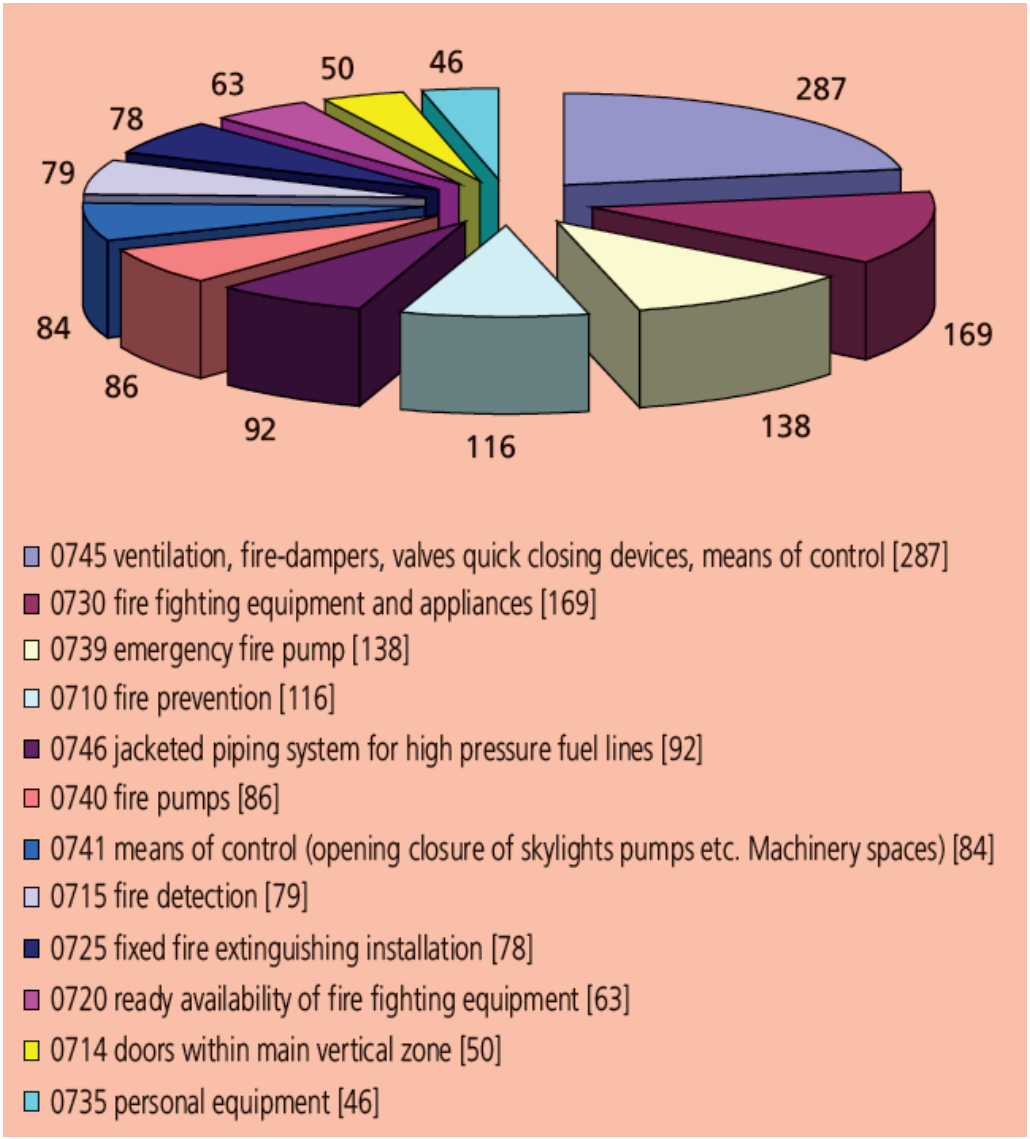


Figure 4.1.1 Operational Deficiencies by Lloyd's Register 2006-2008
(Source: Lloyd Register, 2009)

4.2 AHP Structure

The AHP Structure was formed in order to define the decisions and level of each criteria as stated in the literature study chapter. The objective is to describe the levels of each criteria within its sub-criteria. The AHP Structure can be found in **Figure 4.2.1**. The goal is to determine the weight of each element which affects the vessels' vulnerability against fire. With all the criteria level and the sub-criteria level exposed.

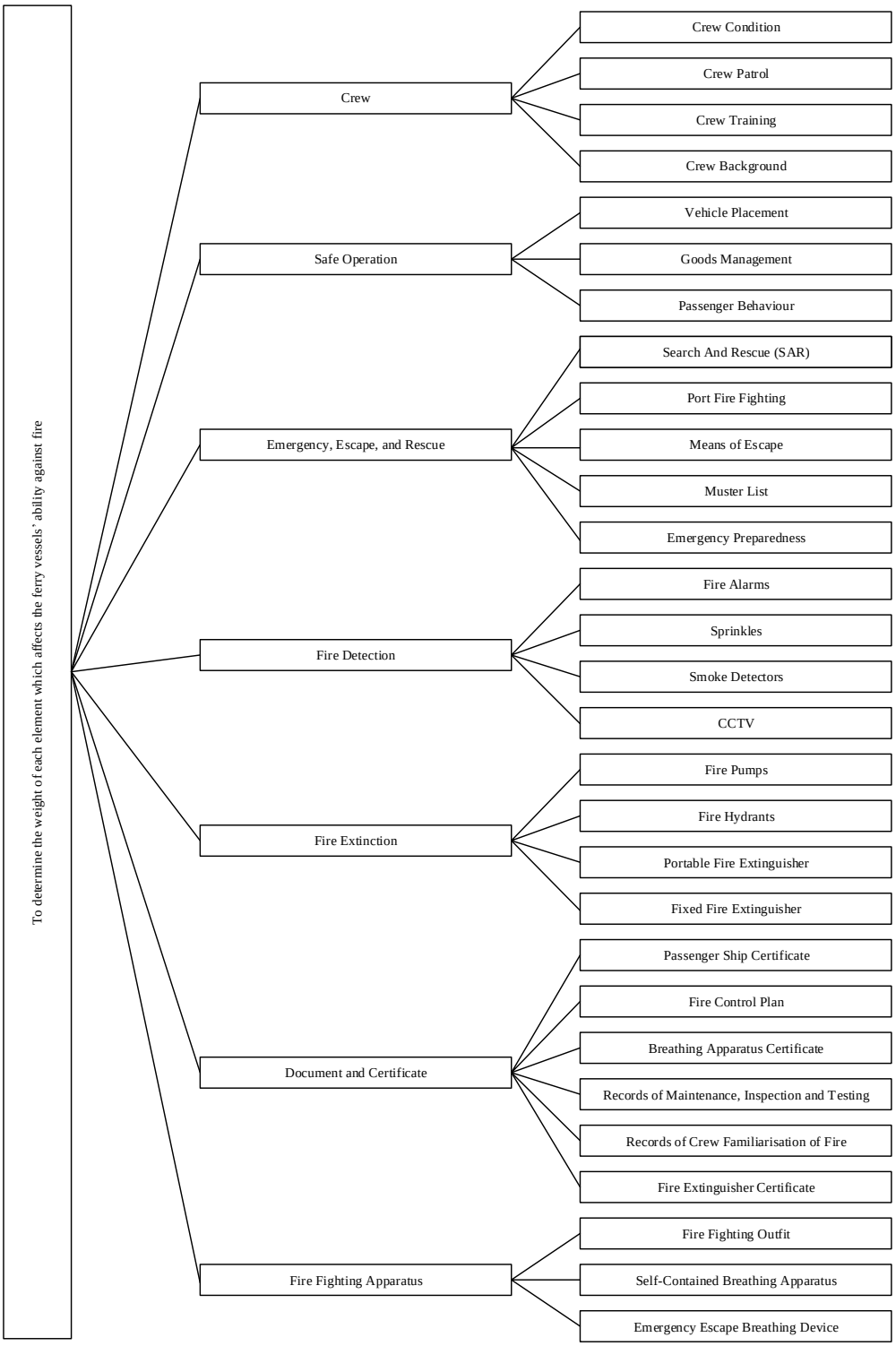


Figure 4.2.1 AHP Structure
(Source: Private Document, 2019)

4.3 AHP Questionnaire

The criteria is formed into a questionnaire which will be distributed among experts and professionals. The questionnaire is designed to have 1-9 scale among 2 available options. The respondents may select the answer based on their private experience regarding its field in their own perspective. An example of questionnaire is in table XX and XX, while the full questionnaire is available in the attachment.

Table 4.3.1 Example of Questionnaire

With respect to the GOAL, please scale these following options according to its level of importance (9 is Extremely Important, 1 is Equally Important) in terms of FIRE FIGHTING APPARATUS									
A Option	Extremely	Very Strongly	Strongly	Moderately	Equally	Moderately	Strongly	Very Strongly	Extremely	B Options
Fire-Fighting Outfits	9	7	5	3	1	3	5	7	9	Self Contained Breathing Apparatus
Fire-Fighting Outfits	9	7	5	3	1	3	5	7	9	Emergency Escape Breathing Devices
Self Contained Breathing Apparatus	9	7	5	3	1	3	5	7	9	Emergency Escape Breathing Devices

4.4 Pairwise Comparison Matrix

In determining the weight of each elements, the response must be turned into a pairwise comparison matrix as seen in the tables below. Due to the number of respondents, the response are process by calculating the geometric mean first. By then it can be turned into the pairwise comparison.

Table 4.4.1 Crew Sub-Criteria Pairwise Comparison

CREW	Crew Condition	Crew Patrol	Crew Training	Crew Background
Crew Condition	1	3.28	3.71	1.20
Crew Patrol	0.305	1	0.465	0.634
Crew Training	0.270	2.15	1	0.607
Crew Background	0.833	1.58	1.65	1

Table 4.4.2 Safe Operation Sub-Criteria Pairwise Comparison

Safe Operation	Vehicle Placement	Goods Management	Passenger Behaviour
Vehicle Placement	1	2.15	2.09
Goods Management	0.465	1	3.28
Passenger Behaviour	0.478	0.305	1

Table 4.4.3 Emergency, Escape and Rescue Sub-Criteria Pairwise Comparison

Emergency, Escape, and Rescue	Search and Rescue	Port Fire-Fighter	Means of Escape	Muster List	Emergency Preparedness
Search and Rescue	1	1.22	1.42	1.68	1.26
Port Fire-Fighter	0.821	1	1.92	2.04	1.40
Means of Escape	0.706	0.520	1	2.69	0.258
Muster List	0.596	0.490	0.371	1	0.318
Emergency Preparedness	0.795	0.716	3.87	3.15	1

Table 4.4.4 Fire Detection Sub-Criteria Pairwise Comparison

Fire Detection	Fire Alarms	Sprinkles	Smoke Detector	CCTV
Fire Alarms	1	2.24	2.17	2.81
Sprinkles	0.446	1	1.89	3.49
Smoke Detector	0.461	0.528	1	3.39
CCTV	0.356	0.287	0.295	1

Table 4.4.5 Fire Extinction Sub-Criteria Pairwise Comparison

Fire Extinguisher	Fire Pumps	Fire Hydrants	Portable Fire Extinguisher	Fixed Fire Extinguisher
Fire Pumps	1	2.43	1.34	1.70
Fire Hydrant	0.411	1	1.70	2.08
Portable Fire Extinguisher	0.747	0.588	1	1.78
Fixed Fire Extinguisher	0.588	0.481	0.561	1

Table 4.4.6 Document and Certificate Sub-Criteria Pairwise Comparison

Document and Certificates	Passenger Ship Certificate	Fire Control Plan	Breathing Apparatus Certificate	Records of Maintenance	Records of Crew Familiarisation	Fire Extinguisher Certificate
Passenger Ship Certificate	1	1.11	1.79	1.30	1.09	2.01
Fire Control Plan	0.901	1	2.99	2.75	2.88	0.51
Breathing Apparatus Certificate	0.559	0.335	1	1.24	1.45	0.407
Records of Maintenance	0.772	0.36	0.806	1	2.28	0.487
Records of Crew Familiarisation	0.914	0.347	0.690	0.439	1	0.740
Fire Extinguisher Certificate	0.496	1.96	2.45	2.05	1.35	1

Table 4.4.7 Fire Fighting Apparatus

Fire Fighting Apparatus	Fire Fighting Outfit	Self-Contained Breathing Apparatus	Emergency Escape Breathing Device
Fire Fighting Outfit	1	2.77	2.41
Self-Contained Breathing Apparatus	0.361	1	1.89
Emergency Escape Breathing Devices	0.415	0.530	1

Table 4.4.8 General Criteria Pairwise Comparison

GC	A	B	C	D	E	F	G
A	1	1.91	2.07	2.20	2.51	2.08	1.73
B	0.523	1	2.76	2.73	0.664	2.66	2.21
C	0.483	0.363	1	0.504	0.412	2.73	0.366
D	0.454	0.366	1.99	1	0.655	2.76	1.95
E	0.398	1.51	2.43	1.53	1	2.78	2.37
F	0.481	0.376	0.366	0.362	0.359	1	0.481
G	0.577	0.452	2.73	0.513	0.421	2.08	1

4.5 Weight Determination

Results of pairwise comparisons are normalized in order to obtain the weight of each criteria and sub-criteria. Each of the criteria and sub criteria are explained in the table below.

Table 4.5.1 Crew Criteria Pairwise Comparison

CREW	Crew Condition	Crew Patrol	Crew Training	Crew Background	Weight
Crew Condition	0.415	0.410	0.544	0.349	0.429
Crew Patrol	0.127	0.125	0.068	0.184	0.126
Crew Training	0.112	0.269	0.147	0.176	0.176
Crew Background	0.346	0.197	0.241	0.291	0.269

Table 4.5.2 Safe Operation Pairwise Comparison

Safe Operation	Vehicle Placement	Goods Management	Passenger Behaviour	Weight
Vehicle Placement	0.515	0.623	0.328	0.489
Goods Management	0.239	0.289	0.515	0.348
Passenger Behaviour	0.246	0.088	0.157	0.164

Table 4.5.3 Emergency Escape and Rescue Pairwise Comparison

Emergency, Escape, and Rescue	Search and Rescue	Port Fire-Fighter	Means of Escape	Muster List	Emergency Preparedness	Weight
Search and Rescue	0.255	0.309	0.165	0.159	0.297	0.237
Port Fire-Fighter	0.209	0.254	0.224	0.193	0.330	0.242
Means of Escape	0.180	0.132	0.117	0.255	0.061	0.149
Muster List	0.152	0.124	0.043	0.095	0.075	0.098
Emergency Preparedness	0.203	0.182	0.451	0.298	0.236	0.274

Table 4.5.4 Fire Detection Pairwise Comparison

Fire Detection	Fire Alarms	Sprinkles	Smoke Detector	CCTV	Weight
Fire Alarms	0.442	0.553	0.405	0.263	0.416
Sprinkles	0.197	0.246	0.353	0.326	0.281
Smoke Detector	0.204	0.130	0.187	0.317	0.209
CCTV	0.157	0.071	0.055	0.094	0.094

Table 4.5.5 Fire Extinguisher

Fire Extinguisher	Fire Pumps	Fire Hydrants	Portable Fire Extinguisher	Fixed Fire Extinguisher	Weight
Fire Pumps	0.364	0.540	0.291	0.259	0.364
Fire Hydrant	0.150	0.222	0.370	0.317	0.265
Portable Fire Extinguisher	0.272	0.131	0.217	0.272	0.223
Fixed Fire Extinguisher	0.214	0.107	0.122	0.152	0.149

Table 4.5.6 Document and Certificates Pairwise Comparison

Document and Certificates	Passenger Ship Certificate	Fire Control Plan	Breathing Apparatus Certificate	Records of Maintenance	Records of Crew Familiarisation	Fire Extinguisher Certificate
Passenger Ship Certificate	0.215	0.217	0.184	0.148	0.109	0.39
Fire Control Plan	0.194	0.196	0.307	0.313	0.286	0.099
Breathing Apparatus Certificate	0.12	0.065	0.103	0.141	0.144	0.079
Records of Maintenance	0.166	0.071	0.083	0.114	0.226	0.094
Records of Crew Familiarisation	0.197	0.068	0.071	0.05	0.1	0.143
Fire Extinguisher Certificate	0.107	0.383	0.252	0.234	0.134	0.194

Table 4.5.7 Fire Fighting Apparatus Pairwise Comparison

Fire Fighting Apparatus	Fire Fighting Outfit	Self-Contained Breathing Apparatus	Emergency Escape Breathing Device	WEIGHT
Fire Fighting Outfit	0.563	0.644	0.455	0.554
Self-Contained Breathing Apparatus	0.203	0.232	0.356	0.264
Emergency Escape Breathing Devices	0.234	0.123	0.189	0.182

Table 4.5.8 General Criteria Pairwise Comparison

GC	A	B	C	D	E	F	G	Weight
A	0.255	0.320	0.155	0.249	0.417	0.129	0.171	0.242
B	0.134	0.167	0.207	0.309	0.110	0.165	0.219	0.187
C	0.123	0.061	0.075	0.057	0.068	0.170	0.036	0.084
D	0.116	0.061	0.149	0.113	0.109	0.171	0.193	0.130
E	0.102	0.252	0.182	0.173	0.166	0.173	0.235	0.183
F	0.123	0.063	0.027	0.041	0.060	0.062	0.048	0.060
G	0.147	0.076	0.205	0.058	0.070	0.129	0.099	0.112

The explanation for the general criteria is shown in **Table 4.5.9**.

Table 4.5.9 General Criteria

A	Crew
B	Safe Operation
C	Emergency, Escape and Rescue
D	Fire Detection
E	Fire Extinction
F	Document and Certificates
G	Fire-Fighting Apparatus

4.6 Survey Report

4.6.1 KM. Satya Kencana III

In 27th April 2019, an observation was conducted in the KM. Satya Kencana III. A Ro-Ro vessel owned by PT. Dharma Lautan Utama. It was scheduled to departure from Surabaya, in 07.00. With destination to Kumai. It begins its loading process with trucks until around 09.00 and around 10.30 the ship proceeds to departure. The ship particular will be stated in the table below.

Vessel Name	KM. Satya Kencana III	LPP	-(m)
Vessel Age	30 years	LWL	70 (m)
Vessel GT	1196	LOA	76.88(m)
Vessel Capacity	354/32/29 (passenger/vehicle)	B	13.3 (m)
DWT	2825 (ton)	T	3.91 (m)
Date of Survey	27 April 2019	H	4.7 (m)

Figure 4.6.1 KM. Satya Kencana III

In the figure below, is another example of one of the trucks loaded into the ro-ro. This truck extended its length through its chassis to load more cargo. These trucks mainly loads vegetables from East Java to Central Kalimantan since the demand for vegetables are high in those areas.

Figure 4.6.2 ODOL Truck

During the manoeuvring process, the author was invited to observe the manoeuvring process from the bridge. The crews are very friendly and they kindly explained every details regarding ro-ro vessel. In one of the corner of the bridge there was the passenger ship safety certificate. It was expired in Dec 2018 and haven't been renewed until now. In the figure below, the documentation of the certificate was written.

Figure 4.6.3 Passenger Ship Safety Certificate

There was also a fire alarm control panel located on the opposite of the passenger ship safety certificate. The alarms are also named with some location of the vessel where potential fire risks may occur.

Figure 4.6.4 Fire Alarm Control Panel

Observation towards the car deck was quite challenging since it was crowded and the pathway was too narrow on each side of the trucks. The lashing on each truck was also didn't met the required regulation which was 2 lashes in the front and 2 lashes at the back.

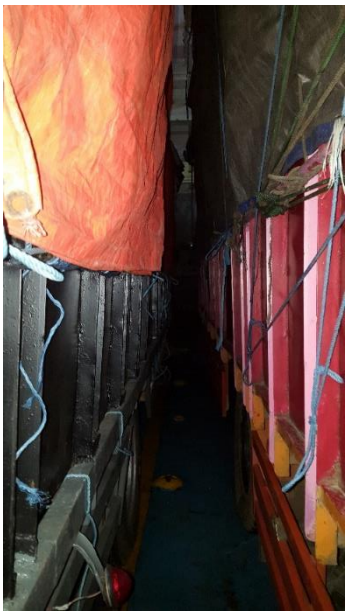


Figure 4.6.5 Distance between Trucks

Another figure below shows that the cargo tied to the truck falls down and there was only one lashing attached behind the truck. This condition raises up a lot question in terms of how does the Port State Control Officer lookouts for trucks like this case.

Figure 4.6.6 Disapproved Lashing and Goods Management

There was a fixed fire extinguisher located near the truck. It uses CO_2 to extinguish fire located in the engine room. While as beside the CO_2 system, there is a Fuel Oil Quick-Closing. The Fuel-Oil Quick Closing uses a pneumatic system to support its function.

Figure 4.6.7 CO_2 System

This figure below shows the pneumatic system used for Fuel Oil Quick-Closing. The system will directly shut down the fuel supply to main engine and auxiliary engine.

Figure 4.6.8 Fuel Oil Quick-Closing

On the trip back to Surabaya from Kumai, the vessel condition wasn't too crowded as before. But still, the trucks are placed too narrow between each other. The maximum clearance available between the ceilings of the car deck is approximately 35cm.

Figure 4.6.9 Truck Vertical Clearance

In the evening, the passengers didn't mostly sleep on the designated rooms or spaces. Instead, they sleep in hallways. In the figure below, the passengers sleep next to the passage to the bridge and this is blocking the access to some safety equipment.

Figure 4.6.10 Passengers blocking access

PT. "MELATY"
Jl. Laksda M. Nasir No. 18 Surabaya
Telp. (031) 3293256 Fax. (031) 3293256

CERTIFICATE
Fire Extinguisher
Fire Extinguisher Instalations
Fire Hoses Safety Ann Rescue Equipment

Vessel : KM.SATYA KENCANA - III
Owner / Address : PT.DHARMA LAUTAN UTAMA
Certificate No. : NO.02/MLY/PMK/4/2019

This is to certiry that Fire Extinguisher has been Inspected, refilling / Serviced according to requirement ship authorities and factory
We guarranted for 1 (one) year since certificate issued, accordingly :

Item	Model	Volume	Quantity	Remarks
1	CO2 SYSTEM ROOMS	45 KG	4 TBG	GOOD CONDITION
2	PILOT CYLINDERS	0,8 KG	2 TBG	GOOD CONDITION
			Total :	6 TBG

The next inspection : " 01 APRIL 2020 "
Date of issue : " 01 APRIL 2019 "

MOH. ALI S, AP, M. Si

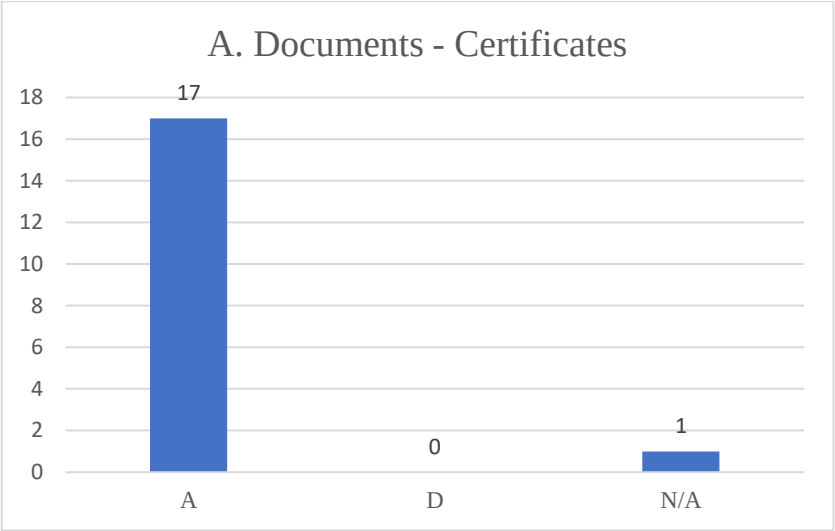
Figure 4.6.11 Fire Extinguishers Certificate

In the figure 10, is an example of the approved certificate stored in the bridge. One of it is the fix fire extinguisher survey and inspection approval. Most of the certificates were renewed since the vessel was docked in 11th April 2019. A tour to the engine room was also provided, a quick view of the engine room is shown in the figure below. The only bias in the engine room is the engine room door. It is always open and don't have any quick closing mechanism. This is bad since engine room doors was supposed to suppress the engine room if any fire lights up.

Figure 4.6.12 Engine Room

4.7 Survey Report

4.7.1 KM. Satya Kencana III

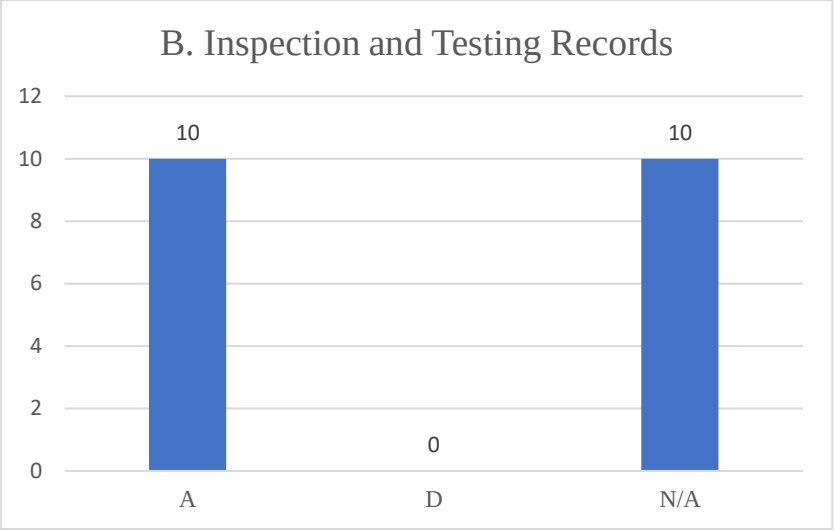


In terms of documents and certificates, KM. Satya Kencana III (SKIII) have a decent amount of approved documents to prove that each of their fire-fighting and safety requirements are relevant and can be accounted for. The only certificate unavailable is the approval for fire detection and alarm system. The explanation of each elements can be seen in the table below.

Table 4.7.1 Document-Certificates Survey Report

A. DOCUMENT - SERTIFICATES			
NO.	SUBJECT	A/D	NOTES
1	Passenger Ship Safety Certificate	A	• Every Documents are checked and renewed. • The only document not available is the approval of fire detection and alarms system.
2	Statement of Operational Limitations and Exemptions	A	
3	Fire Extinguisher Servicing Certificates	A	
4	Fire Extinguisher Pressure Test Certificate	A	
5	Fixed gas Fire Extinguishers System Cylinder Pressure Test and Servicing Sertificates	A	
6	Self Contained Breathing Apparatus (SCBA) cylinder test	A	
7	Approval of All Extinguishers	A	
8	Approval of All Fixed Fire-Fighting Systems	A	
9	Approval of SCBA	A	
10	Approval of EEBDs	A	
11	Approval of Fire Detection and Alarms System	N/A	
12	Instructions for onboard maintenance or a shipboard planned maintenance scheme	A	

13	Ship-specific SOLAS training manuals and onboard training aids	A	
14	Ship-specific Fire Safety Training Manual	A	
15	Records of inspection, maintenance, testing and drills	A	
16	Records of crew familiarisation with fire and abandon ship drills	A	
17	Muster list and emergency instructions	A	
18	Fire Control Plan	A	

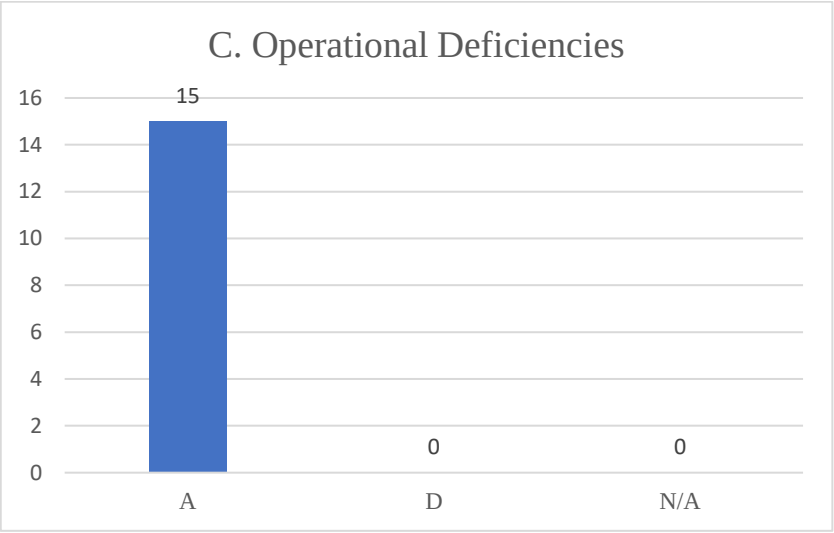


In terms of inspection and testing records, SKIII may provide the equal amount of records. This shows that some of their equipment aren't inspected. Such as, fire doors, fire detection, fire alarm, dampers, and etc.

Table 4.7.2 Inspection and Testing Records Survey Report

B. INSPECTION AND TESTING RECORDS			
NO.	SUBJECT	A/D	NOTES
1	Fire Main System	N/A	
2	Fire Pumps	A	
3	Fire Hydrants	A	
4	Hoses	A	
5	Nozzles	N/A	
6	International Shore Connection	N/A	
7	Fire Detection	N/A	
8	Fire Extinguisher	A	
9	Fire Alarm	N/A	

10	Ventilation System	N/A	
11	Fire and Smoke Damper	N/A	
12	Fuel Oil Quick-Closing	A	
13	Lubricating Oil Quick Closing	N/A	
14	Fire Doors	N/A	
15	General Emergency Alarm System	A	
16	EEBD - Fire Fighter's Outfit	A	
17	Portable Fire Extinguishers	A	
18	Non-Portable Fire Extinguishers	A	
19	Low Location Lighting	N/A	
20	Public Address System	A	

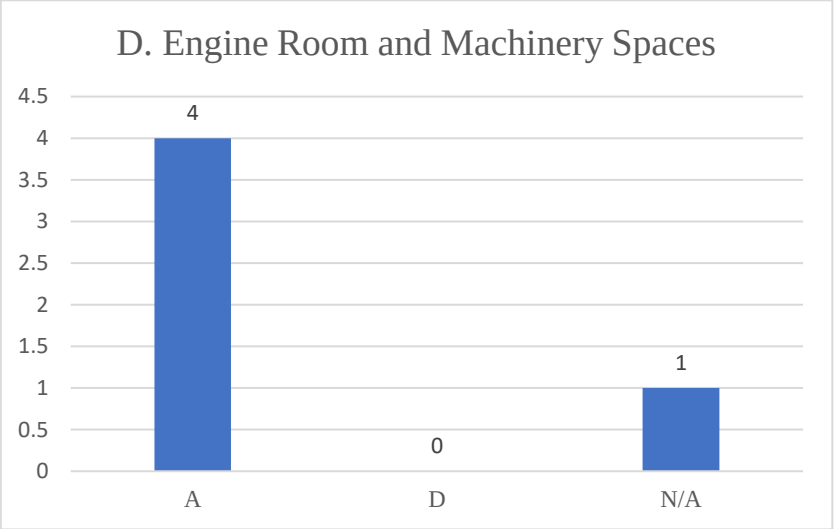


SKIII have none approval of any operational deficiencies of the equipment since most of these equipment work normally and have been tested regularly. It is almost impossible to find any expired date of inspection on the equipment.

Table 4.7.3 Operation Deficiencies Survey Report

C. OPERATIONAL DEFICIENCIES			
NO.	SUBJECT	A/D	NOTES
1	Fire Dampers	A	
2	Ventilators	A	
3	Means of Escape	A	
4	Fire Main System	A	
5	Fire Pumps	A	
6	Fire Hydrants	A	
7	Hoses	A	

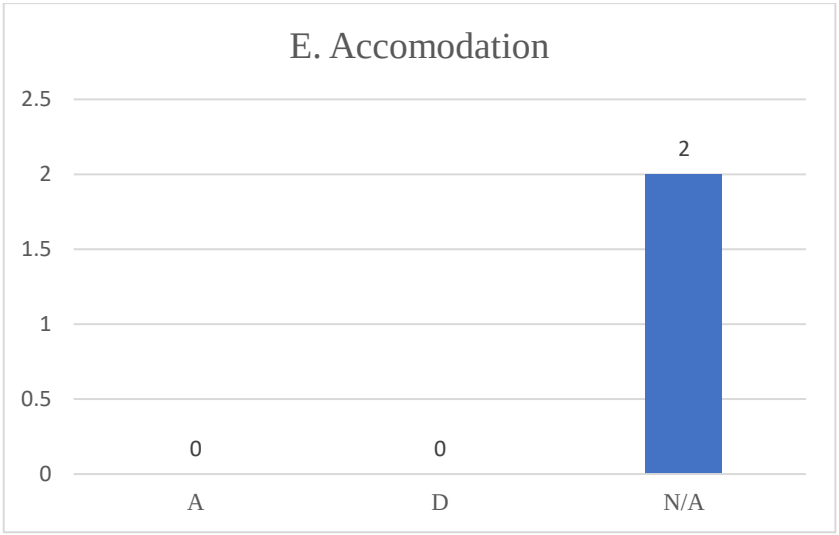
8	Nozzles	A	
9	SCBA	A	
10	EEBDs	A	
11	Fire Fighter's Outfit	A	
12	Fire Doors	A	
13	Fire Detection	A	
14	Fire Alarm	A	
15	Fixed Fire Extinguishing System and Installations	A	



Inside the engine room, it was clean of operational waste and oil leakage. This provides a decent view of the engine room since failure of equipment or any anomaly can be visually detected and inspected. The only not available option in SKIII in terms of Machinery Spaces is the Jacketed Piping System for High Pressure Fuel Lines.

Table 4.7.4 Engine Room and Machinery Spaces Survey Report

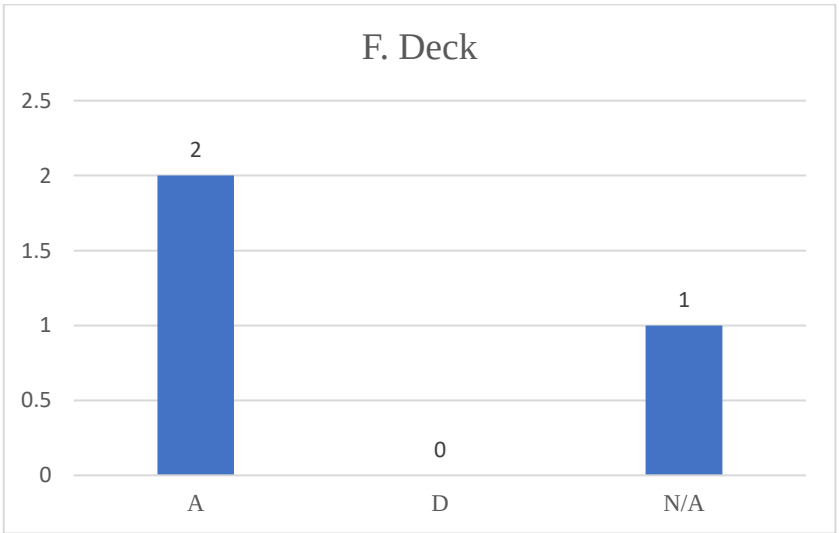
D. ENGINE ROOM AND MACHINERY SPACES			
NO.	SUBJECT	A/D	NOTES
1	Cleanliness	A	• This vessel uses MDO as the main fuel which doesn't require jacketed piping system.
2	Fire Pumps	A	
3	Emergency Quick Closing Valves	A	
4	Jacketed Piping System for High Pressure Fuel lines	N/A	
5	Fire Prevention	A	



In the accommodation, SKIII may have the same number of disapproval and not available options. There are currently no sprinkler system and no ventilators that may be remotely controlled outside of the accommodation.

Table 4.7.5 Accommodation Survey Report

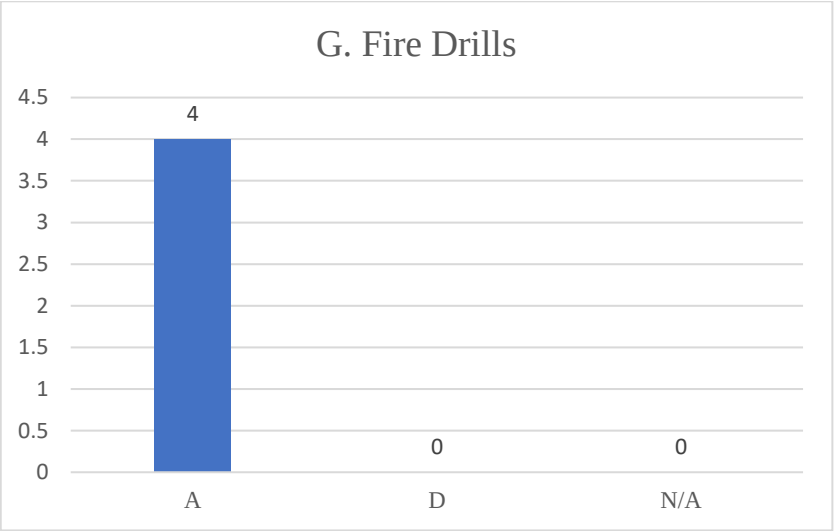
E. ACCOMODATION			
NO.	SUBJECT	A/D	NOTES
1	Sprinkler System	N/A	• There are no sprinkle available at the accommodation.
2	Ventilators	N/A	• No ventilators available



In the deck, or commonly known as vehicle deck, SKIII may have one not available option which is the Paint Locker Fire Protection System. The ventilators can be remotely access while the international shore connection is marked and easily recognized.

Table 4.7.6 Deck

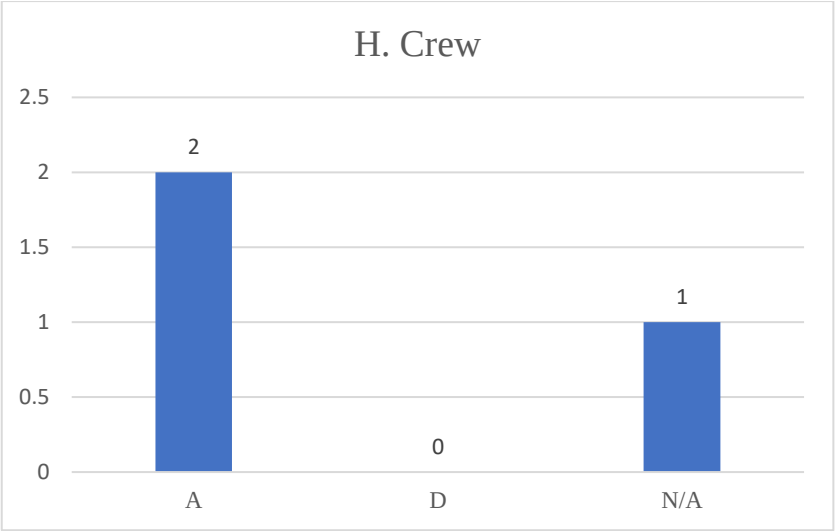
F. DECK			
NO.	SUBJECT	A/D	NOTES
1	International Shore Connection	A	• International Shore Connection is marked and well protected. • Ventilators are available and can be controlled remotely.
2	Paint Locker Fire Protection System	N/A	
3	Ventilators	A	



For the fire drills, SKIII conducted fire drills approximately per 2 weeks. This is done to familiarize the crew with any possible fire emergency situation and these drills are documented and perfectly stored inside the bridge. Every options in fire drills are approved.

Table 4.7.7 Fire Drills Survey Report

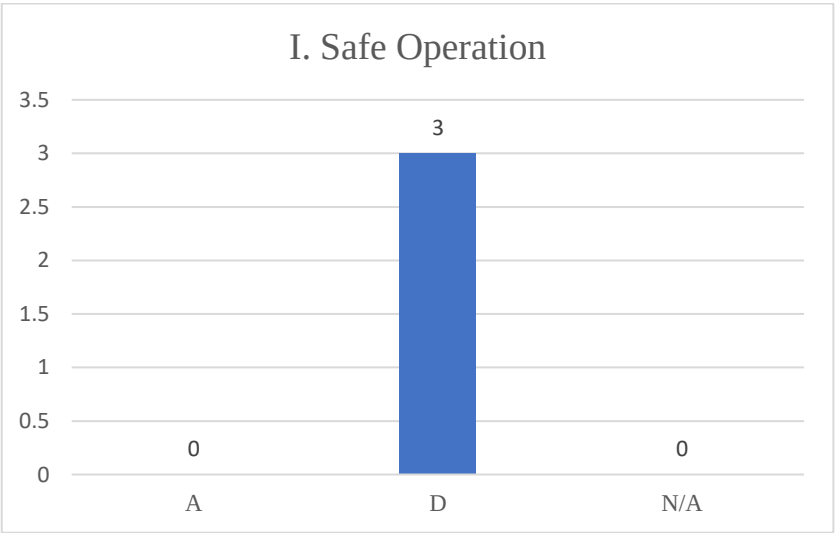
G. FIRE DRILLS			
NO.	SUBJECT	A/D	NOTES
1	Fire Drills	A	
2	Emergency Preparedness	A	
3	Crew Muster	A	
4	Operation of Fire Protection System	A	



In terms of crew, the SKIII have on not available option which is the Crew Patrol. This is because there were no crew patrol conducted in the accommodation and the only patrol is on the vehicle deck.

Table 4.7.8 Crew Survey Report

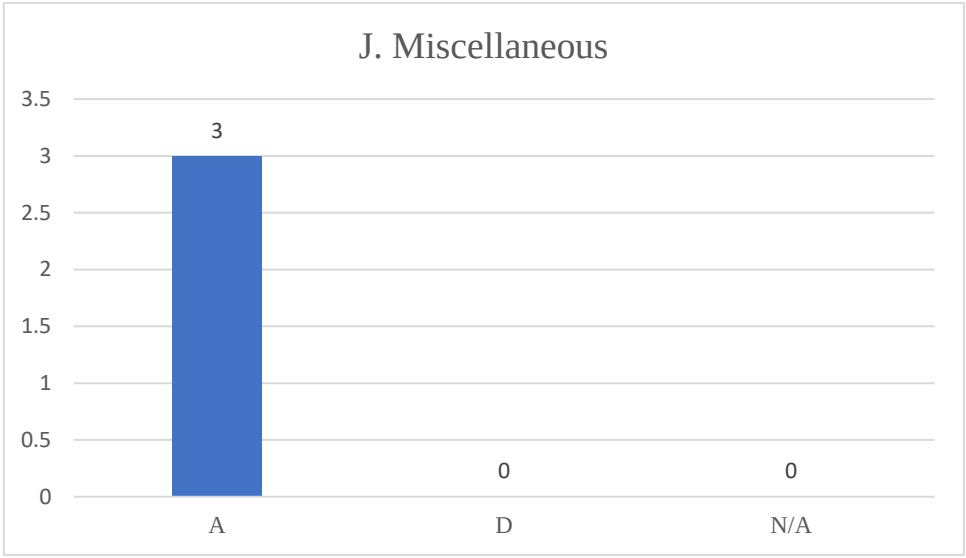
H. CREW			
NO.	SUBJECT	A/D	NOTES
1	Crew Background	A	• The crew operating the vessel came from a credible background. • Crew are well trained and well educated. • Crew are disciplined.
2	Crew Training	A	
3	Crew Patrol	A	



This is the worst section which was occurred in SKIII. Every options in this section is disapproved because of a number of reason. Lack of crew patrols, insufficient lashings, passageway between trucks and etc. contributed in developing a disapproved condition for this section.

Table 4.7.9 Safe Operation Survey Report

I. SAFE OPERATION			
NO.	SUBJECT	A/D	NOTES
1	Vehicle Placement	D	• Lack of Crew Patrol leads to bad passenger behaviour. • Most of the passenger still smoke at the cafeteria. • Goods are placed near the ramp door. • A motorcycle was covering an access to the emergency fire pump
2	Goods Management	D	
3	Passengers Behaviour	D	



Every emergency equipment are marked and clearly visible in case of emergency situations. These emergency equipment are also inspected regularly since the documents for emergency equipment is available.

Table 4.7.10 Miscellaneous Survey Report

J. MISCELLANEOUS			
NO.	SUBJECT	A/D	NOTES
1	Emergency Fire Pump	A	
2	Emergency Generator	A	
3	Emergency Batteries	A	

4.8 Global Scale

The global scale can be seen in **Table 4.8.1**.

Table 4.8.1 Global Scale (Descending)

GLOBAL SCALE	
Weight	Sub-Criteria
0.104	Crew Condition
0.091	Vehicle Placement
0.067	Fire Pump
0.065	Crew Background
0.065	Goods Management
0.062	Fire Fighters Outfit
0.054	Fire Alarms
0.048	Fire Hydrants
0.043	Crew Training
0.041	Portable Fire Extinguisher
0.037	Sprinkles
0.031	Passenger Behaviour
0.031	Crew Patrol
0.030	Self-Contained Breathing Apparatus
0.027	Smoke Detector
0.027	Fixed Fire Extinguisher
0.023	Emergency Preparedness
0.020	Port Fire-Fighting
0.020	Emergency Escape Breathing Devices
0.020	Search and Rescue
0.014	Fire Control Plan
0.013	Fire Extinguisher Certificate
0.013	Passenger Ship Certificate
0.013	Means of Escape
0.012	CCTV
0.008	Muster List
0.008	Records of Maintenance, Inspection and Testing
0.007	Breathing Apparatus Certificate
0.006	Records of Crew Familiarisation with Fire
1	SUMCHECK

Table 4.8.2 General Criteria

0.242474	Crew
0.187258	Safe Operation
0.084324	Emergency, Escape and Rescue
0.130284	Fire Detection
0.183167	Fire Extinction
0.060487	Document and Certificates
0.112005	Fire-Fighting Apparatus
1	SUMCHECK

4.9 Vulnerability Score

This chapter calculates the vulnerability score for the vessels observe in the chapter before. By multiplying the weight obtained from AHP process and the remarks given from the actual survey, the vulnerability score can be seen in **Table 4.9.1**.

Table 4.9.1 Vulnerability Score

VULNERABILITY SCORE			
Weight	Sub-Criteria	REMARK	SCORE
0.104	Crew Condition	1	0.10414
0.031	Crew Patrol	1	0
0.043	Crew Training	1	0.04266
0.065	Crew Background	1	0.06515
0.091	Vehicle Placement	0	0
0.065	Goods Management	0	0
0.031	Passenger Behaviour	0	0
0.020	Search and Rescue	1	0.01999
0.020	Port Fire-Fighting	1	0.02041
0.013	Means of Escape	1	0.01256
0.008	Muster List	1	0.00825
0.023	Emergency Preparedness	1	0.0231
0.054	Fire Alarms	1	0.05416
0.037	Sprinkles	1	0.03659
0.027	Smoke Detector	0.6666667	0.01818
0.012	CCTV	1	0.01226
0.067	Fire Pump	1	0.06659
0.048	Fire Hydrants	1	0.04849
0.041	Portable Fire Extinguisher	1	0.04084
0.027	Fixed Fire Extinguisher	1	0.02725
0.013	Passenger Ship Certificate	1	0.01273
0.014	Fire Control Plan	1	0.01407

0.007	Breathing Apparatus Certificate	1	0.00659
0.008	Records of Maintenance, Inspection and Testing	0	0
0.006	Records of Crew Familiarisation with Fire	1	0.00634
0.013	Fire Extinguisher Certificate	1	0.01315
0.062	Fire Fighters Outfit	1	0.06205
0.030	Self-Contained Breathing Apparatus	1	0.02957
0.020	Emergency Escape Breathing Devices	1	0.02039
1	SUMCHECK	Vulnerability Score	0.76551

The equation to calculate the vulnerability score is:

$$VS_i = \sum_{i=1}^{n} Wi \times Fi \quad (4.1)$$

$$VS_j = \sum_{j=1}^{n} \frac{RC}{Ref.\ C} \times Wj \times Fi \quad (4.2)$$

$$VS_{total} = VS_i + VS_j \quad (4.3)$$

Where:

Wi = Weight Indicated

Fi = Function Indicated = 1

Rc = Real Component

Ref. C = Reference Component

VS_i = Qualitative Weight (e.g

VS_j = Quantitative Weight (e.g

In the **Table 4.9.1**, an example can be seen at the smoke detector section, the score value is 0.01957. It is because 1 out of 3 smoke detectors is unavailable. It is unavailable because it is located in the cafeteria and the passengers still smoke in the cafeteria.

From this calculation, the Satya Kencana III ro-ro vessel, manage to score 0.80623 out of 1. These place Satya Kencana III in the "Excellent" category. The explanation of the ranks can be seen in the table below.

Table 4.9.2 Vulnerability Scale

Vulnerability Score	Definition	Color Code
1 – 0.8	Excellent	Blue
0.799 – 0.6	Good	Green
0.599 – 0.4	Fair	Yellow
0.399 – 0.2	Poor	Orange
0.199 – 0	Very Poor	Red

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CHAPTER V
CONCLUSION

5.1 Conclusion

Several conclusion can be made from this final project, which are:

1. A questionnaire has been distributed among experts in sea transportation and fire safety. The questionnaire consists of 7 criteria and 26 sub-criteria. The responds from the respondents will be further process and calculated by using the Analytical Hierarchy Process method.
2. The result from the 7 criteria and 26 sub-criteria of the questionnaire placed the "Crew Condition" as the most important element with a value of 0.104, while "Records of Crew Familiarisation with Fire" as the least important element with a value of 0.006.
3. A ferry has been surveyed and observed managed to score approximately 0.76 vulnerability score out of 0 to 1 scale.

5.2 Suggestion

Based on this research, there are few suggestion which can be made to assess ferry vessel vulnerability towards fire accidents, which are:

1. The software (rules, regulation) and hardware (fire extinguisher, fire detection) can be analyse separately.
2. In using AHP method, some respondents denied to fill in the questionnaire due to the number of questions, and the lack of simplicity of the questionnaire.
3. National Transportation Safety Committee can improve this vulnerability instrument by conducting random sampling on ferry. This will show which vessel are seaworthy and safe to operate.
4. Some criteria and sub-criteria requires vessel in operating condition rather than loading – unloading condition to analyse, if this vulnerability assessment will be use before departure, than safety measures before departing must be considered.

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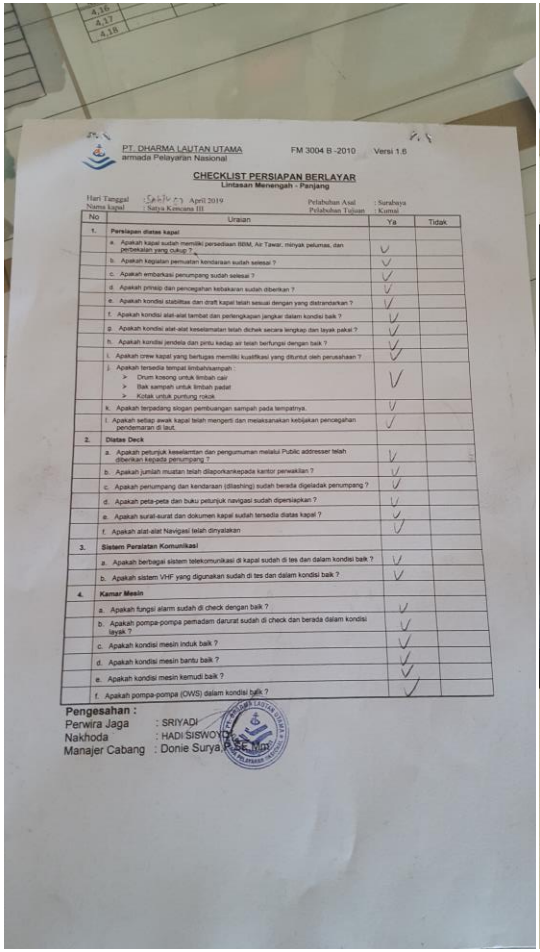
APPENDIX I



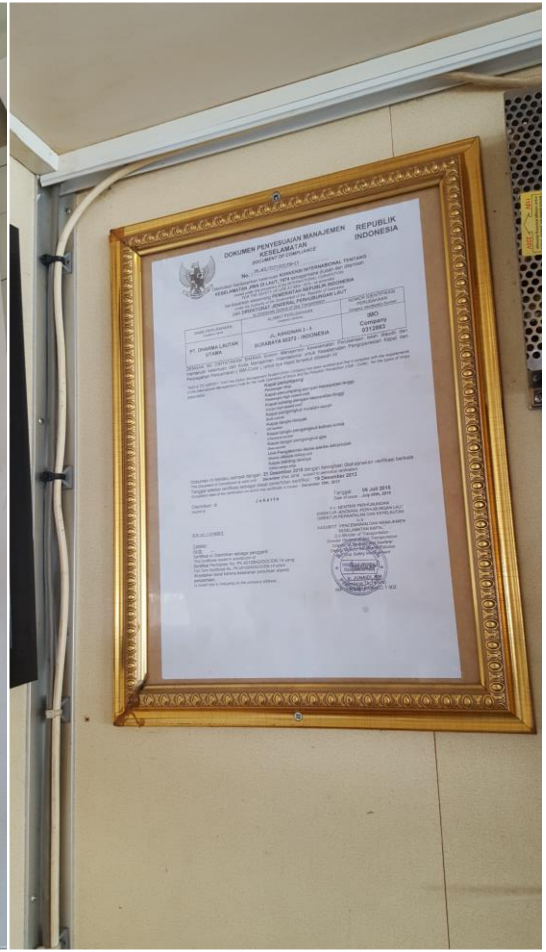
PT. DHARMA LAUTAN UTAMA FM 3004 B -2010 Versi 1.6
armada Pelayaran Nasional

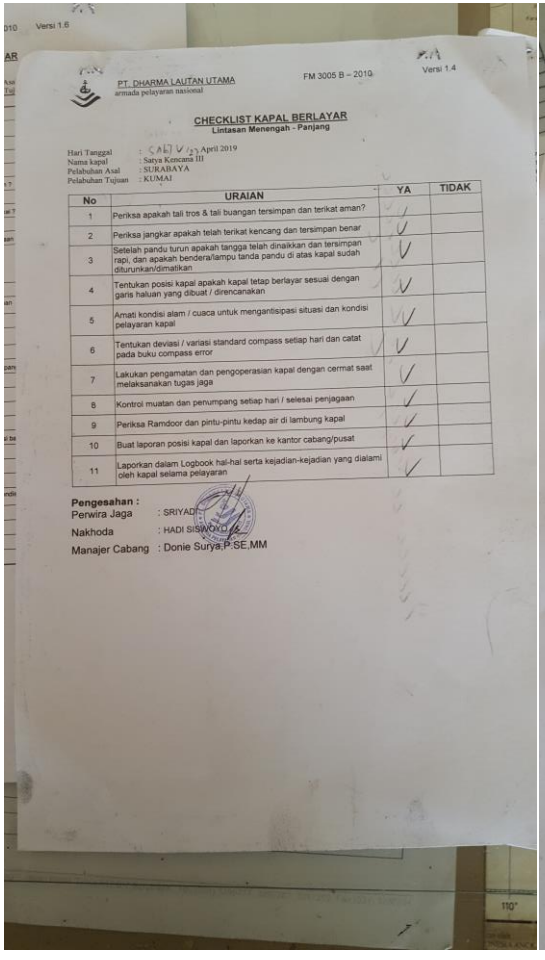
CHECKLIST PERSIAPAN BERLAYAR
Lintasan Menengah - Panjang

Hari Tanggal : Sabtu 27 April 2019 Pelabuhan Asal : Surabaya
Nama kapal : Satya Kencana III Pelabuhan Tujuan : Kumai

No	Uraian	Ya	Tidak
1.	**Persiapan diatas kapal**		
	a. Apakah kapal sudah memiliki persediaan BBM, Air Tawar, minyak pelumas, dan perbekalan yang cukup ?	√	
	b. Apakah kegiatan pemuatan kendaraan sudah selesai ?	√	
	c. Apakah embarkasi penumpang sudah selesai ?	√	
	d. Apakah prinsip dan pencegahan kebakaran sudah diberikan ?	√	
	e. Apakah kondisi stabilitas dan draft kapal telah sesuai dengan yang distrandarkan ?	√	
	f. Apakah kondisi alat-alat tambat dan perlengkapan jangkar dalam kondisi baik ?	√	
	g. Apakah kondisi alat-alat keselamatan telah dicheck secara lengkap dan layak pakai ?	√	
	h. Apakah kondisi jendela dan pintu kedap air telah berfungsi dengan baik ?	√	
	i. Apakah crew kapal yang bertugas memiliki kualifikasi yang dituntut oleh perusahaan ?	√	
	j. Apakah tersedia tempat limbah/sampah : ➢ Drum kosong untuk limbah cair ➢ Bak sampah untuk limbah padat ➢ Kotak untuk puntung rokok	√	
	k. Apakah terpadang slogan pembuangan sampah pada tempatnya.	√	
	l. Apakah setiap awak kapal telah mengerti dan melaksanakan kebijakan pencegahan pencemaran di laut.	√	
2.	**Diatas Deck**		
	a. Apakah petunjuk keselamtan dan pengumuman melalui Public addresser telah diberikan kepada penumpang ?	√	
	b. Apakah jumlah muatan telah dilaporkankepada kantor perwakilan ?	√	
	c. Apakah penumpang dan kendaraan (dlashing) sudah berada digeladak penumpang ?	√	
	d. Apakah peta-peta dan buku petunjuk navigasi sudah dipersiapkan ?	√	
	e. Apakah surat-surat dan dokumen kapal sudah tersedia diatas kapal ?	√	
	f. Apakah alat-alat Navigasi telah dinyalakan	√	
3.	**Sistem Peralatan Komunikasi**		
	a. Apakah berbagai sistem telekomunikasi di kapal sudah di tes dan dalam kondisi baik ?	√	
	b. Apakah sistem VHF yang digunakan sudah di tes dan dalam kondisi baik ?	√	
4.	**Kamar Mesin**		
	a. Apakah fungsi alarm sudah di check dengan baik ?	√	
	b. Apakah pompa-pompa pemadam darurat sudah di check dan berada dalam kondisi layak ?	√	
	c. Apakah kondisi mesin induk baik ?	√	
	d. Apakah kondisi mesin bantu baik ?	√	
	e. Apakah kondisi mesin kemudi baik ?	√	
	f. Apakah pompa-pompa (OWS) dalam kondisi baik ?	√	

Pengesahan :
Perwira Jaga : SRIYADI
Nakhoda : HADI SISWOYO
Manajer Cabang : Donie Surya P, SE, MM





PT. DHARMA LAUTAN UTAMA
armada pelayaran nasional

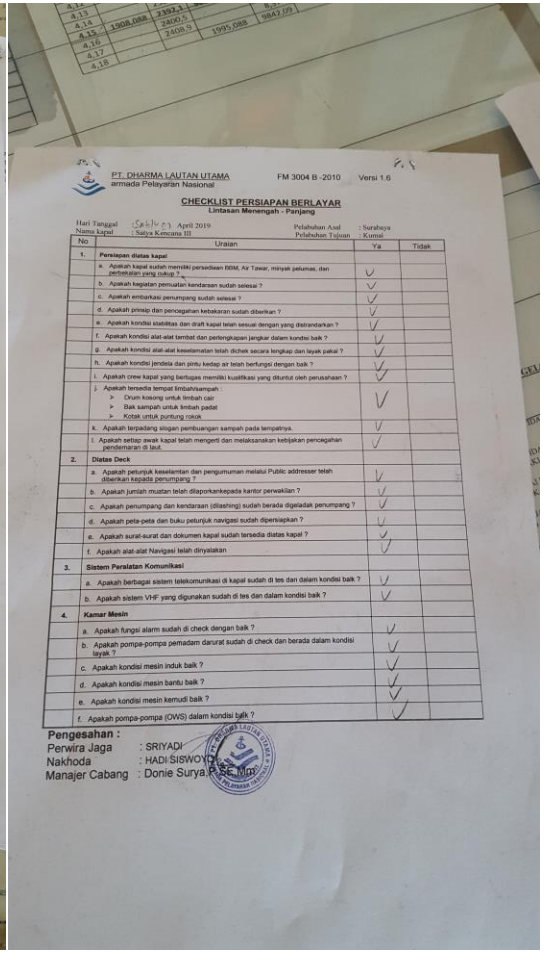
FM 3005 B – 2019 Versi 1.4

CHECKLIST KAPAL BERLAYAR
Lintasan Menengah - Panjang

Hari Tanggal : [illegible] April 2019
Nama kapal : Satya Kencana III
Pelabuhan Asal : SUKABAYA
Pelabuhan Tujuan : KUMAI

No	URAIAN	YA	TIDAK
1	Periksa apakah tali tros & tali buangan tersimpan dan terikat aman?	✓	
2	Periksa jangkar apakah telah terikat kencang dan tersimpan benar	✓	
3	Setelah pandu turun apakah tangga telah dinaikkan dan tersimpan rapi, dan apakah bendera/lampu tanda pandu di atas kapal sudah diturunkan/dimatikan	✓	
4	Tentukan posisi kapal apakah kapal tetap berlayar sesuai dengan garis haluan yang dibuat / direncanakan	✓	
5	Amati kondisi alam / cuaca untuk mengantisipasi situasi dan kondisi pelayaran kapal	✓	
6	Tentukan deviasi / variasi standard compass setiap hari dan catat pada buku compass error	✓	
7	Lakukan pengamatan dan pengoperasian kapal dengan cermat saat melaksanakan tugas jaga	✓	
8	Kontrol muatan dan penumpang setiap hari / selesai penjagaan	✓	
9	Periksa Ramdoor dan pintu-pintu kedap air di lambung kapal	✓	
10	Buat laporan posisi kapal dan laporkan ke kantor cabang/pusat	✓	
11	Laporkan dalam Logbook hal-hal serta kejadian-kejadian yang dialami oleh kapal selama pelayaran	✓	

Pengesahan :
Perwira Jaga : SRIYADI
Nakhoda : HADI SISWOYO
Manajer Cabang : Donie Surya P.SE.MM



PT. DHARMA LAUTAN UTAMA
armada Pelayaran Nasional

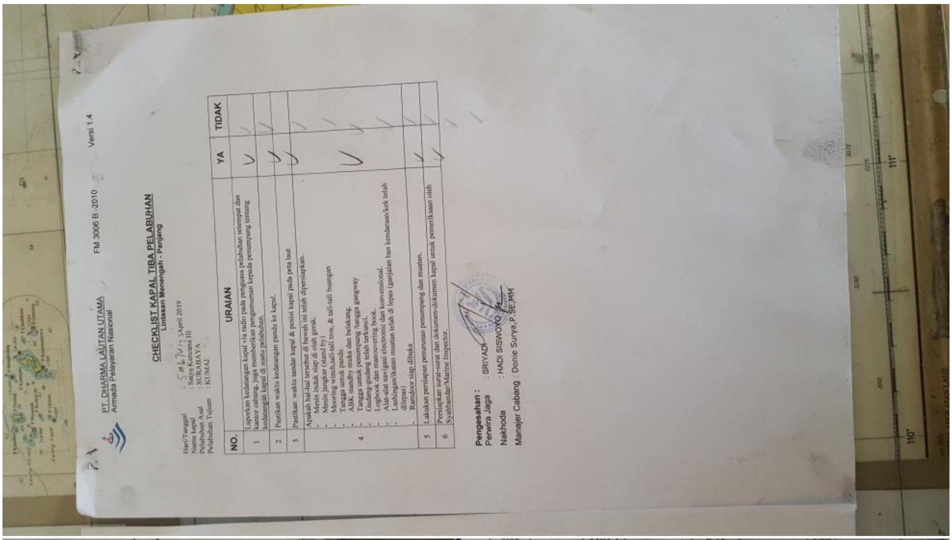
FM 3004 B -2010 Versi 1.6

CHECKLIST PERSIAPAN BERLAYAR
Lintasan Menengah - Panjang

Hari Tanggal : [illegible] April 2019 Pelabuhan Asal : Surabaya
Nama kapal : Satya Kencana III Pelabuhan Tujuan : Kumai

No	Uraian	Ya	Tidak
1.	**Persiapan diatas kapal:**		
	a. Apakah kapal sudah memiliki persediaan BBM, Air Tawar, minyak pelumas, dan perbekalan yang cukup ?	✓	
	b. Apakah kegiatan perpuatan kendaraan sudah selesai ?	✓	
	c. Apakah embarkasi penumpang sudah selesai ?	✓	
	d. Apakah prinsip dan pencegahan kebakaran sudah diberikan ?	✓	
	e. Apakah kondisi stabilitas dan draft kapal telah sesuai dengan yang distrandarkan ?	✓	
	f. Apakah kondisi alat-alat tambat dan perlengkapan jangkar dalam kondisi baik ?	✓	
	g. Apakah kondisi alat-alat keselamatan telah dicheck secara lengkap dan layak pakai ?	✓	
	h. Apakah kondisi jendela dan pintu kedap air telah berfungsi dengan baik ?	✓	
	i. Apakah crew kapal yang bertugas memiliki kualifikasi yang dituntut oleh perusahaan ?	✓	
	j. Apakah tersedia tempat limbah/sampah : ➢ Drum kosong untuk limbah cair ➢ Bak sampah untuk limbah padat ➢ Kotak untuk puntung rokok	✓	
	k. Apakah terpadang slogan pembuangan sampah pada tempatnya.	✓	
	l. Apakah setiap awak kapal telah mengerti dan melaksanakan kebijakan pencegahan pendemaran di laut	✓	
2.	**Diatas Deck**		
	a. Apakah petunjuk keselamtari dan pengumuman melalui Public addresser telah diberikan kepada penumpang ?	✓	
	b. Apakah jumlah muatan telah dilaporkankepada kantor perwakilan ?	✓	
	c. Apakah penumpang dan kendaraan (dilashing) sudah berada digeladak penumpang ?	✓	
	d. Apakah peta-peta dan buku petunjuk navigasi sudah dipersiapkan ?	✓	
	e. Apakah surat-surat dan dokumen kapal sudah tersedia diatas kapal ?	✓	
	f. Apakah alat-alat Navigasi telah dinyalakan	✓	
3.	**Sistem Peralatan Komunikasi**		
	a. Apakah berbagai sistem telekomunikasi di kapal sudah di tes dan dalam kondisi baik ?	✓	
	b. Apakah sistem VHF yang digunakan sudah di tes dan dalam kondisi baik ?	✓	
4.	**Kamar Mesin**		
	a. Apakah fungsi alarm sudah di check dengan baik ?	✓	
	b. Apakah pompa-pompa pemadam darurat sudah di check dan berada dalam kondisi layak ?	✓	
	c. Apakah kondisi mesin induk baik ?	✓	
	d. Apakah kondisi mesin bantu baik ?	✓	
	e. Apakah kondisi mesin kemudi baik ?	✓	
	f. Apakah pompa-pompa (OWS) dalam kondisi baik ?	✓	

Pengesahan :
Perwira Jaga : SRIYADI
Nakhoda : HADI SISWOYO
Manajer Cabang : Donie Surya P.SE.MM



PT. DHARMA LAUTAN UTAMA
Armada Pelayaran Nasional

FM 3006 B -2010 Versi 1.4

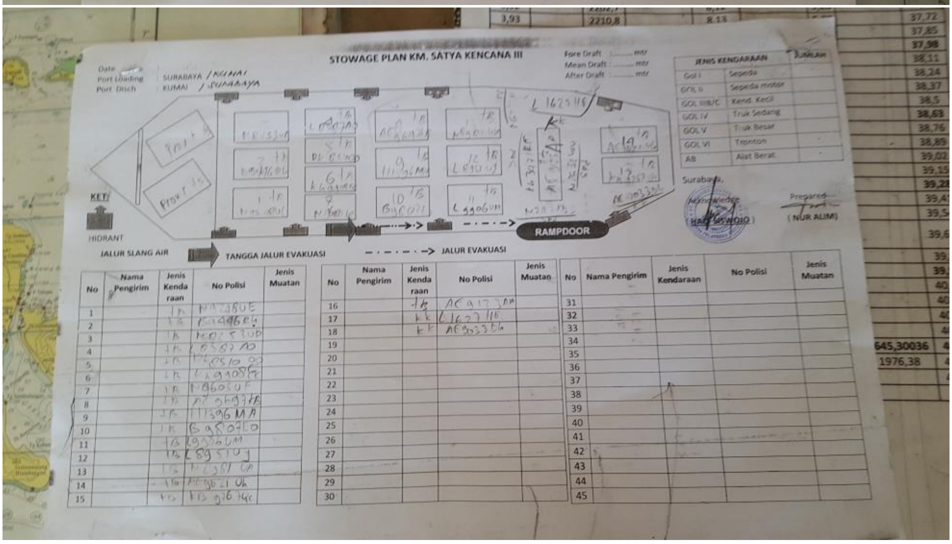
CHECKLIST KAPAL TIBA PELABUHAN

Lintasan Menengah - Panjang

Hari/Tanggal : Sabtu/13 April 2019
Nama kapal : Satya Kencana III
Pelabuhan Asal : SURABAYA
Pelabuhan Tujuan : KUMAI

NO.	URAIAN	YA	TIDAK
1	Laporkan kedatangan kapal via radio pada penguasa pelabuhan setempat dan kantor cabang, juga memberikan pengumuman kepada penumpang tentang kedatangan kapal di suatu pelabuhan.	√	
2	Pastikan waktu kedatangan pandu ke kapal.	√	
3	Pastikan waktu sandar kapal & posisi kapal pada peta laut	√	
4	Apakah hal-hal tersebut di bawah ini telah dipersiapkan. - Mesin induk siap di olah gerak. - Mesin jangkar (stand by) - Mooring winch,tali-tali tros, & tali-tali buangan - Tangga untuk pandu - ABK standby muka dan belakang. - Tangga untuk penumpang /tangga gangway - Gudang-gudang telah terkunci. - Logbook dan manouvering book. - Alat-alat navigasi electronic dan konvensional. - Lashingan/ikatan muatan telah di lepas (ganjalan ban kendaraan/kek telah dilepas) - Ramdoor siap dibuka	√	
5	Lakukan persiapan penurunan penumpang dan muatan.	√	
6	Persiapkan surat-surat dan dokumen-dokumen kapal untuk pemeriksaan oleh Syahbandar/Marine Inspector.	√	

Pengesahan :
Perwira Jaga : SRIYADI
Nakhoda : HADI SISWOYO
Manajer Cabang : Donie Surya,P.SE,MM



STOWAGE PLAN KM. SATYA KENCANA III

Date :
Port Loading : SURABAYA / KUMAI
Port Disch : KUMAI / SURABAYA

Fore Draft : .... mtr
Mean Draft : .... mtr
After Draft : .... mtr

JENIS KENDARAAN		JUMLAH
Gol I	Sepeda	
GOL II	Sepeda motor	
GOL III/B/C	Kend. Kecil	
GOL IV	Truk Sedang	
GOL V	Truk Besar	
GOL VI	Tronton	
AB	Alat Berat	

KET:
HIDRANT
JALUR SLANG AIR
TANGGA JALUR EVAKUASI
JALUR EVAKUASI
RAMPDOOR

Surabaya,
Acknowledge
(HADI SISWOYO)

Prepared
(NUR ALIM)

No	Nama Pengirim	Jenis Kendaraan	No Polisi	Jenis Muatan
1				
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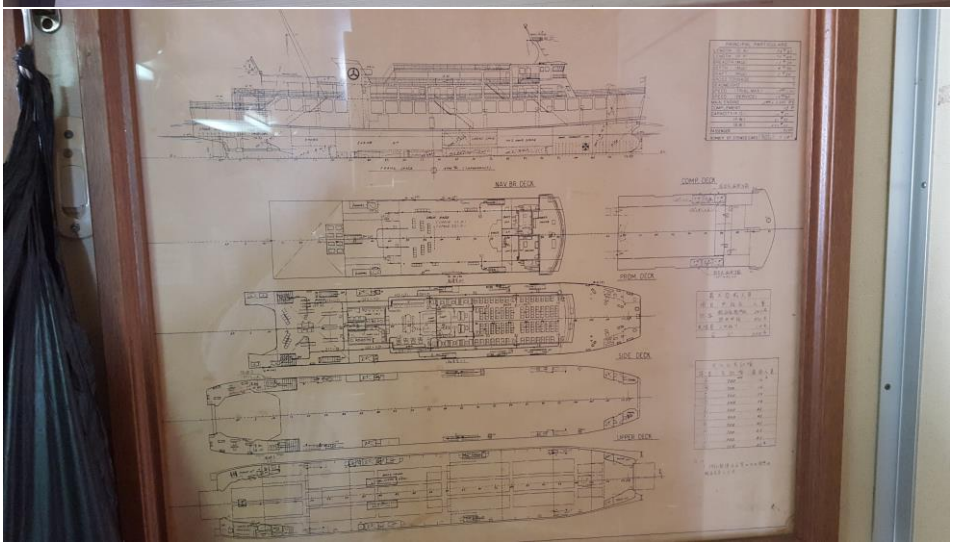
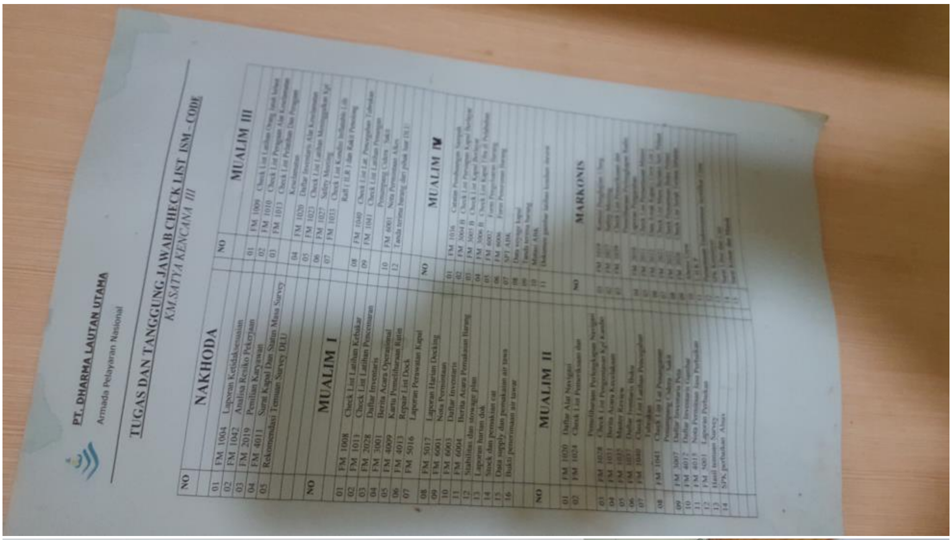
ALAT BANTU PERNAFASAN
LEMARI BAJU TAHAN API


NAV BR DECK
COMP DECK
MAIN DECK
SIDE DECK
UPPER DECK



PT. DHARMA LAUTAN UTAMA
Armada Pelayaran Nasional

TUGAS DAN TANGGUNG JAWAB CHECK LIST ISM - CODE
KM.SATYA KENCANA III

NO	NAKHODA
01	FM 1004 Laporan Ketidaksesuaian
02	FM 1042 Analisa Resiko Pekerjaan
03	FM 2019 Penilian Karyawan
04	FM 4011 Surat Kapal Dan Status Masa Survey
05	Rekomendasi Temuan Survey DLU

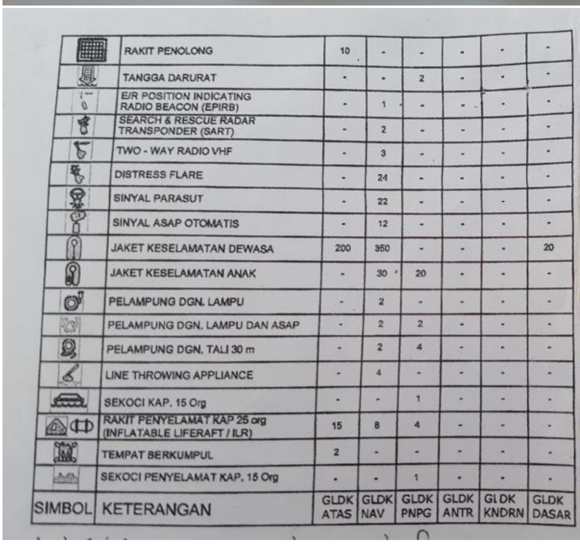
MUALIM I

MUALIM II

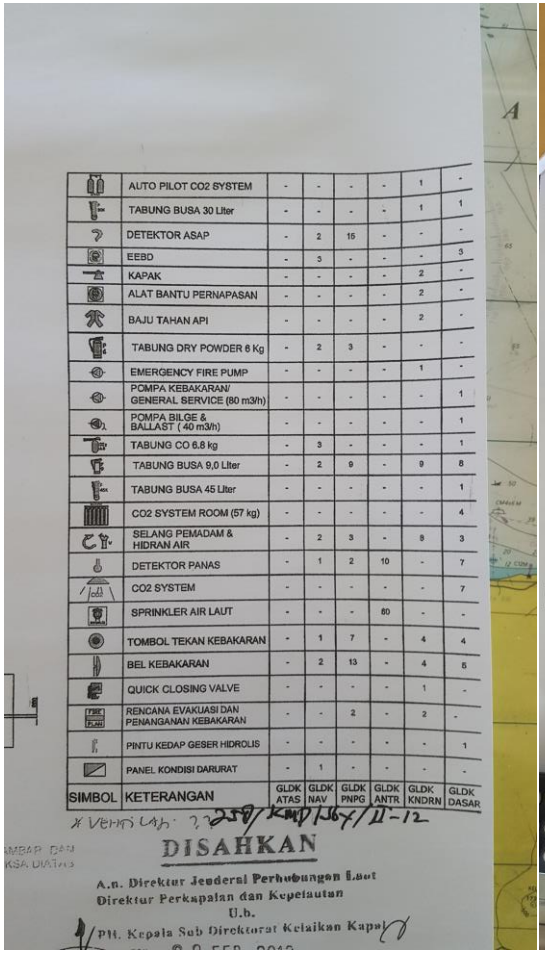
MUALIM III

MUALIM IV

MARKONIS



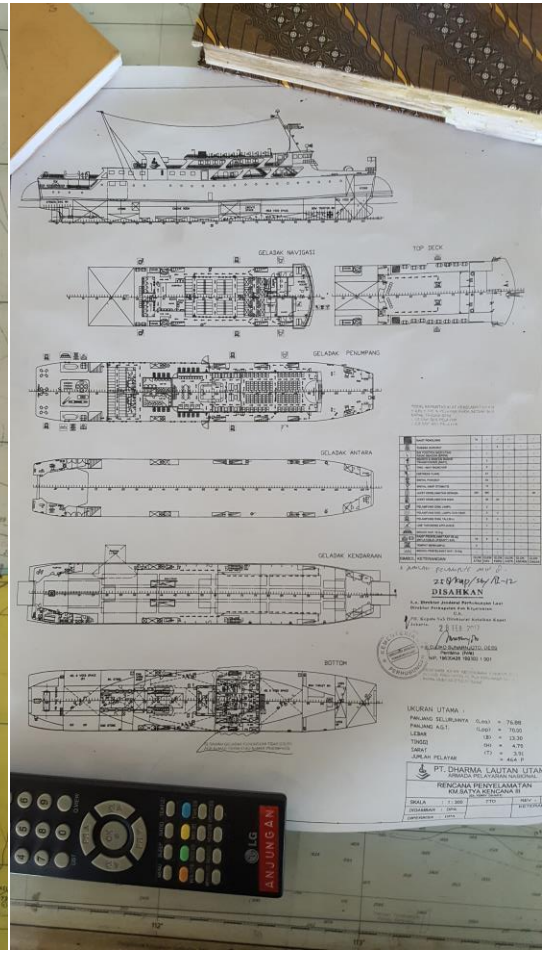
SIMBOL	KETERANGAN	GLDK ATAS	GLDK NAV	GLDK PNPG	GLDK ANTR	GLDK KNDRN	GLDK DASAR
	RAKIT PENOLONG	10	-	-	-	-	-
	TANGGA DARURAT	-	-	2	-	-	-
	E/R POSITION INDICATING RADIO BEACON (EPIRB)	-	1	-	-	-	-
	SEARCH & RESCUE RADAR TRANSPONDER (SART)	-	2	-	-	-	-
	TWO - WAY RADIO VHF	-	3	-	-	-	-
	DISTRESS FLARE	-	24	-	-	-	-
	SINYAL PARASUT	-	22	-	-	-	-
	SINYAL ASAP OTOMATIS	-	12	-	-	-	-
	JAKET KESELAMATAN DEWASA	200	350	-	-	-	20
	JAKET KESELAMATAN ANAK	-	30	20	-	-	-
	PELAMPUNG DGN. LAMPU	-	2	-	-	-	-
	PELAMPUNG DGN. LAMPU DAN ASAP	-	2	2	-	-	-
	PELAMPUNG DGN. TALI 30 m	-	2	4	-	-	-
	LINE THROWING APPLIANCE	-	4	-	-	-	-
	SEKOCI KAP. 15 Org	-	-	1	-	-	-
	RAKIT PENYELAMAT KAP 25 org (INFLATABLE LIFERAFT / ILR)	15	8	4	-	-	-
	TEMPAT BERKUMPUL	2	-	-	-	-	-
	SEKOCI PENYELAMAT KAP. 15 Org	-	-	1	-	-	-

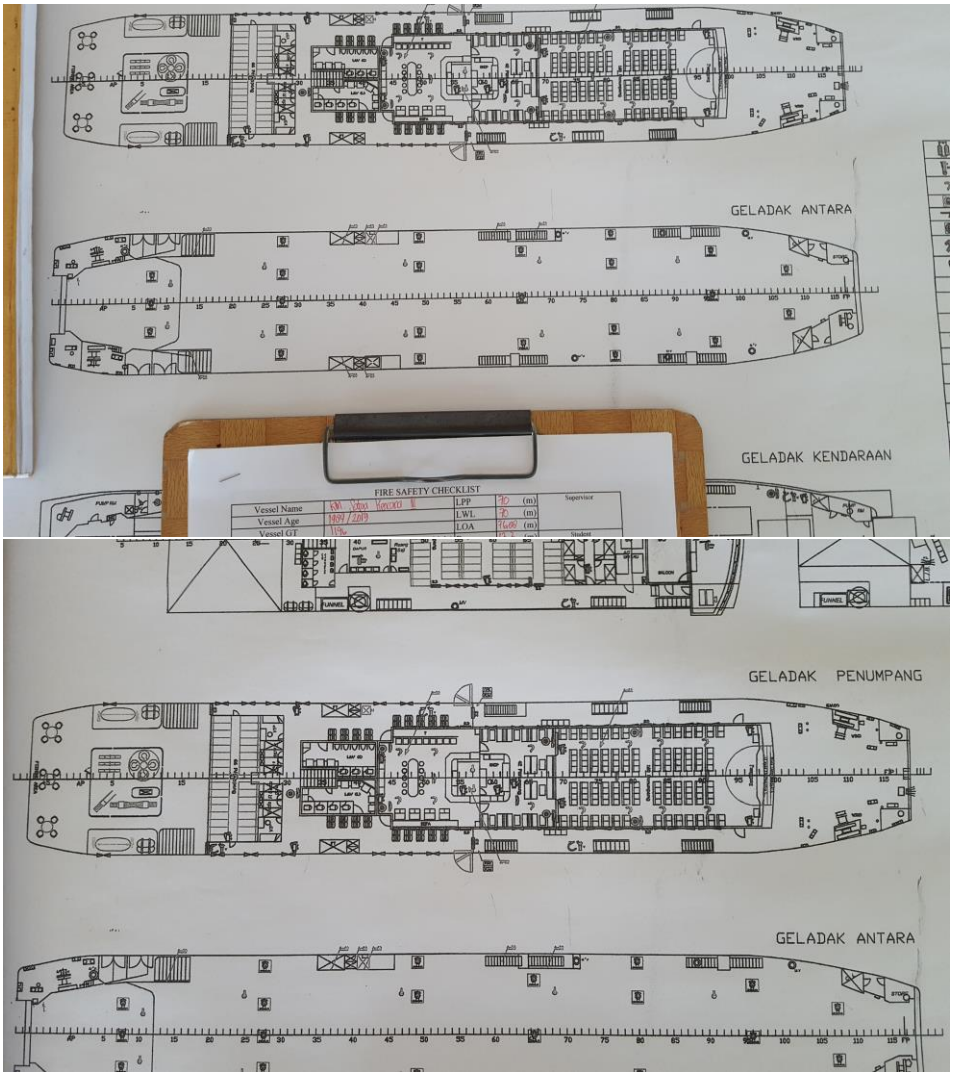


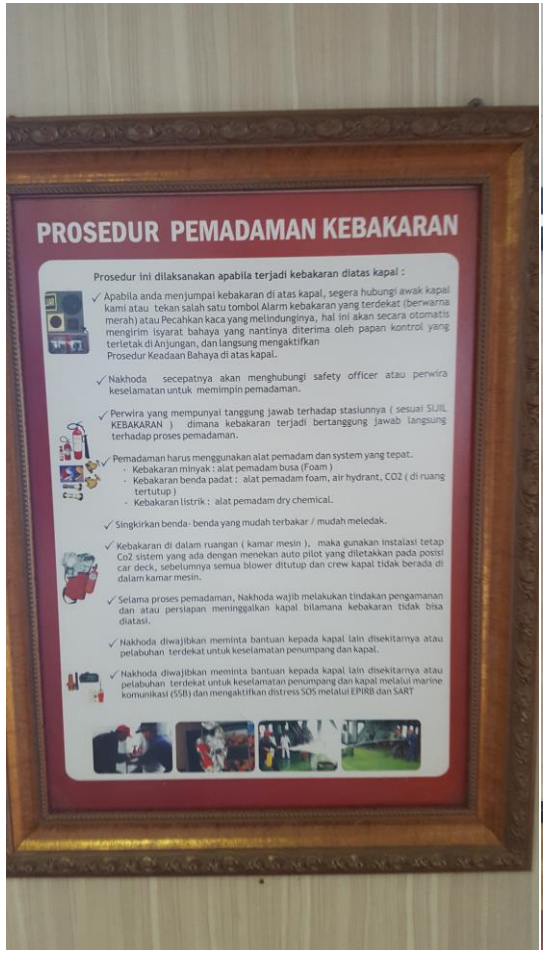
SIMBOL	KETERANGAN	GLDK ATAS	GLDK NAV	GLDK PNPG	GLDK ANTR	GLDK KNDRN	GLDK DASAR
	AUTO PILOT CO2 SYSTEM	-	-	-	-	1	-
	TABUNG BUSA 30 Liter	-	-	-	-	1	1
	DETEKTOR ASAP	-	2	15	-	-	-
	EEBD	-	3	-	-	-	3
	KAPAK	-	-	-	-	2	-
	ALAT BANTU PERNAPASAN	-	-	-	-	2	-
	BAJU TAHAN API	-	-	-	-	2	-
	TABUNG DRY POWDER 6 Kg	-	2	3	-	-	-
	EMERGENCY FIRE PUMP	-	-	-	-	1	-
	POMPA KEBAKARAN/ GENERAL SERVICE (80 m3/h)	-	-	-	-	-	1
	POMPA BILGE & BALLAST (40 m3/h)	-	-	-	-	-	1
	TABUNG CO 6.8 kg	-	3	-	-	-	1
	TABUNG BUSA 9,0 Liter	-	2	9	-	9	8
	TABUNG BUSA 45 Liter	-	-	-	-	-	1
	CO2 SYSTEM ROOM (57 kg)	-	-	-	-	-	4
	SELANG PEMADAM & HIDRAN AIR	-	2	3	-	9	3
	DETEKTOR PANAS	-	1	2	10	-	7
	CO2 SYSTEM	-	-	-	-	-	7
	SPRINKLER AIR LAUT	-	-	-	80	-	-
	TOMBOL TEKAN KEBAKARAN	-	1	7	-	4	4
	BEL KEBAKARAN	-	2	13	-	4	5
	QUICK CLOSING VALVE	-	-	-	-	1	-
	RENCANA EVAKUASI DAN PENANGANAN KEBAKARAN	-	-	2	-	2	-
	PINTU KEDAP GESER HIDROLIS	-	-	-	-	-	1
	PANEL KONDISI DARURAT	-	1	-	-	-	-

DISAHKAN

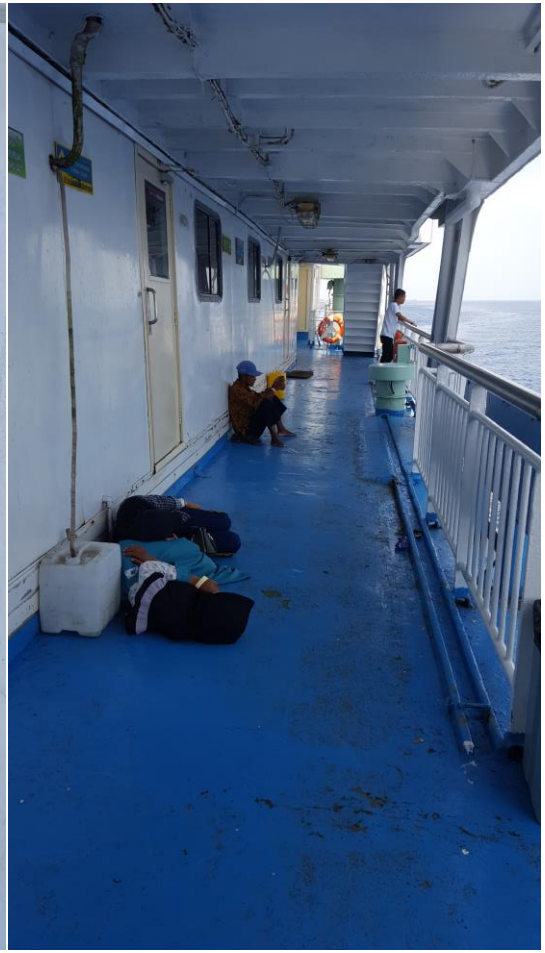
A.n. Direktur Jenderal Perhubungan Laut
Direktur Perkapalan dan Kepelautan
U.b.
Plt. Kepala Sub Direktorat Kelaikan Kapal



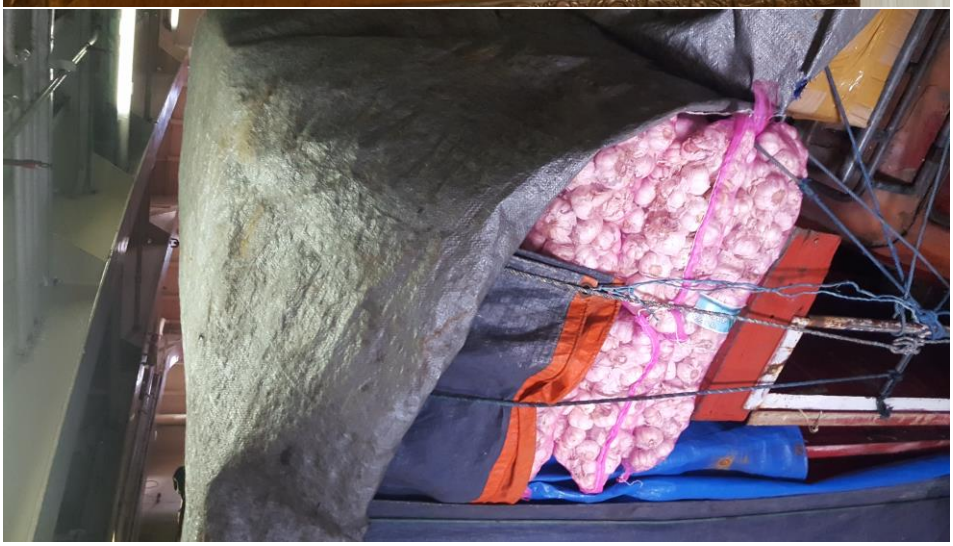

GELADAK ANTARA
GELADAK KENDARAAN
FIRE SAFETY CHECKLIST
Vessel Name
Vessel Age
Vessel GT
LPP
LWL
LOA
Supervisor
Student
GELADAK PENUMPANG
GELADAK ANTARA

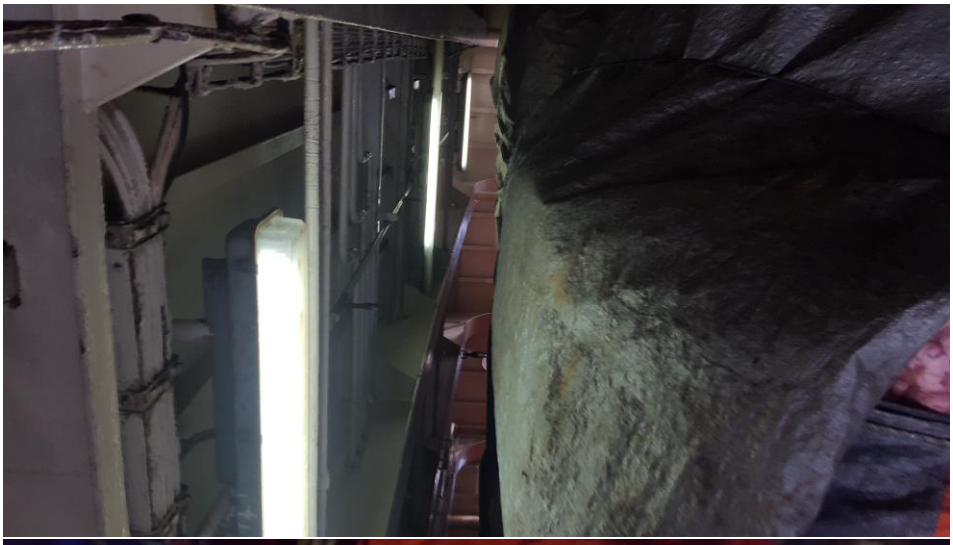

PROSEDUR PEMADAMAN KEBAKARAN
Prosedur ini dilaksanakan apabila terjadi kebakaran diatas kapal :
✓ Apabila anda menjumpai kebakaran di atas kapal, segera hubungi awak kapal kami atau tekan salah satu tombol Alarm kebakaran yang terdekat (berwarna merah) atau Pecahkan kaca yang melindunginya, hal ini akan secara otomatis mengirim isyarat bahaya yang nantinya diterima oleh papan kontrol yang terletak di Anjungan, dan langsung mengaktifkan Prosedur Keadaan Bahaya di atas kapal.
✓ Nakhoda secepatnya akan menghubungi safety officer atau perwira keselamatan untuk memimpin pemadaman.
✓ Perwira yang mempunyai tanggung jawab terhadap stasiunnya (sesuai SIJIL KEBAKARAN) dimana kebakaran terjadi bertanggung jawab langsung terhadap proses pemadaman.
✓ Pemadaman harus menggunakan alat pemadam dan system yang tepat.
- Kebakaran minyak : alat pemadam busa (Foam)
- Kebakaran benda padat : alat pemadam foam, air hydrant, CO2 (di ruang tertutup)
- Kebakaran listrik : alat pemadam dry chemical.
✓ Singkirkan benda- benda yang mudah terbakar / mudah meledak.
✓ Kebakaran di dalam ruangan (kamar mesin), maka gunakan instalasi tetap Co2 sistem yang ada dengan menekan auto pilot yang diletakkan pada posisi car deck, sebelumnya semua blower ditutup dan crew kapal tidak berada di dalam kamar mesin.
✓ Selama proses pemadaman, Nakhoda wajib melakukan tindakan pengamanan dan atau persiapan meninggalkan kapal bilamana kebakaran tidak bisa diatasi.
✓ Nakhoda diwajibkan meminta bantuan kepada kapal lain disekitarnya atau pelabuhan terdekat untuk keselamatan penumpang dan kapal.
✓ Nakhoda diwajibkan meminta bantuan kepada kapal lain disekitarnya atau pelabuhan terdekat untuk keselamatan penumpang dan kapal melalui marine komunikasi (SSB) dan mengaktifkan distress SOS melalui EPIRB dan SART

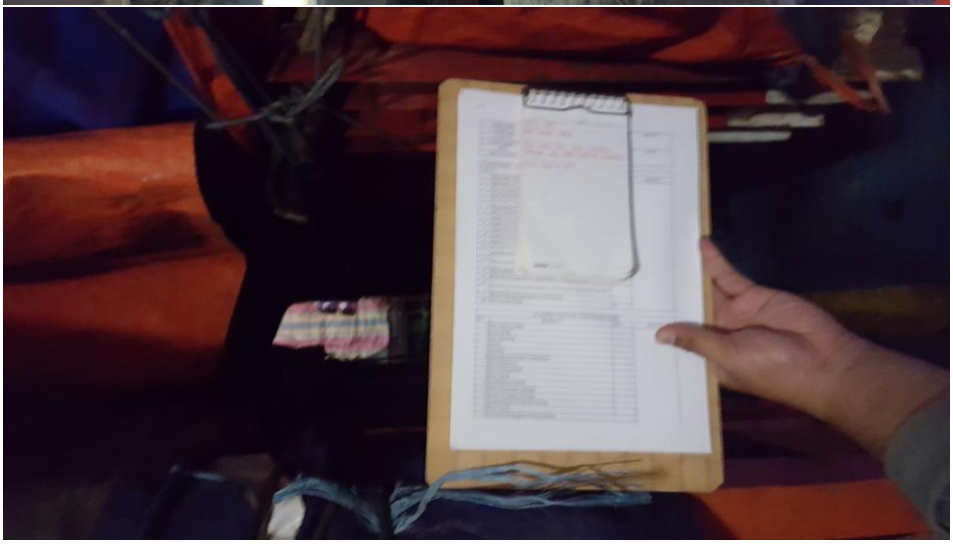
PELAMPUNG

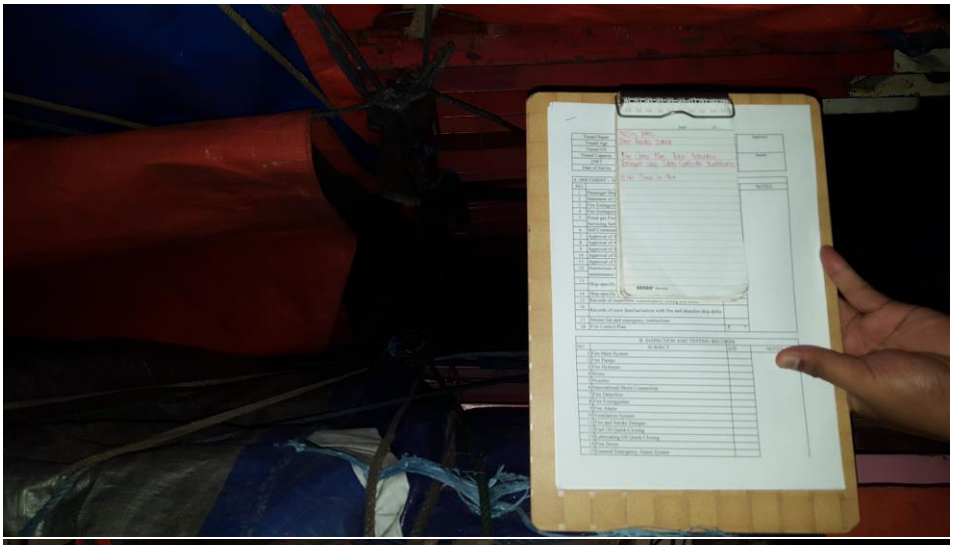

PROSEDUR PELUNCURAN
LIFE RAFT
ISM Code
Works
ALAT PELEPAS OTOMATIS
JANGAN DIPEGANG
UNIT SEPERTI INI ATAU SEJENIS
PELEPAS MANUAL
CARILAH DAN LEPASKAN
PENGAIT MANUAL
3 PERIKSA TALI IKATAN
4 PERIKSA PANDANGAN SAMPING
5 LEMPAR LIFE RAFT
6 TARIK TALI IKATAN
JANGAN MELUNCURKAN LIFE RAFT HINGGA BENAR-BENAR SIAP DIGUNAKAN
A LIFE RAFT AKAN TERLEPAS DAN MENGAPUNG KE ATAS
B KEMUDIAN AKAN MENGEMBANG DAN TERBEBAS DARI KAPAL
C KEMUDIAN AKAN MENGAPUNG DI PERMUKAAN AIR
ALAT PELEPAS OTOMATIS
PROSEDUR
JIKA LIFE RAFT TERBALIK
ARAH ANGIN
TERBALIK
TARIK
BALIKAN
PERSIAPKAN DIRI ANDA: PASTIKAN DIRI ANDA TELAH MEMAKAI JAKET KESELAMATAN
SUHU DINGIN DAPAT MENIMBULKAN HYPOTHERMIA


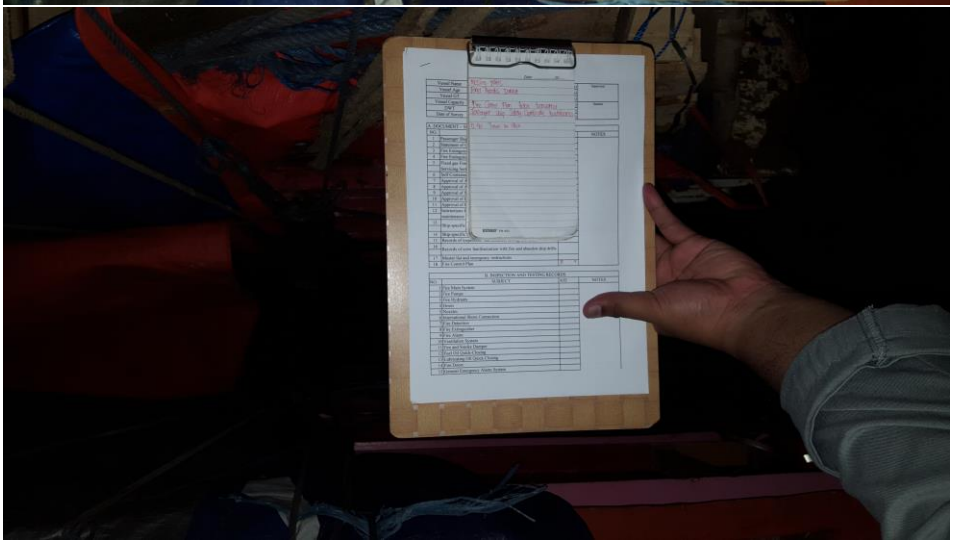

SISTEM MANAJEMEN KESELAMATAN
ARMADA PT. DHARMA LAUTAN UTAMA
PT. DHARMA LAUTAN UTAMA
ISM-Code Certificate
Sertifikat Manajemen Keselamatan
DOC (Document Of Compliance)
Sertifikat Manajemen Keselamatan yang harus dimiliki oleh Perusahaan
Untuk kantor PT. Dharma Lautan Utama memiliki sertifikat DOC yang dilakukan
berkelanjutan oleh Biro Klasifikasi Indonesia.
SMC (Safety Management Certificate)
Sertifikat Manajemen Keselamatan yang harus dimiliki oleh kapal
Seluruh armada kapal PT. Dharma Lautan Utama memiliki sertifikat SMC
yang merupakan pengakuan terhadap standart keselamatan secara
internasional yang dalam memperolehnya dilakukan Verifikasi secara
berkala oleh lembaga yang ditunjuk oleh pemerintah yaitu dalam hal
ini Biro Klasifikasi Indonesia.
Verifikasi Sistem Keselamatan Dilakukan
Verifikasi system keselamatan (audit) yang dilakukan :
Internal Audit
Dilakukan internal audit sistem manajemen keselamatan secara berkala setiap tahun
Eksternal Audit
Sertifikasi SMC Dilakukan Eksternal Audit oleh PT. Biro Klasifikasi Indonesia sesuai dengan jadwal verifikasi
Untuk Sertifikasi DOC dilakukan Eksternal Audit oleh PT. BKI setiap tahun sekali
Latihan Penanggulangan Kejadian Berbahaya
Dilakukan latihan latihan keadaan darurat secara kontinyu oleh seluruh crew kapal pada seluruh armada PT. Dharma lautan Utama.
Program program latihan tersebut meliputi :
Latihan Kebakaran dilaksanakan satu minggu sekali
Latihan Meninggalkan Kapal dilaksanakan satu minggu sekali
Latihan Menolong Orang Jatuh ke Laut dilaksanakan 1 bulan sekali
Latihan Menanggulangi Pencemaran dilaksanakan setiap 1 bulan sekali
Latihan Pengatasan Kapal Kandas dilaksanakan setiap tiga bulan sekali
Latihan Pengatasan Kerusakan Kemudi dilaksaakan setiap tiga bulan sekali.
LatihanPengatasan Kerusakan Motor Pokok setiap tiga bulan sekali.
Keselamatan Tanggung Jawab Kita Bersama

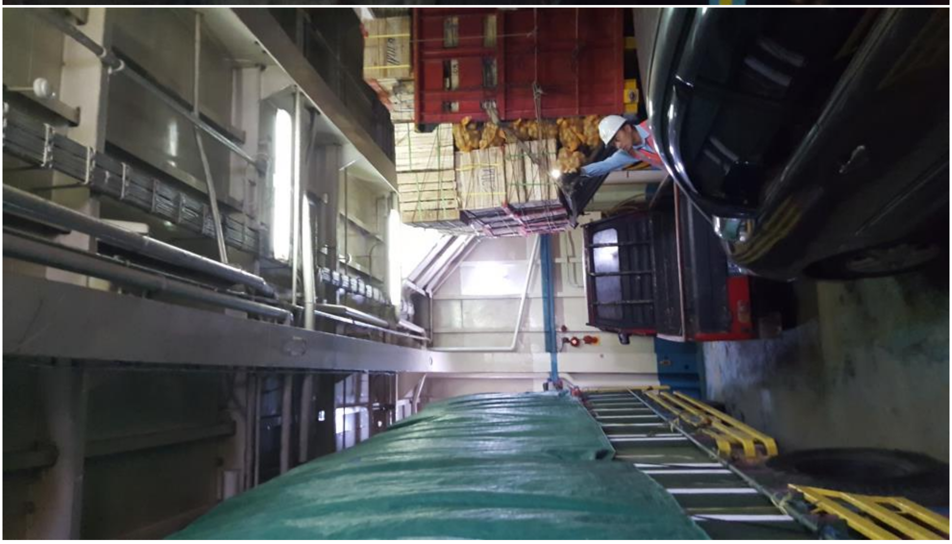


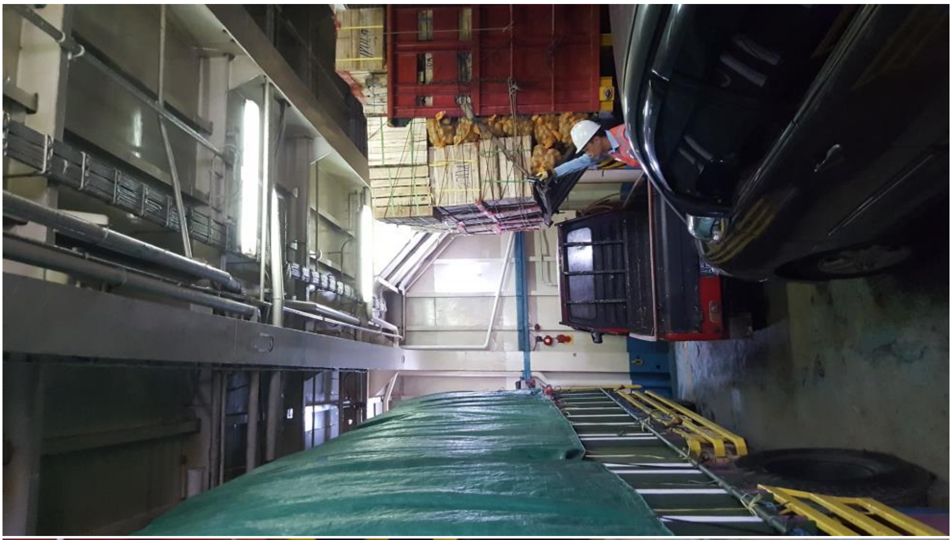


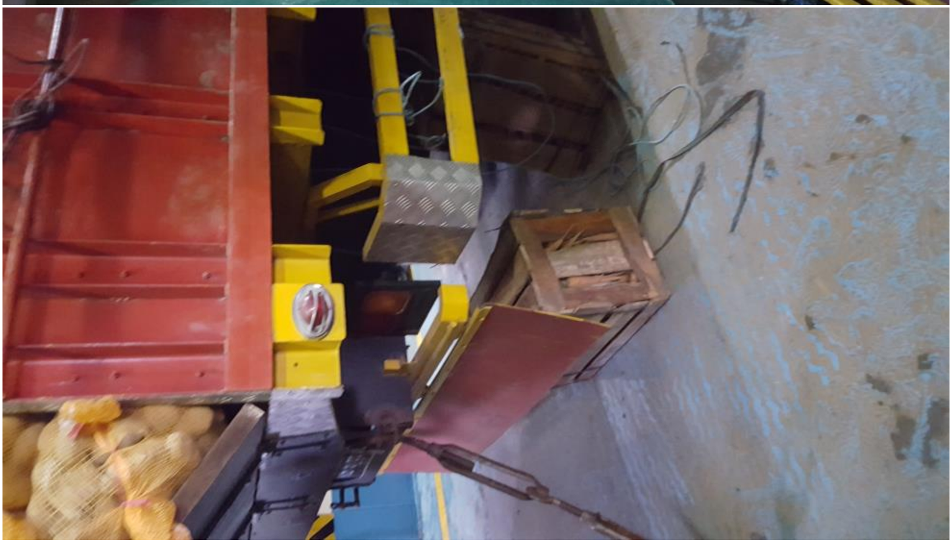




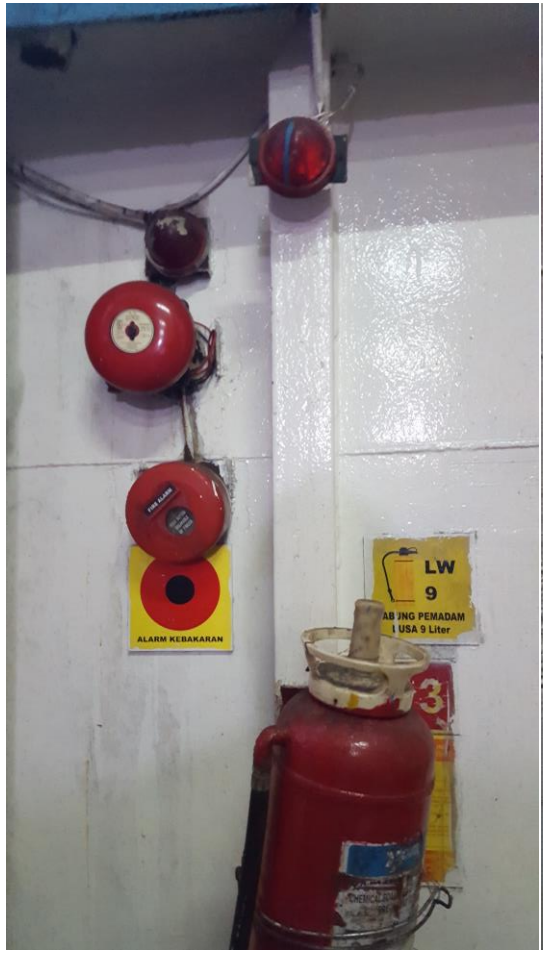


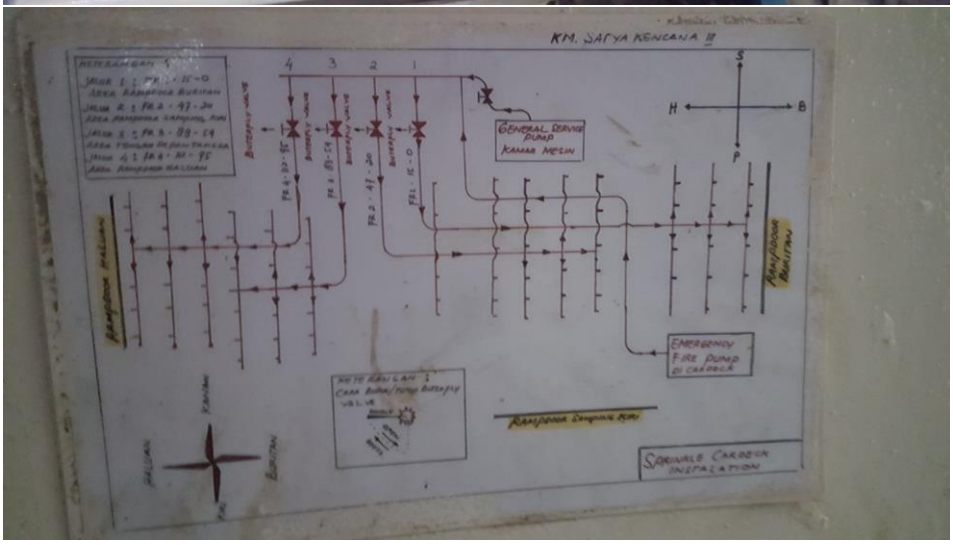




TAMPİL


ALARM KEBAKARAN
LW
9
USA 9 Liter


EMERGENCY
GENERATOR
GUDANG
LASHING


KM. SARYA KENCANA VII
4
3
2
1
S
H
B
P
GENERAL SERVICE PUMP
KAMAR MESIN
EMERGENCY FIRE PUMP IN CARGO
SEWAGE CARGO INSTALATION


ISO


15


REMOTE PENUTUP
KATUP BAHAN BAKAR
(QUICK CLOSING VALVE)
PETUNJUK KERJA
QUICK CLOSE VALVE
• Pastikan angin kerja selalu terbuka pada botol angin dengan tekanan ± 5 – 10 Kh /cm2
• Buka Box Quick Close Valve
• Buka Kran Utama Untuk Pemicu Quick Close Valve
• Tarik tuas Pemicu Quick Close Valve, maka semua kran tanki BBM harian dan tangki Setting BBM ME dan AE akan tertutup
ISC


REMOTE PENUTUP
KATUP BAHAN BAKAR
(QUICK CLOSING VALVE)
PETUNJUK KERJA
QUICK CLOSE VALVE
• Pastikan angin kerja selalu terbuka pada botol angin dengan tekanan ± 5 – 10 Kh /cm2
• Buka Box Quick Close Valve
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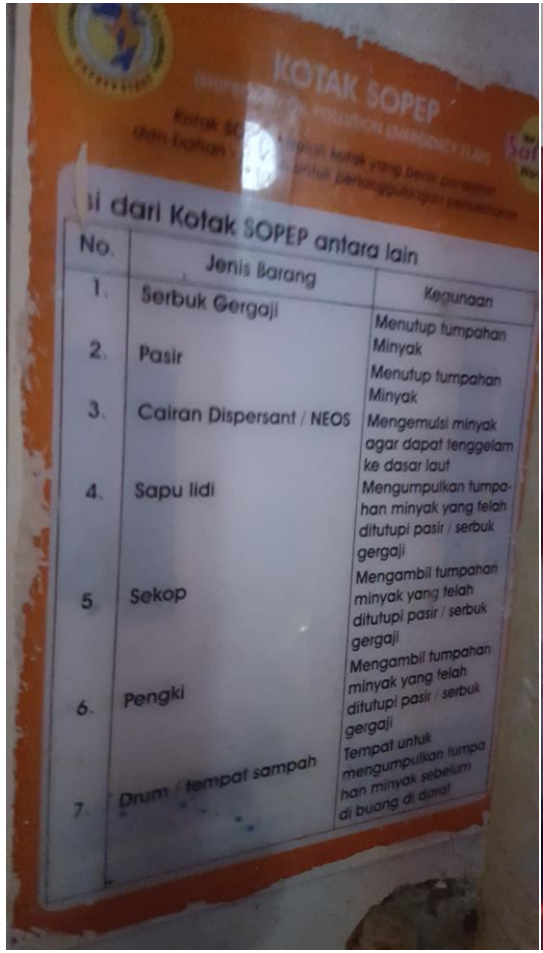
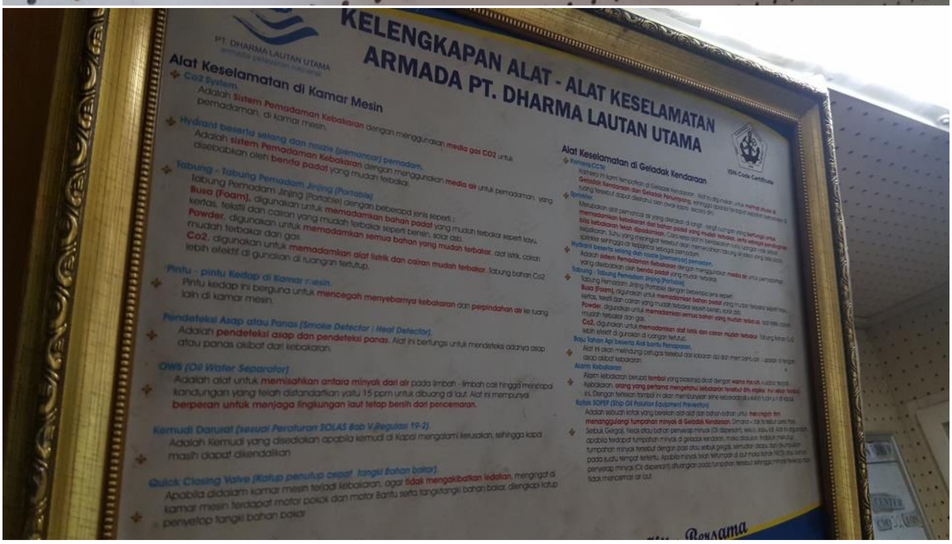
• Tarik tuas Pemicu Quick Close Valve, maka semua kran tanki BBM harian dan tangki Setting BBM ME dan AE akan tertutup
ISC

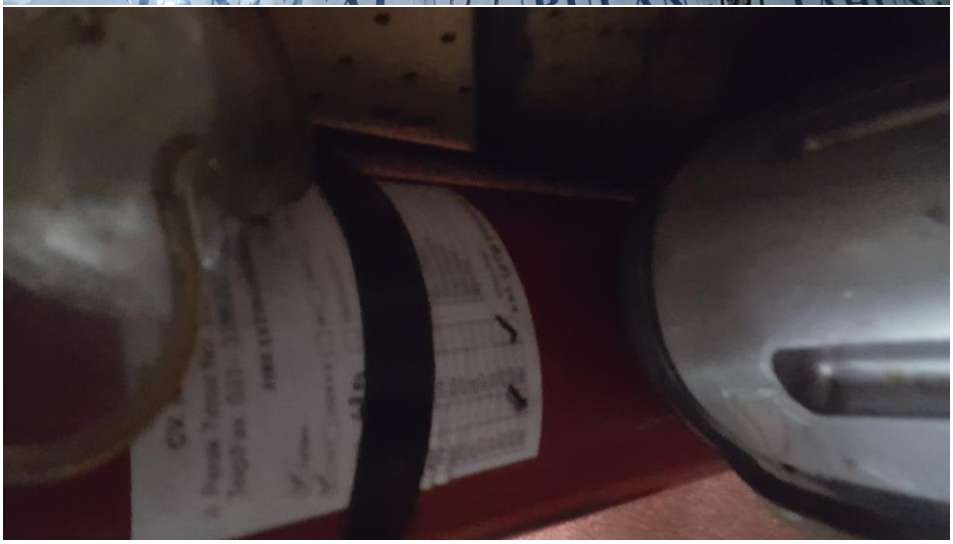

KOTAK SOPEP
si dari Kotak SOPEP antara lain
No.
Jenis Barang
Kegunaan
1. Serbuk Gergaji
Menutup tumpahan Minyak
2. Pasir
Menutup tumpahan Minyak
3. Cairan Dispersant / NEOS
Mengemulsi minyak agar dapat tenggelam ke dasar laut
4. Sapu lidi
Mengumpulkan tumpahan minyak yang telah ditutupi pasir / serbuk gergaji
5. Sekop
Mengambil tumpahan minyak yang telah ditutupi pasir / serbuk gergaji
6. Pengki
Mengambil tumpahan minyak yang telah ditutupi pasir / serbuk gergaji
7. Drum / tempat sampah
Tempat untuk mengumpulkan tumpahan minyak sebelum di buang di darat

CO2
CO2 SYSTEM


BUSA 9 Liter
TABUNG PEMADAM
Super Busa
Cara Penggunaan
DIGUNAKAN UNTUK
29


PT. DHARMA LAUTAN UTAMA
KELENGKAPAN ALAT - ALAT KESELAMATAN ARMADA PT. DHARMA LAUTAN UTAMA
Alat Keselamatan di Kamar Mesin
Co2 System.
Adalah Sistem Pemadaman Kebakaran dengan menggunakan media gas CO2 untuk pemadaman, di kamar mesin.
Hydrant beserta selang dan nozzle (pemancar) pemadam.
Adalah sistem Pemadaman Kebakaran dengan menggunakan media air untuk pemadaman, yang disebabkan oleh benda padat yang mudah terbakar.
Tabung - Tabung Pemadam Jinjing (Portable)
Tabung Pemadam Jinjing (Portable) dengan beberapa jenis seperti :
Busa (Foam), digunakan untuk memadamkan bahan padat yang mudah terbakar seperti kayu, kertas, tekstil dan cairan yang mudah terbakar seperti bensin, solar dsb.
Powder, digunakan untuk memadamkan semua bahan yang mudah terbakar, alat listrik, cairan mudah terbakar dan gas.
Co2, digunakan untuk memadamkan alat listrik dan cairan mudah terbakar. Tabung bahan Co2 lebih efektif di gunakan di ruangan tertutup.
Pintu - pintu Kedap di Kamar mesin.
Pintu kedap ini berguna untuk mencegah menyebarnya kebakaran dan perpindahan air ke ruang lain di kamar mesin.
Pendeteksi Asap atau Panas (Smoke Detector / Heat Detector).
Adalah pendeteksi asap dan pendeteksi panas. Alat ini berfungsi untuk mendeteksi adanya asap atau panas akibat dari kebakaran.
OWS (Oil Water Separator)
Adalah alat untuk memisahkan antara minyak dari air pada limbah - limbah cair hingga mencapai kandungan yang telah distandartkan yaitu 15 ppm untuk dibuang di laut. Alat ini mempunyai berperan untuk menjaga lingkungan laut tetap bersih dari pencemaran.
Kemudi Darurat (sesuai Peraturan SOLAS Bab V,Regulasi 19-2)
Adalah Kemudi yang disediakan apabila kemudi di Kapal mengalami kerusakan, sehingga kapal masih dapat dikendalikan
Quick Closing Valve (Katup penutup cepat tangki Bahan bakar).
Apabila didalam kamar mesin terjadi kebakaran, agar tidak mengakibatkan ledakan, mengingat di kamar mesin terdapat motor pokok dan motor Bantu serta tangki-tangki bahan bakar, dilengkapi katup penyetop tangki bahan bakar
Alat Keselamatan di Geladak Kendaraan


火災警報
非常警報

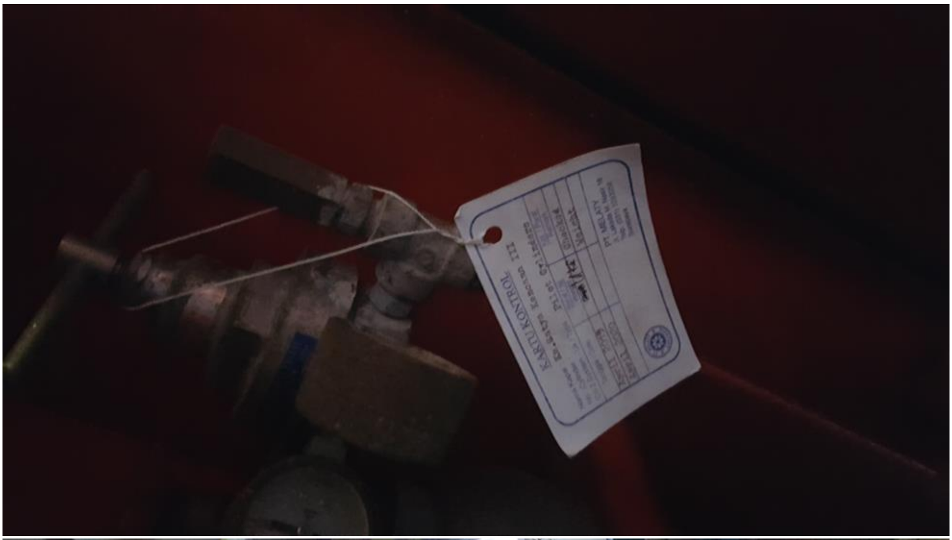



OneMed


LW
30
TABUNG PEMADAM
BUSA 30 LTR

CV NAUTICAL MERINUS
Jl. Perak Timur No. 564 Blok A7, Surabaya
Telp/Fax. 031 - 3286288,031 - 3281043
FIRE EXTINGUISHER
45 Ltr


EMERGENCY
FIRE PUMP



KARTU KONTROL
PT MELATY


MASA BERLAKU UJI BERKALA : 10-10-2018
(PERIODICAL INSPECTION VALIDITY)
BERAT KOSONG KENDARAAN (KERB WEIGHT)
PANJANG KENDARAAN (LENGTH)
LEBAR KENDARAAN (WIDTH)
TINGGI KENDARAAN (HEIGHT)
J.B.B (G.V.W)
J.B.I (G.P.W)
M.S.T (M.A.L)
DAYA ANGKUT (PAY LOAD)
- ORANG (60 KG/PERSON)
- BARANG (GOODS)
KELAS JALAN TERENDAH (LOWEST ROAD CLASS)
DINAS/ KANTOR (VEHICLE INSPECTION OFFICE)
JKT587515

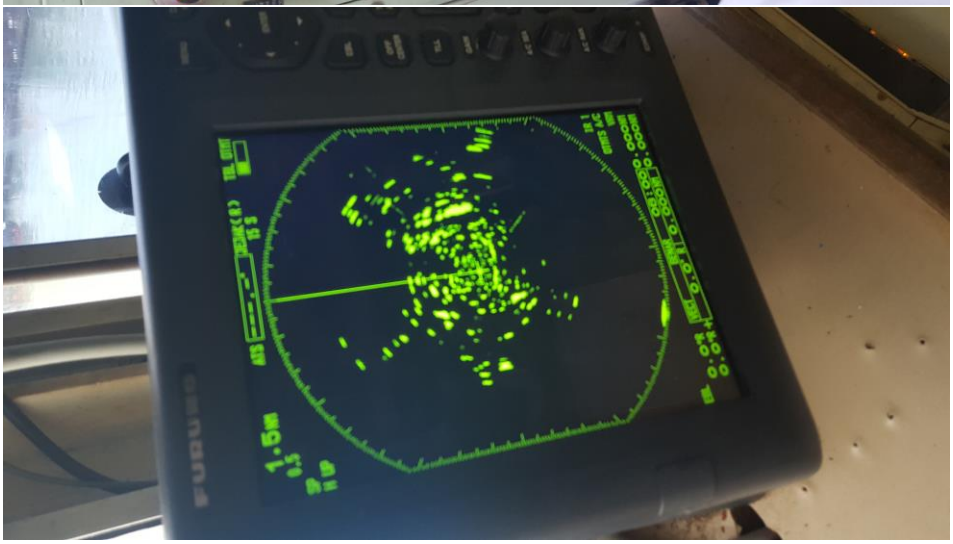
11

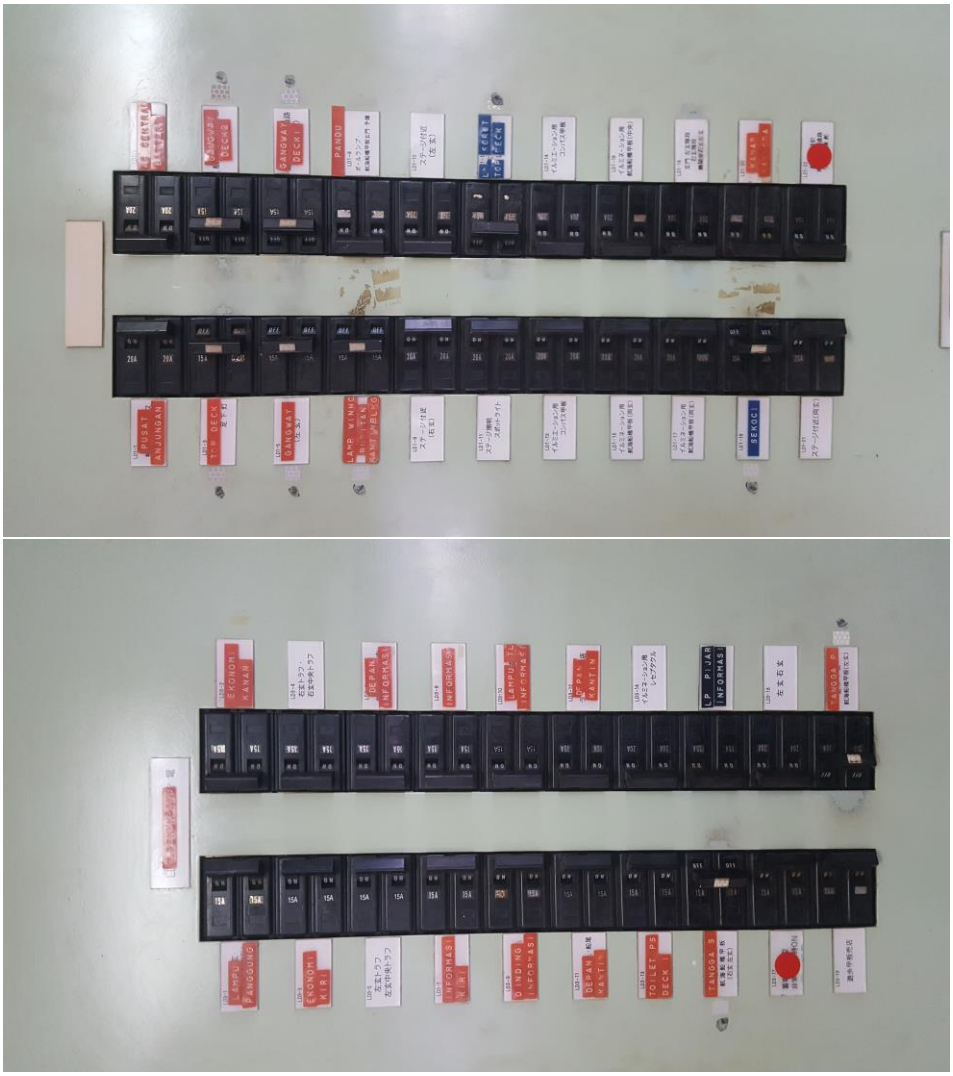

ME II
LW
30
39


LW
9
TABUNG PEMADAM
BUSA 9 Liter
ALARM KEBAKARAN


SIJIL MENANGANI KEBAKARAN
KM. SATYA KENCANA III
NAMA
JABATAN
TANGGUNG JAWAB


SPEED
CONTROL POSITION


FURUNO
1.5NM

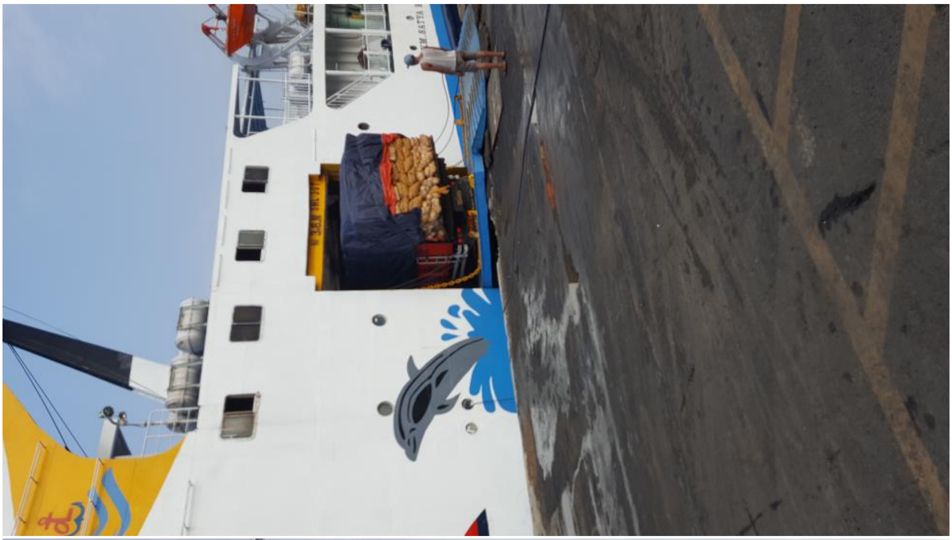



We Serve The Nation
Ferry
We Serve The


We Serve The Nation
Ferry
We Serve The


RHENOZ
MITSUBISHI

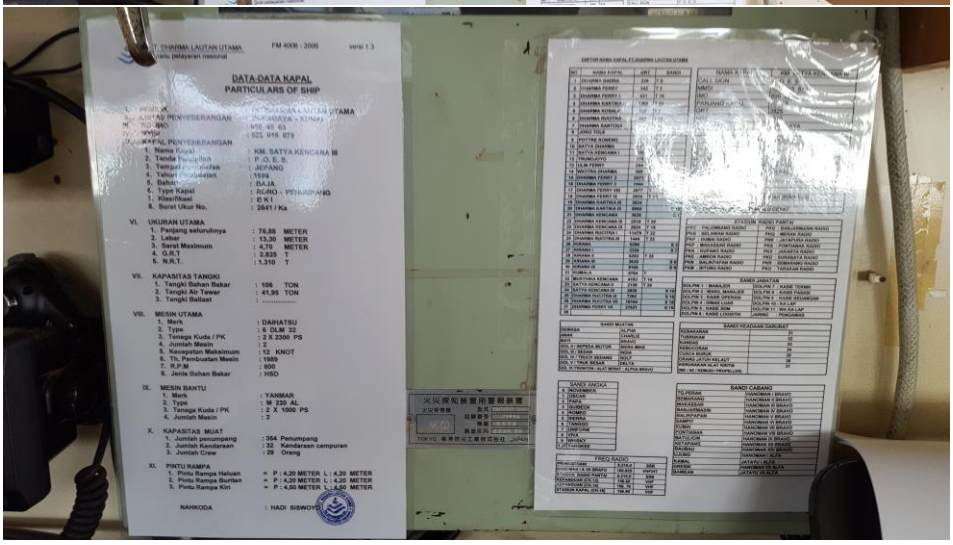

Independent
SATYA KENCANA III



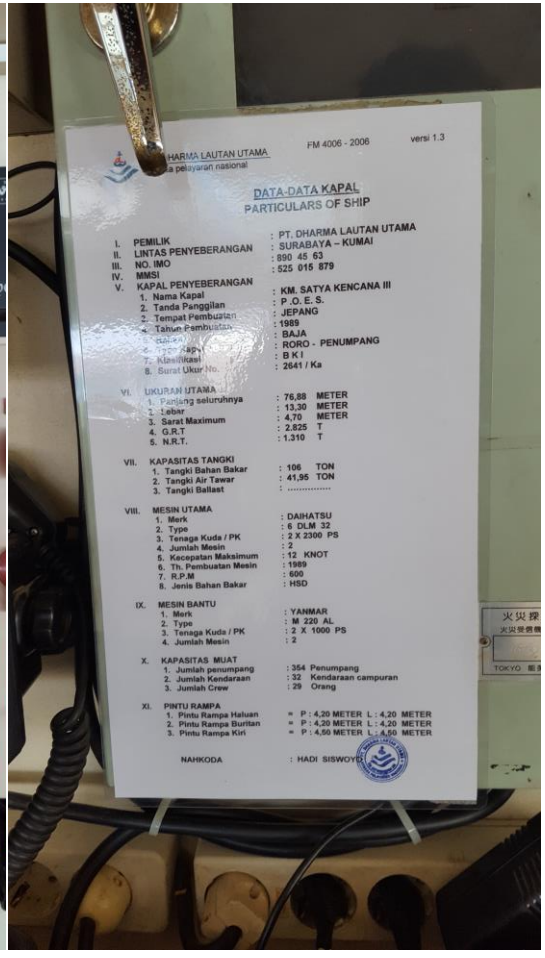

KENCANA III


BORNEO CITY


30A
24V ⟶ 12V
POWER
FUSE
High quality
car power supply transformer
IN
24V
FIRE ALARM
BUZZER
ブザー

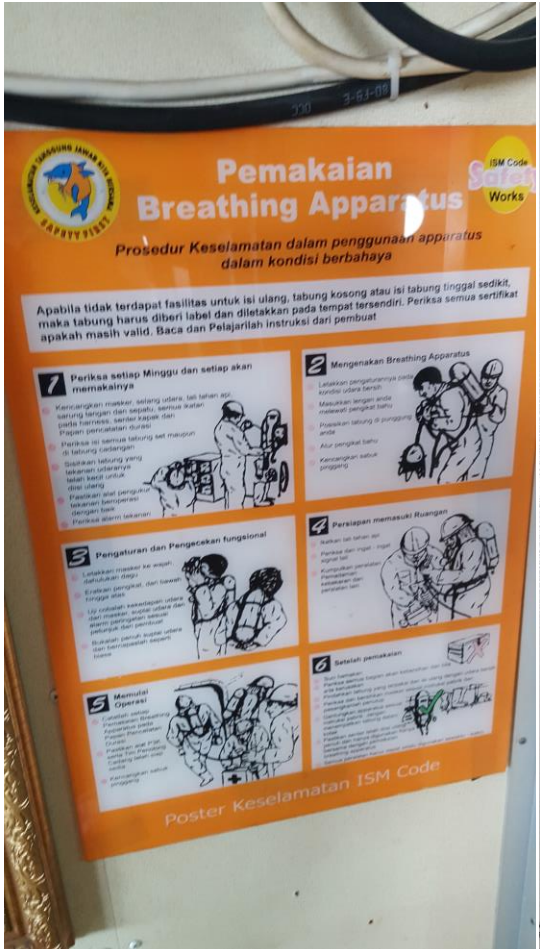

DATA-DATA KAPAL
PARTICULARS OF SHIP
FM 4008 : 2005
versi 1.3
KAPAL PENYEBERANGAN
Nama Kapal : KM. SATYA KENCANA III
Tanda Panggilan : P. O. E. S.
Tempat Pembuatan : JEPANG
Tahun Pembuatan : 1999
Bahan : BAJA
Type Kapal : AGRO - PENUMPANG
Klas/Ikasi : B K I
Surat Ukur No. : 2641 / Ka
UKURAN UTAMA
1. Panjang seluruhnya : 76,88 METER
2. Lebar : 13,30 METER
3. Sarat Maximum : 4,70 METER
4. G.R.T : 3.835 T
5. N.R.T. : 1.310 T
KAPASITAS TANGKI
1. Tangki Bahan Bakar : 106 TON
2. Tangki Air Tawar : 41,95 TON
3. Tangki Ballast : .....
MESIN UTAMA
1. Merk : DAIHATSU
2. Type : 6 DLM 32
3. Tenaga Kuda / PK : 2 X 2300 PS
4. Jumlah Mesin : 2
5. Kecepatan Maksimum : 12 KNOT
6. Th. Pembuatan Mesin : 1999
7. R.P.M : 600
8. Jenis Bahan Bakar : HSD
MESIN BANTU
1. Merk : YANMAR
2. Type : M 220 AL
3. Tenaga Kuda / PK : 2 X 1000 PS
4. Jumlah Mesin : 2
KAPASITAS MUAT
1. Jumlah penumpang : 354 Penumpang
2. Jumlah Kendaraan : 32 Kendaraan campuran
3. Jumlah Crew : 29 Orang
PINTU RAMPA
1. Pintu Rampa Haluan = P : 4,20 METER L : 4,20 METER
2. Pintu Rampa Buritan = P : 4,20 METER L : 4,20 METER
3. Pintu Rampa Kiri = P : 4,50 METER L : 4,50 METER
NAHKODA : HADI SISWOYO

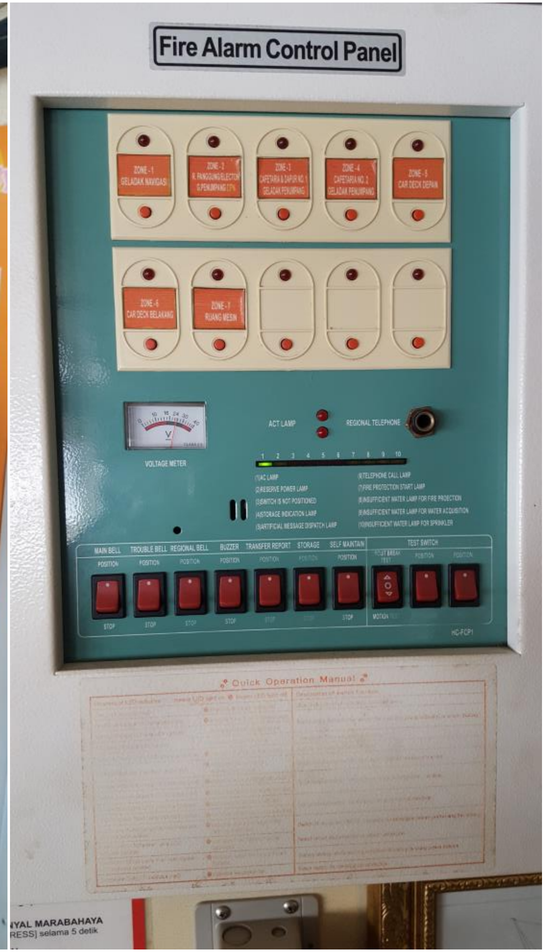

ENGINE ROOM HORON GAS
GAS DISCHARGE ALARM
HARON VESSEL
消火
EXTINGUISH
低下
VESSEL PRESS
SOURCE
低下
LOW
投入
ON
BUZZER STOP
LAMP BUZZER TEST
DIMMER
Kashiwa Co., Ltd.


HARMA LAUTAN UTAMA
a pelayaran nasional
FM 4006 - 2006
versi 1.3
DATA-DATA KAPAL
PARTICULARS OF SHIP
I. PEMILIK : PT. DHARMA LAUTAN UTAMA
II. LINTAS PENYEBERANGAN : SURABAYA – KUMAI
III. NO. IMO : 890 45 63
IV. MMSI : 525 015 879
V. KAPAL PENYEBERANGAN
1. Nama Kapal : KM. SATYA KENCANA III
2. Tanda Panggilan : P.O.E.S.
3. Tempat Pembuatan : JEPANG
4. Tahun Pembuatan : 1989
: BAJA
: RORO - PENUMPANG
7. Klasifikasi : B K I
8. Surat Ukur No. : 2641 / Ka
VI. UKURAN UTAMA
1. Panjang seluruhnya : 76,88 METER
2. Lebar : 13,30 METER
3. Sarat Maximum : 4,70 METER
4. G.R.T : 2.825 T
5. N.R.T. : 1.310 T
VII. KAPASITAS TANGKI
1. Tangki Bahan Bakar : 106 TON
2. Tangki Air Tawar : 41,95 TON
3. Tangki Ballast : .....
VIII. MESIN UTAMA
1. Merk : DAIHATSU
2. Type : 6 DLM 32
3. Tenaga Kuda / PK : 2 X 2300 PS
4. Jumlah Mesin : 2
5. Kecepatan Maksimum : 12 KNOT
6. Th. Pembuatan Mesin : 1989
7. R.P.M : 600
8. Jenis Bahan Bakar : HSD
IX. MESIN BANTU
1. Merk : YANMAR
2. Type : M 220 AL
3. Tenaga Kuda / PK : 2 X 1000 PS
4. Jumlah Mesin : 2
X. KAPASITAS MUAT
1. Jumlah penumpang : 354 Penumpang
2. Jumlah Kendaraan : 32 Kendaraan campuran
3. Jumlah Crew : 29 Orang
XI. PINTU RAMPA
1. Pintu Rampa Haluan = P : 4,20 METER L : 4,20 METER
2. Pintu Rampa Buritan = P : 4,20 METER L : 4,20 METER
3. Pintu Rampa Kiri = P : 4,50 METER L : 4,50 METER
NAHKODA : HADI SISWOYO

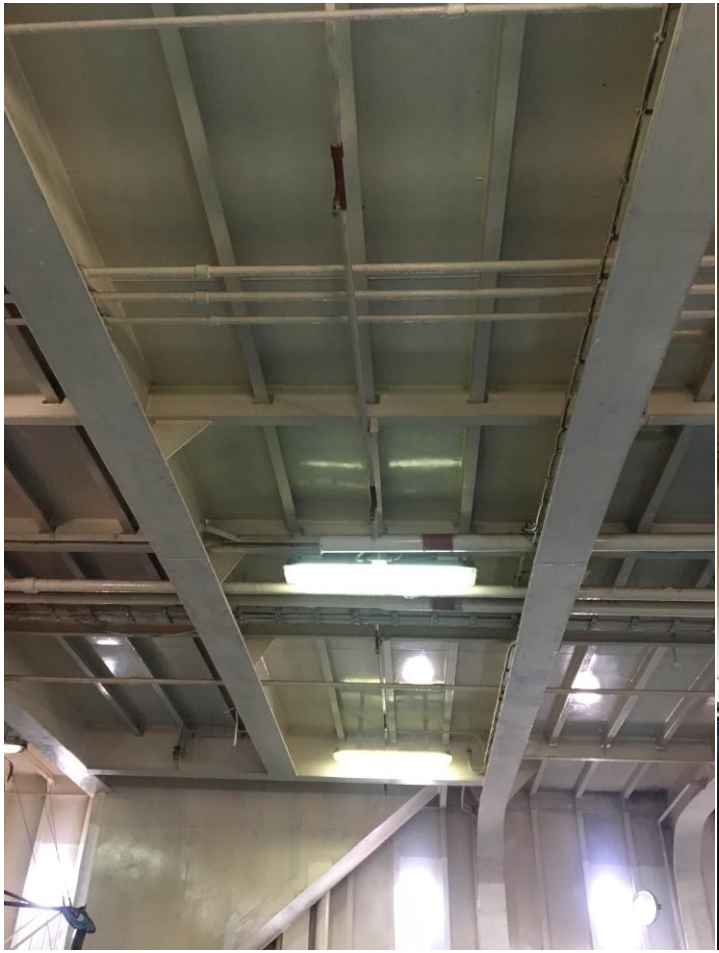

EMERGENCY ALARM
非常警報スイッチ
ALARM 警報
USUAL 通常
EMERGENCY STOP
非常停止スイッチ
E/R
DECK
NAVIGATION LIGHT
SOURCE
SOURCE
電源
ON
OFF
NO VOLTAGE TEST
無電圧テスト
RAMP DOOR DPN
ランプドア(船首)
OPEN 開
CLOSE 閉
RAMP DOOR BLKG
ランプドア(船尾)
OPEN 開
CLOSE 閉
BUZZER STOP

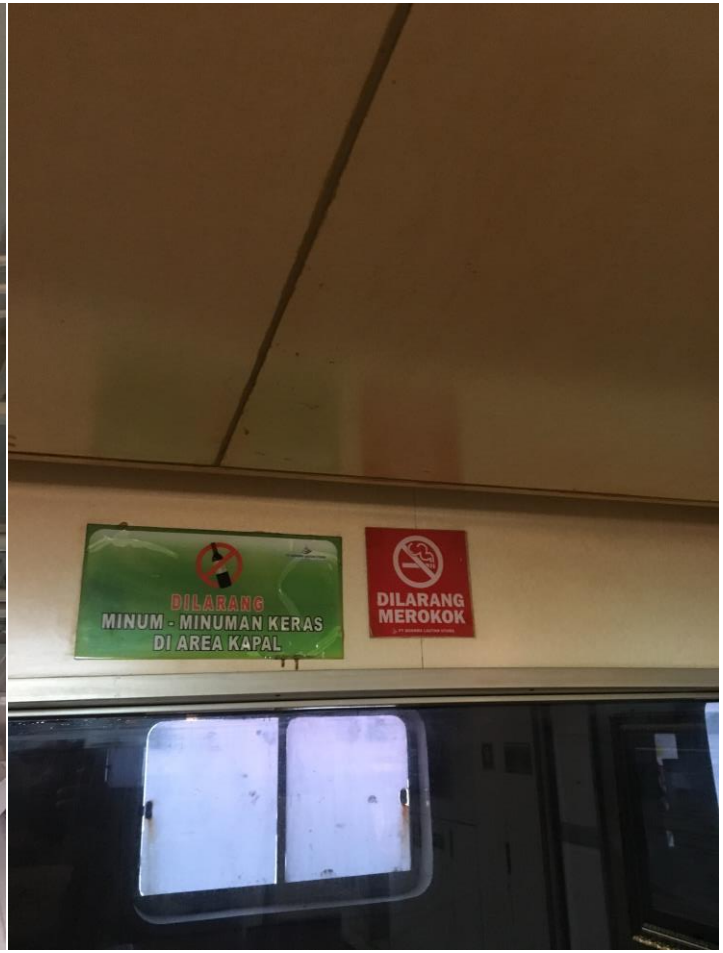

FOCUS
HEADING
PILOT SOURCE
PILOT LAMP
STEERING MODE


Pemakaian
Breathing Apparatus
ISM Code
Works
Prosedur Keselamatan dalam penggunaan apparatus dalam kondisi berbahaya
Apabila tidak terdapat fasilitas untuk isi ulang, tabung kosong atau isi tabung tinggal sedikit, maka tabung harus diberi label dan diletakkan pada tempat tersendiri. Periksa semua sertifikat apakah masih valid. Baca dan Pelajarilah instruksi dari pembuat
1 Periksa setiap Minggu dan setiap akan memakainya
2 Mengenakan Breathing Apparatus
3 Pengaturan dan Pengecekan fungsional
4 Persiapan memasuki Ruangan
5 Memulai Operasi
6 Setelah pemakaian
Poster Keselamatan ISM Code

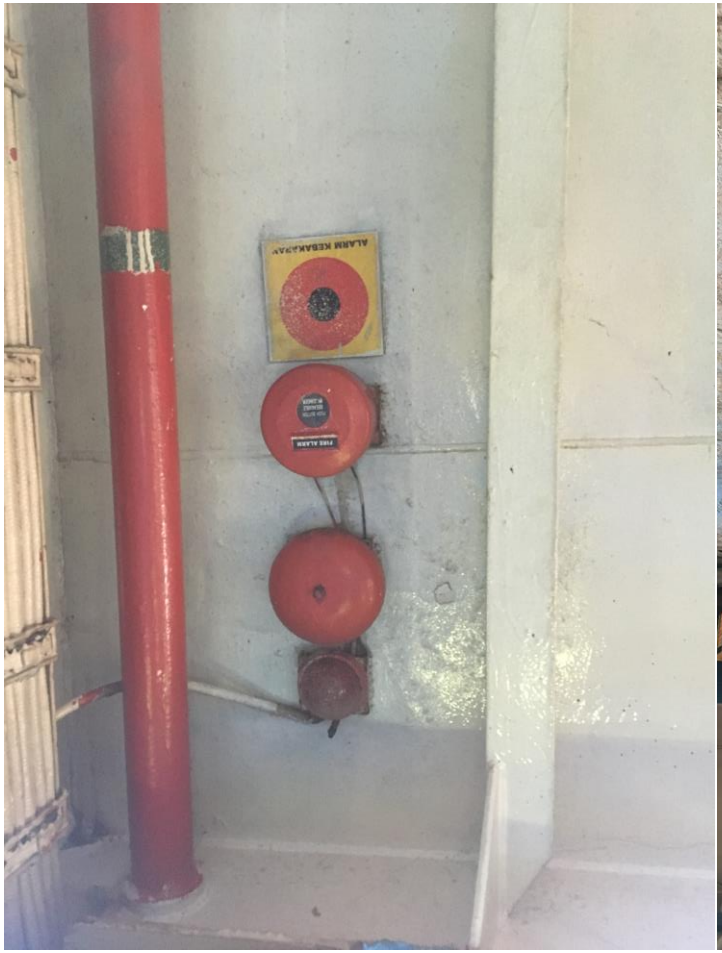

Fire Alarm Control Panel
VOLTAGE METER
ACT LAMP
REGIONAL TELEPHONE
MAIN BELL
TROUBLE BELL
REGIONAL BELL
BUZZER
TRANSFER REPORT
STORAGE
SELF MAINTAIN
TEST SWITCH
Quick Operation Manual
NYAL MARABAHAYA
RESS] selama 5 detik

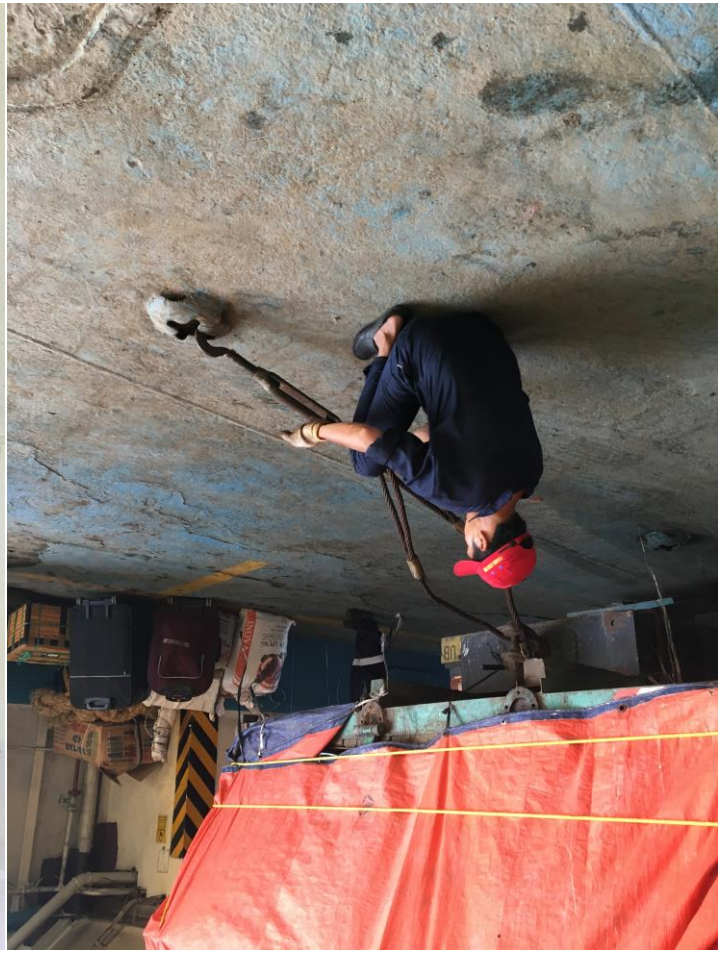

KELUAR
EXIT
ALARM KEBAKARAN
FIRE ALARM

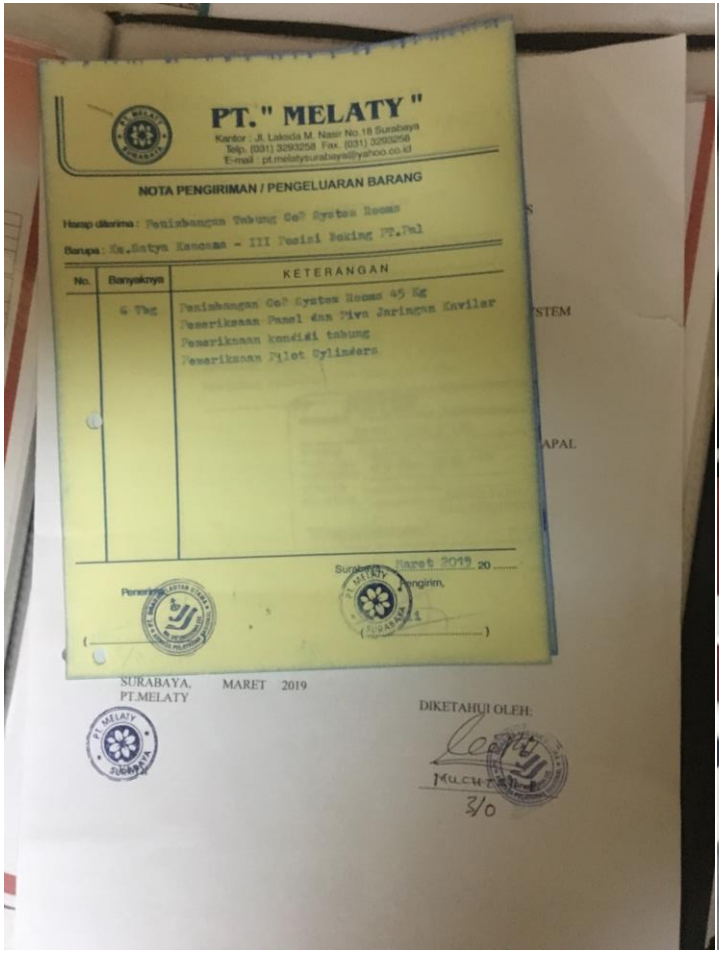



DILARANG
MINUM - MINUMAN KERAS
DI AREA KAPAL
DILARANG
MEROKOK


08


ALARM KEBAKARAN





PT." MELATY "

Kantor : Jl. Laksda M. Nasir No.18 Surabaya
Telp. (031) 3293258 Fax. (031) 3293258
E-mail : pt.melatysurabaya@yahoo.co.id

NOTA PENGIRIMAN / PENGELUARAN BARANG

Harap diterima : Penimbangan Tabung Co2 System Rooms

Barupa : Km.Satya Kencana - III Posisi Boking PT.Pal

No.	Banyaknya	KETERANGAN
	6 Tbg	Penimbangan Co2 System Rooms 45 Kg Pemeriksaan Panel dan Piva Jaringan Kaviler Pemeriksaan kondisi tabung Pemeriksaan Pilot Cylinders

Surabaya, Maret 2019 20.....

Penerima, Pengirim,

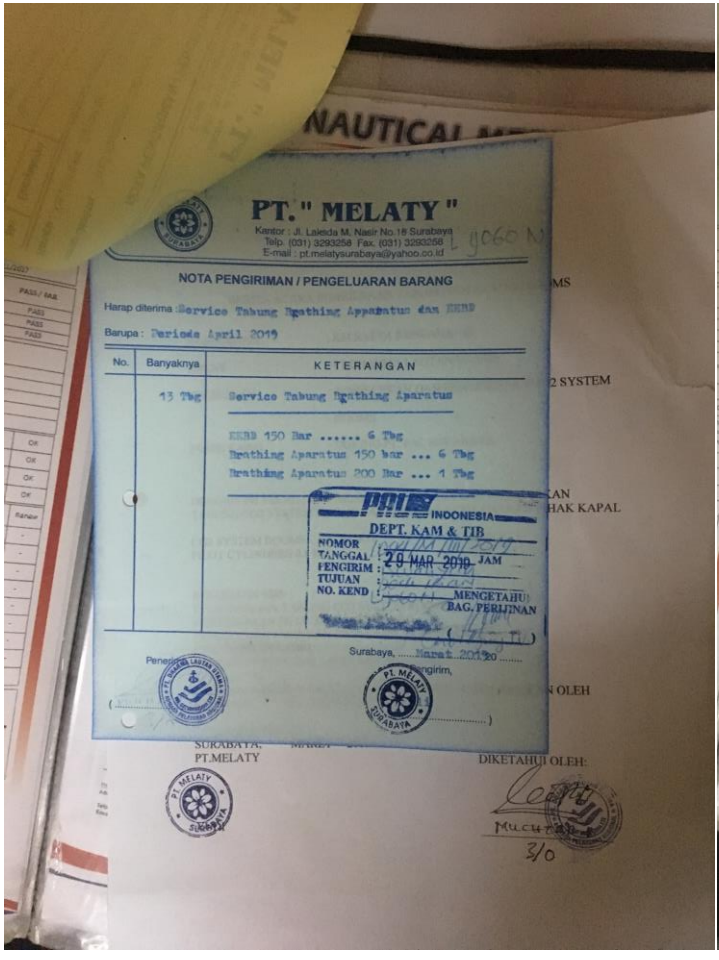
( ) ( )

SURABAYA, MARET 2019
PT.MELATY

DIKETAHUI OLEH:

3/0

SATYA KENCANA



PT." MELATY "

Kantor : Jl. Laksda M. Nasir No.16 Surabaya
Telp. (031) 3292058 Fax. (031) 3293256
E-mail : pt.melatysurabaya@yahoo.co.id

NOTA PENGIRIMAN / PENGELUARAN BARANG

Harap diterima : Service Tabung Breathing Apparatus dan SCBA

Barupa : Periode April 2019

No.	Banyaknya	KETERANGAN
	13 Tbg	Service Tabung Breathing Aparatus
		SCBA 150 Bar ..... 6 Tbg
		Breathing Aparatus 150 bar ... 6 Tbg
		Breathing Aparatus 200 Bar ... 1 Tbg

PMI INDONESIA
DEPT. KAM & TIB
NOMOR :
TANGGAL : 29 MAR 2019 JAM
PENGIRIM :
TUJUAN :
NO. KEND :
MENGETAHUI
BAG. PERIJINAN

Surabaya, ... Maret ..... 20 .....

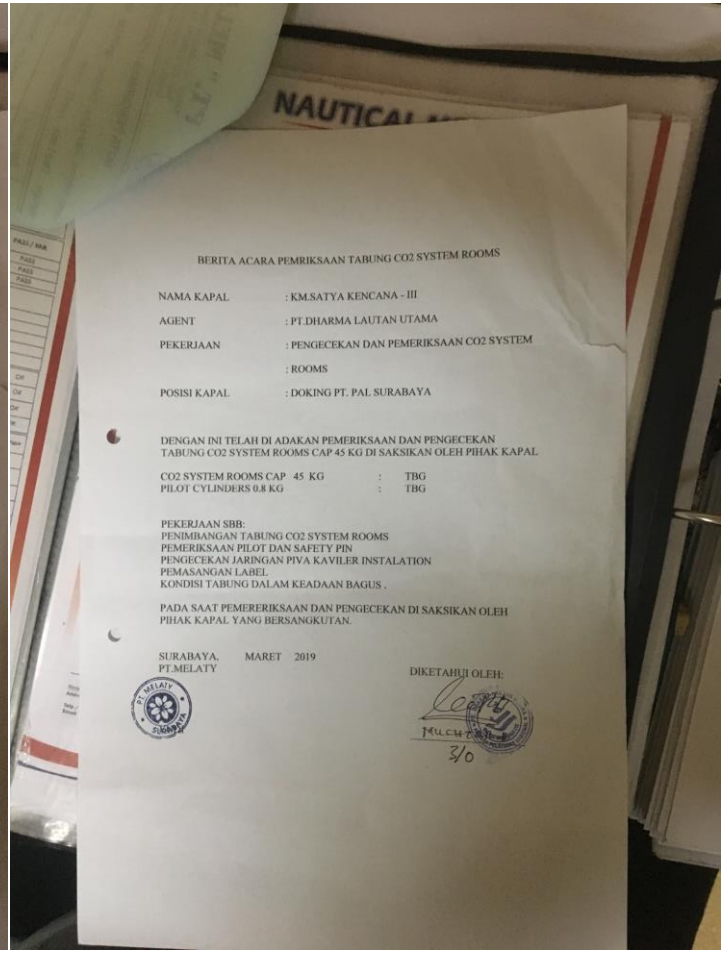
Penerima, Pengirim,

( ) ( )

SURABAYA,
PT.MELATY

DIKETAHUI OLEH:

3/0



BERITA ACARA PEMRIKSAAN TABUNG CO2 SYSTEM ROOMS

NAMA KAPAL : KM.SATYA KENCANA - III

AGENT : PT.DHARMA LAUTAN UTAMA

PEKERJAAN : PENGECEKAN DAN PEMERIKSAAN CO2 SYSTEM
: ROOMS

POSISI KAPAL : DOKING PT. PAL SURABAYA

DENGAN INI TELAH DI ADAKAN PEMERIKSAAN DAN PENGECEKAN
TABUNG CO2 SYSTEM ROOMS CAP 45 KG DI SAKSIKAN OLEH PIHAK KAPAL

CO2 SYSTEM ROOMS CAP 45 KG : TBG
PILOT CYLINDERS 0.8 KG : TBG

PEKERJAAN SBB:
PENIMBANGAN TABUNG CO2 SYSTEM ROOMS
PEMERIKSAAN PILOT DAN SAFETY PIN
PENGECEKAN JARINGAN PIVA KAVILER INSTALATION
PEMASANGAN LABEL
KONDISI TABUNG DALAM KEADAAN BAGUS .

PADA SAAT PEMERERIKSAAN DAN PENGECEKAN DI SAKSIKAN OLEH
PIHAK KAPAL YANG BERSANGKUTAN.

SURABAYA, MARET 2019
PT.MELATY

DIKETAHUI OLEH:

3/0

NO.1 **SURAT LAUT**

REPUBLIK INDONESIA

SURAT LAUT

No.PK.207/2469/SL-PMTK-13

Diterbitkan berdasarkan ketentuan Pasal 58
Permenhub Nomor PM 13 Tahun 2012

Yang bertanda tangan di bawah ini Direktur Perkapalan dan Kepelautan
menyatakan bahwa : Kapal Motor Ferry

NAMA KAPAL	TANDA PANGGILAN	TEMPAT PENDAFTARAN	TANDA PENDAFTARAN
SATYA KENCANA III eks FERRY OSUMI NO. 6	POES	SURABAYA	2011 Ka No. 4766/L

UKURAN P X L X D (M)	TONASE KOTOR (GT)	TONASE BERSIH (NT)	TAHUN PEMBANGUNAN	NOMOR IMO
71,27 X 13,30 X 4,70	2825	1310	1989	

PENGGERAK UTAMA	MEREK TK/TW	BAHAN UTAMA KAPAL	JUMLAH GELADAK	JUMLAH BALING-BALING
MESIN	DAIHATSU 2 X 2300 PS	BAJA	DUA	DUA

Milik PT. DHARMA LAUTAN UTAMA SURABAYA

memenuhi syarat sebagai Kapal Indonesia, [illegible] ketentuan peraturan perundang-undangan, oleh karena itu berhak berlayar dengan mengibarkan bendera Indonesia sebagai bendera kebangsaan kapal.

Kepada seluruh pejabat yang berwenang dan pejabat-pejabat Republik Indonesia maupun mereka yang bersangkutan berkewajiban supaya memperlakukan nakhoda kapal dan muatannya sesuai dengan ketentuan peraturan perundang-undangan Republik Indonesia dan perjanjian-perjanjian dengan negara-negara lain.

Tanda Selar : GT. 2825 No. 2641/Ka

PUP.NO.13015372

Diterbitkan di : Jakarta
Pada tanggal : 3 Juni 2013

Didaftarkan dalam Register Surat Laut
No. Urut : 9734
No. Halaman : 173
Buku Register : XXV

An. MENTERI PERHUBUNGAN
DIREKTUR JENDERAL PERHUBUNGAN LAUT
DIREKTUR PERKAPALAN DAN KEPELAUTAN
U. b.
KEPALA SUBDIT PENGUKURAN, PENDAFTARAN DAN KEBANGSAAN KAPAL

I. ZAHARA SAPUTRA, ST, MM
Pembina (IV/a)
NIP. 19630618 198903 1 002

DKP1 - 02

PT. "MELATY"

Jl. Laksda M. Nasir No. 18 Surabaya
Telp. (031) 3293258 Fax. (031) 3293258

CERTIFICATE

Fire Extinguisher
Fire Extinguisher Instalations
Fire Hoses Safety Ann Rescue Equipment

Vessel : KM.SATYA KENCANA - III
Owner / Address : PT.DHARMA LAUTAN UTAMA

Certificate No. : NO.03/MLY/PMK/4/2019

This is to certivy that Fire Extinguisher has been Inspected, refilling / Serviced according to requirement ship authorities and factory
We quarranted for 1 (one) year since certificate issued, accordingly :

Item	Model	Volume	Quantity	Remarks
1	EEBD	150 bar	6 TBG	REFILLED
2	BRATHING APARATUS	150 bar	6 TBG	REFILLED
3	BRATHING APARATUS	200 bar	1 TBG	REFILELD

Total : 13 TBG

The next inspection : " 01 APRIL 2020 "
Date of issue : " 01 APRIL 2019 "

MOH. ALI, S.AP. M. Si
Pembina (IV / a)
NIP. 19620713 198401 1 001

Ali Buang S.Sos.
Inspector

NO.7

SERTIFIKAT MANAJEMEN KESELAMATAN

REPUBLIK INDONESIA
REPUBLIC OF INDONESIA

SERTIFIKAT MANAJEMEN KESELAMATAN
SAFETY MANAGEMENT CERTIFICATE

PK.401/388/SMC/DK-18
No. .....

Diterbitkan berdasarkan ketentuan KONVENSI INTERNASIONAL TENTANG KESELAMATAN JIWA DI LAUT, 1974, sebagaimana telah di amandemen
Issued under the provisions of the INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

berdasarkan wewenang PEMERINTAH REPUBLIK INDONESIA
under the authority of the GOVERNMENT OF THE REPUBLIC OF INDONESIA

oleh DIREKTORAT JENDERAL PERHUBUNGAN LAUT
by DIRECTORATE GENERAL OF SEA TRANSPORTATION

Nama Kapal *Name of Ship*	Angka atau Huruf Pengenal *Distinctive Number or Letters*	Pelabuhan Pendaftaran *Port of Registry*	Tonase Kotor *Gross Tonnage*	Nomor IMO *IMO Number*
SATYA KENCANA III	P O E S	SURABAYA	2825	8904563

Tipe Kapal* *Type of Ship**	Nama dan Alamat Perusahaan *Name and Address of Company*	Nomor Identifikasi Perusahaan *Company Identification Number*
PASSENGER SHIP	PT. DHARMA LAUTAN UTAMA JL. KANGINAN 3-5 SURABAYA 60272 - INDONESIA	IMO 0312863

DENGAN INI MENYATAKAN BAHWA Sistem Manajemen Keselamatan Kapal telah diverifikasi dan memenuhi ketentuan Koda Manajemen Internasional untuk Keselamatan Pengoperasian Kapal dan Pencegahan Pencemaran *(ISM Code)*, melengkapi verifikasi yang menyatakan bahwa Dokumen Penyesuaian Manajemen Keselamatan Perusahaan dapat dipergunakan untuk tipe kapal ini.
THIS IS TO CERTIFY THAT the Safety Management System of the Ship has been audited and that it complies with the requirements of the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code), following verification that the Document of Compliance for the company is applicable to this type of ship.

Sertifikat ini berlaku sampai dengan JULY 10th, 2022 dengan kewajiban dilaksanakan
This Safety Management Certificate is valid until *subject to periodical verification*

verifikasi berkala dan mengikuti masa berlaku Dokumen Penyesuaian Manajemen Keselamatan.
and the Document of Compliance remaining valid.

Tanggal verifikasi terakhir yang dijadikan dasar penerbitan sertifikat JULY 09th, 2017
Completion date of the verification on which this certificate is based

Diterbitkan di JAKARTA
Issued at

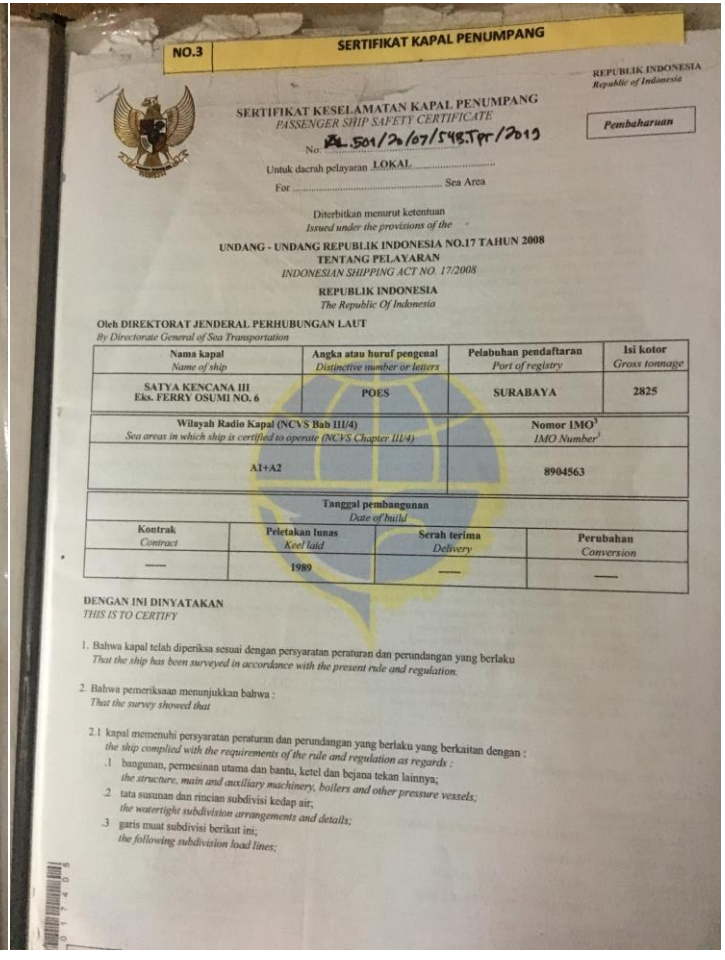
Tanggal DECEMBER 19th, 2017
Date of issue

PUP.NO.820180104552774

A.n. MENTERI PERHUBUNGAN
O.b. MINISTER OF TRANSPORTATION
DIREKTUR JENDERAL PERHUBUNGAN LAUT
DIRECTOR GENERAL OF SEA TRANSPORTATION
DIREKTUR PERKAPALAN DAN KEPELAUTAN
DIRECTOR OF SHIPPING AND SEAFARERS
U.b.
For
KEPALA SUBDIREKTORAT PENCEGAHAN PENCEMARAN DAN MANAJEMEN KESELAMATAN KAPAL DAN PERLINDUNGAN LINGKUNGAN DIPERAIRAN
DEPUTY DIRECTOR FOR MARINE POLLUTION PREVENTION AND SHIP SAFETY MANAGEMENT AND ENVIRONMENT PROTECTION

ABDUL ROCHMAN
Pembina Tk. I (IV/b)
NIP. 19651031 1997 09 1 001

DKP II - 27



NO.3

SERTIFIKAT KAPAL PENUMPANG

REPUBLIK INDONESIA
Republic of Indonesia

Pembaharuan

SERTIFIKAT KESELAMATAN KAPAL PENUMPANG
PASSENGER SHIP SAFETY CERTIFICATE

No. PK.501/20/07/548.Tpr/2019

Untuk daerah pelayaran LOKAL
For ..... Sea Area

Diterbitkan menurut ketentuan
Issued under the provisions of the

UNDANG - UNDANG REPUBLIK INDONESIA NO.17 TAHUN 2008
TENTANG PELAYARAN
INDONESIAN SHIPPING ACT NO. 17/2008

REPUBLIK INDONESIA
The Republic Of Indonesia

Oleh DIREKTORAT JENDERAL PERHUBUNGAN LAUT
By Directorate General of Sea Transportation

Nama kapal *Name of ship*	Angka atau huruf pengenal *Distinctive number or letters*	Pelabuhan pendaftaran *Port of registry*	Isi kotor *Gross tonnage*
SATYA KENCANA III Eks. FERRY OSUMI NO. 6	POES	SURABAYA	2825

Wilayah Radio Kapal (NCVS Bab III/4) *Sea areas in which ship is certified to operate (NCVS Chapter III/4)*	Nomor IMO[3] *IMO Number*[3]
A1+A2	8904563

Tanggal pembangunan *Date of build*			
Kontrak *Contract*	Peletakan lunas *Keel laid*	Serah terima *Delivery*	Perubahan *Conversion*
——	1989	——	——

DENGAN INI DINYATAKAN
THIS IS TO CERTIFY

1. Bahwa kapal telah diperiksa sesuai dengan persyaratan peraturan dan perundangan yang berlaku
   That the ship has been surveyed in accordance with the present rule and regulation.

2. Bahwa pemeriksaan menunjukkan bahwa :
   That the survey showed that

   2.1 kapal memenuhi persyaratan peraturan dan perundangan yang berlaku yang berkaitan dengan :
   the ship complied with the requirements of the rule and regulation as regards :
   .1 bangunan, permesinan utama dan bantu, ketel dan bejana tekan lainnya;
   the structure, main and auxiliary machinery, boilers and other pressure vessels;
   .2 tata susunan dan rincian subdivisi kedap air;
   the watertight subdivision arrangements and details;
   .3 garis muat subdivisi berikut ini;
   the following subdivision load lines;

NO.8 **D O C (DOKUMEN PENYESUAIAN MANAJEMEN KESELAMATAN)**

1964

DOKUMEN PENYESUAIAN MANAJEMEN KESELAMATAN SEMENTARA

SHORT TERM DOCUMENT OF COMPLIANCE

No. : 2308 R - SB / D1.S - DOC / 2018

Diterbitkan berdasarkan ketentuan KONVENSI INTERNASIONAL TENTANG KESELAMATAN JIWA DI LAUT, 1974 sebagaimana diubah dan ditambah

Issued under the provisions of the INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as amended

berdasarkan wewenang **PEMERINTAH REPUBLIK INDONESIA**

Under the Authority of the Government of the Republic of Indonesia

oleh **BIRO KLASIFIKASI INDONESIA**

by Biro Klasifikasi Indonesia

NAMA PERUSAHAAN *Company name*	ALAMAT PERUSAHAAN *Company address*	NOMOR IDENTIFIKASI PERUSAHAAN *Company identification number*
PT. DHARMA LAUTAN UTAMA	**JL. KANGINAN 3 - 5 SURABAYA 60272 - INDONESIA**	**IMO Company 0312863**

DENGAN INI DINYATAKAN BAHWA Sistem Manajemen Keselamatan Perusahaan telah diaudit dan memenuhi ketentuan dari Koda Manajemen Internasional untuk Keselamatan Pengoperasian Kapal dan Pencegahan Pencemaran (ISM-Code) untuk tipe kapal tersebut dibawah ini:

THIS IS TO CERTIFY THAT the Safety Management System of the Company has been audited and that it complies with the requirements of the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM - Code) for the types of ships listed below :

Kapal penumpang
Passenger ship
~~Kapal penumpang dengan kecepatan tinggi~~
~~Passenger high speed craft~~
~~Kapal barang dengan kecepatan tinggi~~
~~Cargo high speed craft~~
~~Kapal pengangkut muatan curah~~
~~Bulk carrier~~
~~Kapal tangki minyak~~
~~Oil tanker~~
~~Kapal tangki pengangkut bahan kimia~~
~~Chemical tanker~~
~~Kapal tangki pengangkut gas~~
~~Gas carrier~~
~~Unit Pengeboran lepas pantai berpindah~~
~~Mobile offshore drilling unit~~
~~Kapal barang lainnya~~
~~Other cargo ship~~

Dokumen Sementara ini berlaku sampai dengan **10 Juni 2019**
This Short Term Document of Compliance is valid until *June 10th ,2019*

Tanggal selesainya verifikasi sebagai dasar penerbitan sertifikat ini **20 Desember 2018**
Completion date of the verification on which this certificate is based *December 20th , 2018*

Diterbitkan di **Surabaya**
Issued at

Tanggal **11 Maret 2019**
Date of issue *March 11th , 2019*

BIRO KLASIFIKASI INDONESIA
An. Direktur Operasi
Kepala Cabang Utama Klas

SUWANDI
NUP: 38491- KI

Catatan:
Sertifikat ini diterbitkan sebagai pengganti Sertifikat DOC Sementara No. 2308-SB/D1.S-DOC/2018 yang dinyatakan BATAL karena akan habis masa berlakunya.

Menunggu penerbitan sertifikat permanen
Pending issuance of a final certificate :

MITRA BAHARI MARINE

MARINE EQUIPMENT - SAFETY EQUIPMENT

Jl. Perak Barat 353 SURABAYA

Telp. 031 - 3283727 Fax.3283727

REPLACEMENT BATTERY REPORT

SART

Brand	: SAMYUNG
Type	: SART SAR-9
Serial No.	: 1700204
Vessel	: KM. SATYA KENCANA III
Battery Exp.	: 08 / 2020
Owner	: PT. DHARMA LAUTAN UTAMA
Address	: SURABAYA
Flag	: INDONESIA

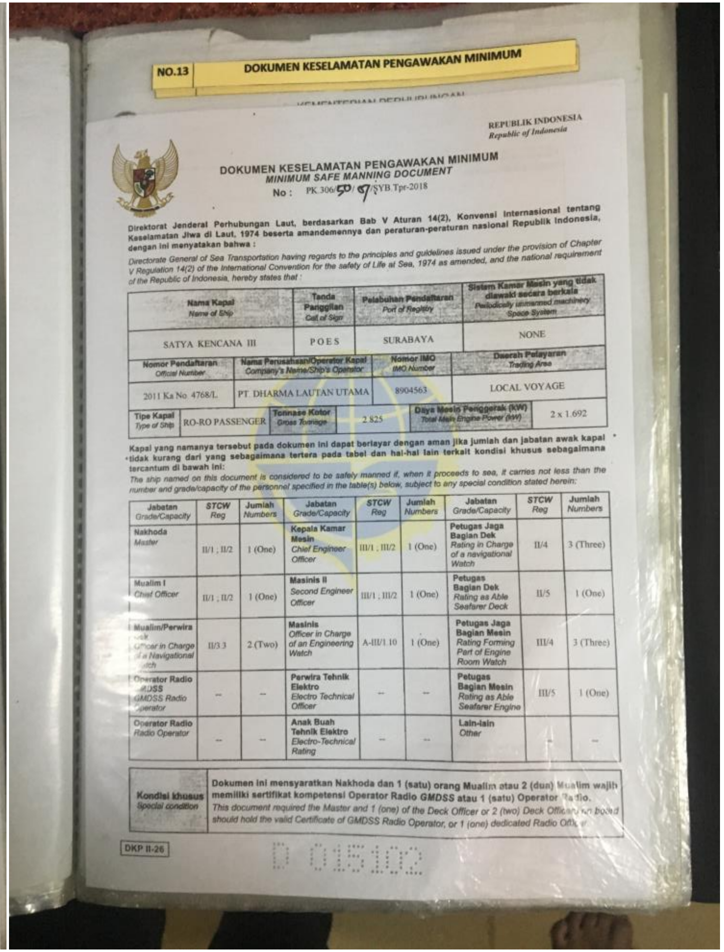
Surabaya, 08 Agustus 2016

Acknowledge

BUDI SETIANTO
Penata TK.I (III/d)
(NIP.19621026 198403 1 001)
Marine Inspector Radio

MITRA BAHARI MARINE SURABAYA

SUKMA
Technical Engineer



NO.13 DOKUMEN KESELAMATAN PENGAWAKAN MINIMUM

REPUBLIK INDONESIA
Republic of Indonesia

DOKUMEN KESELAMATAN PENGAWAKAN MINIMUM
MINIMUM SAFE MANNING DOCUMENT
No : PK.306/50/97/SYB.Tpr-2018

Direktorat Jenderal Perhubungan Laut, berdasarkan Bab V Aturan 14(2), Konvensi Internasional tentang Keselamatan Jiwa di Laut, 1974 beserta amandemennya dan peraturan-peraturan nasional Republik Indonesia, dengan ini menyatakan bahwa :

Directorate General of Sea Transportation having regards to the principles and guidelines issued under the provision of Chapter V Regulation 14(2) of the International Convention for the safety of Life at Sea, 1974 as amended, and the national requirement of the Republic of Indonesia, hereby states that :

Nama Kapal *Name of Ship*	Tanda Panggilan *Call of Sign*	Pelabuhan Pendaftaran *Port of Registry*	Sistem Kamar Mesin yang tidak diawaki secara berkala *Periodically unmanned machinery Space System*
SATYA KENCANA III	POES	SURABAYA	NONE

Nomor Pendaftaran *Official Number*	Nama Perusahaan/Operator Kapal *Company's Name/Ship's Operator*	Nomor IMO *IMO Number*	Daerah Pelayaran *Trading Area*
2011 Ka No. 4768/L	PT. DHARMA LAUTAN UTAMA	8904563	LOCAL VOYAGE

Tipe Kapal *Type of Ship*	RO-RO PASSENGER	Tonnase Kotor *Gross Tonnage*	2.825	Daya Mesin Penggerak (kW) *Total Main Engine Power (kW)*	2 x 1.692

Kapal yang namanya tersebut pada dokumen ini dapat berlayar dengan aman jika jumlah dan jabatan awak kapal tidak kurang dari yang sebagaimana tertera pada tabel dan hal-hal lain terkait kondisi khusus sebagaimana tercantum di bawah ini:

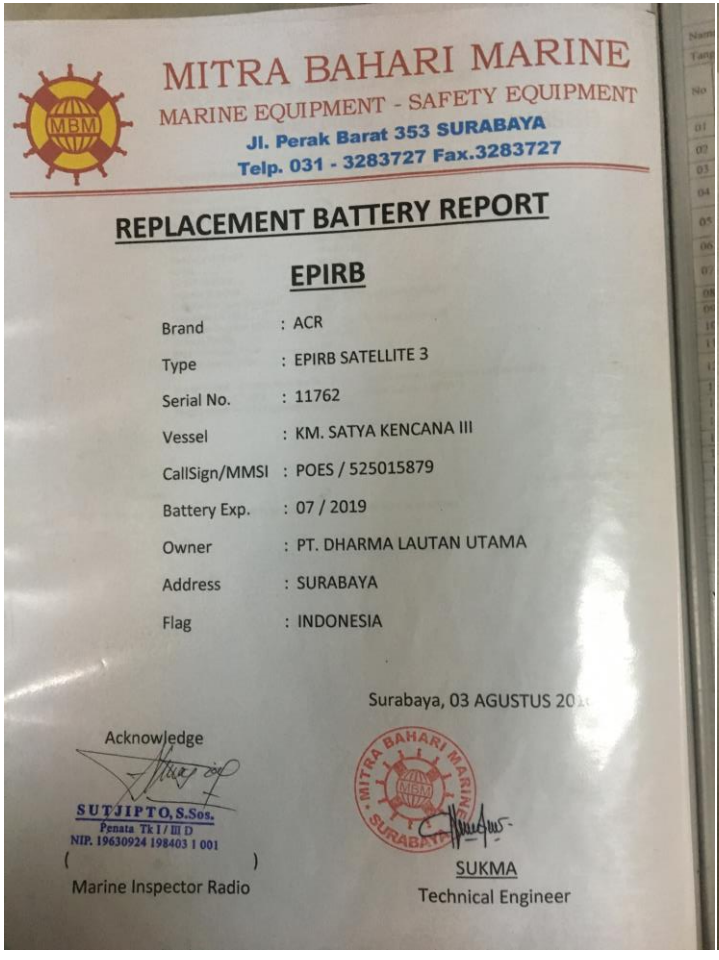
The ship named on this document is considered to be safely manned if, when it proceeds to sea, it carries not less than the number and grade/capacity of the personnel specified in the table(s) below, subject to any special condition stated herein:

Jabatan *Grade/Capacity*	STCW *Reg*	Jumlah *Numbers*	Jabatan *Grade/Capacity*	STCW *Reg*	Jumlah *Numbers*	Jabatan *Grade/Capacity*	STCW *Reg*	Jumlah *Numbers*
Nakhoda *Master*	II/1 ; II/2	1 (One)	Kepala Kamar Mesin *Chief Engineer Officer*	III/1 ; III/2	1 (One)	Petugas Jaga Bagian Dek *Rating in Charge of a navigational Watch*	II/4	3 (Three)
Mualim I *Chief Officer*	II/1 ; II/2	1 (One)	Masinis II *Second Engineer Officer*	III/1 ; III/2	1 (One)	Petugas Bagian Dek *Rating as Able Seafarer Deck*	II/5	1 (One)
Mualim/Perwira Dek *Officer in Charge of a Navigational Watch*	II/3 3	2 (Two)	Masinis *Officer in Charge of an Engineering Watch*	A-III/1 10	1 (One)	Petugas Jaga Bagian Mesin *Rating Forming Part of Engine Room Watch*	III/4	3 (Three)
Operator Radio GMDSS *GMDSS Radio Operator*	–	–	Perwira Tehnik Elektro *Electro Technical Officer*	–	–	Petugas Bagian Mesin *Rating as Able Seafarer Engine*	III/5	1 (One)
Operator Radio *Radio Operator*	–	–	Anak Buah Tehnik Elektro *Electro-Technical Rating*	–	–	Lain-lain *Other*	–	–

Kondisi khusus *Special condition*	**Dokumen ini mensyaratkan Nakhoda dan 1 (satu) orang Mualim atau 2 (dua) Mualim wajib memiliki sertifikat kompetensi Operator Radio GMDSS atau 1 (satu) Operator Radio.** *This document required the Master and 1 (one) of the Deck Officer or 2 (two) Deck Officers on board should hold the valid Certificate of GMDSS Radio Operator, or 1 (one) dedicated Radio Officer.*

DKP II-26

D 015102



MITRA BAHARI MARINE
MARINE EQUIPMENT - SAFETY EQUIPMENT
Jl. Perak Barat 353 SURABAYA
Telp. 031 - 3283727 Fax.3283727

REPLACEMENT BATTERY REPORT

EPIRB

Brand	: ACR
Type	: EPIRB SATELLITE 3
Serial No.	: 11762
Vessel	: KM. SATYA KENCANA III
CallSign/MMSI	: POES / 525015879
Battery Exp.	: 07 / 2019
Owner	: PT. DHARMA LAUTAN UTAMA
Address	: SURABAYA
Flag	: INDONESIA

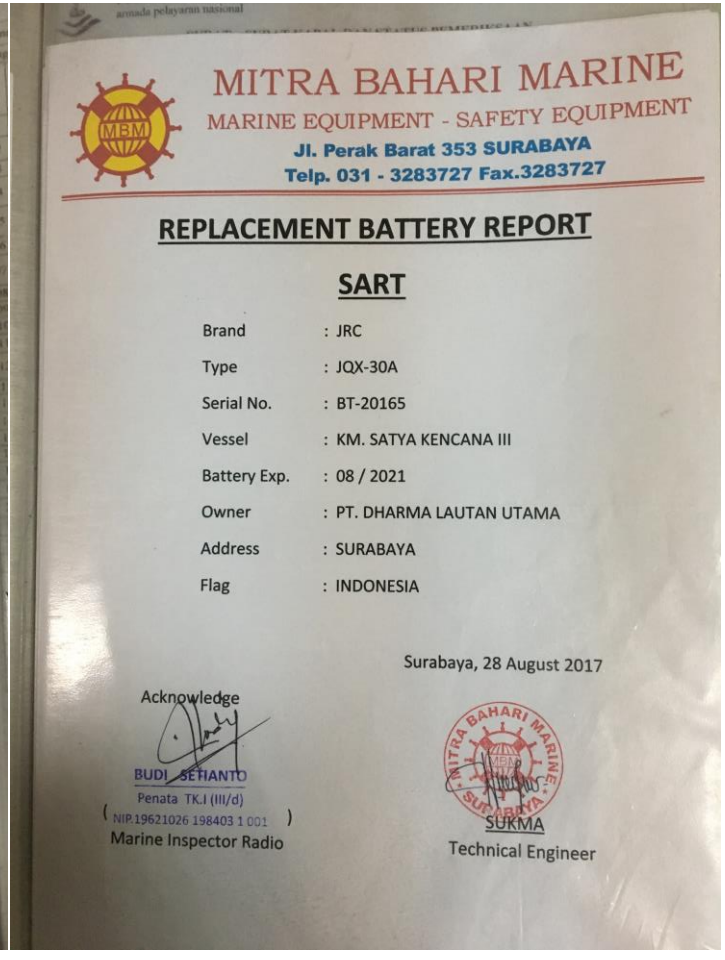
Surabaya, 03 AGUSTUS 201

Acknowledge

SUTJIPTO, S.Sos.
Penata Tk I / III D
NIP. 19630924 198403 1 001

( )
Marine Inspector Radio

SUKMA
Technical Engineer



armada pelayaran nasional

MITRA BAHARI MARINE
MARINE EQUIPMENT - SAFETY EQUIPMENT
Jl. Perak Barat 353 SURABAYA
Telp. 031 - 3283727 Fax.3283727

REPLACEMENT BATTERY REPORT

SART

Brand	: JRC
Type	: JQX-30A
Serial No.	: BT-20165
Vessel	: KM. SATYA KENCANA III
Battery Exp.	: 08 / 2021
Owner	: PT. DHARMA LAUTAN UTAMA
Address	: SURABAYA
Flag	: INDONESIA

Surabaya, 28 August 2017

Acknowledge

BUDI SETIANTO
Penata TK.I (III/d)
NIP.19621026 198403 1 001

( )
Marine Inspector Radio

SUKMA
Technical Engineer

PT.DHARMA LAUTAN UTAMA
armada pelayaran nasional

FM 4011-2006

Versi 1.1

SURAT – SURAT KAPAL DAN STATUS PEMERIKSAAN
SHIP'S CERTIFICATES & SURVEY STATUS

Nama Kapal/Ship Name : KM.Satya Kencana III

Tanggal Pengecekan : 10 April 2019

No	Certificate/Surveys	Tanggal Terbit Date Of Issue	Tempat Terbit Please Of Issue	Tanggal Kedaluarsa Date of Expire	Tgl.Survey Terakhir Date last Survey	Tgl.Survey Yad Date next Survey	Keterangan Remark
01	Surat Laut	03.06.2013	Jakarta	-	21.03.2019	21.03.2020	Permanen
02	Surat ukur Internasional	08.11.2011	Surabaya	-	-	-	-
03	Keselamatan kapal penumpang	21.03.2019	Surabaya	04.10.2019	21.03.2019	04.10.2019	
04	Nasional pencegahan pencemaran dari kapal	13.03.2018	Jakarta	14.02.2021	08.04.2019	14.02.2019	Permanen
05	Konsorsium asuransi kerangka kapal termasuk tanggung jawab Polusi	04.05.2018	Surabaya	04.05.2019	04.05.2018	04.05.2019	
06	Manajemen keselamatan	19.12.2017	Jakarta	10.07.2022	09.07.2017	Juli 2020	Permanen
07	Dokumen penyesuaian manajemen keselamatan sementara	11.03.2019	Surabaya	10.06.2019	11.03.2019	10.06.2019	Copy
08	Nasional garis muat	03.11.2017	Jakarta	15.03.2022	15.02.2019	15.03.2020	Permanen
09	Klasifikasi lambung	03.11.2017	Jakarta	15.03.2022	06.04.2019		Permanen
10	Klasifikasi mesin	03.11.2017	Jakarta	15.03.2022	06.04.2019		Permanen
11	Izin stasiun radio kapal laut	28.06.2015	Jakarta	27.06.2020	27.06.2015	27.06.2020	
12	Dokumen keselamatan pengawakan minimum	05.12.2018	Surabaya	04.12.2019	04.12.2018	04.12.2019	
13	Pola trayek	26.03.2019	Jakarta	25.09.2019	26.03.2019	25.09.2019	
14	Inflatable life raft type HNF - 25	09.11.2018	Tg perak	09.11.2019	09.11.2018	09.11.2019	6 unit
15	Inflatable life raft type HNF - 25	13.11.2018	Tg perak	13.11.2019	13.11.2018	13.11.2019	6 unit
16	Inflatable life raft type DOT UA	04.06.2018	Tg.perak	04.06.2019	04.06.2018	04.06.2019	5 unit
17	Inflatable life raft type HNF - 25	03.12.2018	Tg.perak	03.12.2019	03.12.2018	03.12.2019	8 unit
18	Inflatable life raft HNF –A-25	11.12.2018	Tg.perak	11.12.2019	11.12.2018	11.12.2019	7 unit
19	Inflatable life raft type MTA-25A	28.05.2018	Tg.perak	28.05.2019	28.05.2018	28.05.2019	3 unit
20	Hydrostatic release unit	11.12.2018	Tg.perak	11.12.2019			
21	Hydrostatic release unit	13.11.2018	Tg.Perak	13.11.2019			
22	Fire extiungisher	09.11.2018	Tg.perak	09.11.2019			21 tabung
23	Fire extiungisher	11.12.2018	Tg.Perak	11.12.2019			22 tabung
24	Fire extiungisher fixed CO2 system	16.05.2018	Tg.Perak	16.05.2019			4 tabung
25	Saterai EPIRB	03.08.2016	Tg.Perak	Juli 2019			ACR
26	Saterai SART type SART SAR-9	08.08.2016	Tg.Perak	Agust 2020			Samyung
27	Saterai SART type JQX-30A	28.08.2017	Tg.Perak	Agust 2021			JRC
28	Bebas tindakan sanitasi kapal	15.02.2019	Tg.Perak	15.08.2019	15.02.2019	15.08.2019	
29	Nasional Sistem Anti Teritip	08.04.2019	Tg.Perak	07.07.2019	08.04.2019	07.07.2019	

Catatan : Pemantauan dilakukan setiap ada perubahan minimal setiap 1 (satu)bulan sekali

Yang membuat : Sehat Sitanggang (Mabonis)

Mengetahui : Hadi Siswanto (Nakhoda)

NAUTICAL MERINUS

INFLATABLE LIFERAFT INSPECTION AND TEST REPORT

Vessel Name	: KM. SATYA KENCANA - III			CERTIFICATE NO.	: NM-ILR.18.0379
Owner / Agent	: PT. DHARMA LAUTAN UTAMA			Date of Service	: 04/06/2018
Liferaft Type	: KHA - 20	Capasity : 20 Persons	Mfg Date : JUN - 2016	Next Service Due on	: 04/06/2019
Manufactured	: SHANGHAI YOULONG		Liferaft S/No : 8153	Last Service Date	: 04/06/2017

PRESSURE TEST (mm/Hg)	RELIEF VALVE		STRETCH TIME		READING PRESSURE		TEMP °C		PASS / FAIL
	OPEN	RESEAT	ON	OFF	ON	OFF	ON	OFF	
Upper	106	82	09.00	10.00	82	80	30	30	PASS
Lower	104	82	09.00	10.00	82	80	30	30	PASS
Floor	.....	.....	09.00	10.00	80	80	30	30	PASS

Working Pressure Test	PASS	CO_2 Cylinder Particular				
Floor Strength Test	N/A					
NAP (over pressure) Test	N/A	S/No.	: 531852	S/No.	: 382515	
5 Year Inflation Test	N/A	Full Weight	: 14.750 Kg	Full Weight	: 14.500 Kg	
D/L Release Hook Lanyard Drag Test	N/A	Tare Weight	: 10.250 Kg	Tare Weight	: 10.000 Kg	
O/L Load Test	N/A	Gas Weight	: 4.500 Kg	Gas Weight	: 4.500 Kg	
SOLAS A PACK	.....	Test On	: -	Test On	: -	

Renew and Repair Part	Exterior Light	OK	Lifeline	OK	T / Y Connection	OK	Check Valve	OK
	Reflective Tape	OK	Interior Light	OK	Arches Safety Valve	OK	Boarding Valve	OK
	Rain Water Catchment	OK	Rescue Quoit	OK	Safety Valve Up	OK	Container	OK
	Sea Anchor	OK	Painter	OK	Safety Valve Low	OK	Log Book	OK

Equipment	Origin	Renew	Expire Date	Equipment	Origin	Renew	Equipment	Origin	Renew	Equipment	Origin	Renew
Food Ration		20	10-2020	Clean Bags	1	-	Radar Reflector	1	-	Clamps	1	-
Drinking Water		60	10-2020	Drinking Vessel	1	-	Equip. Bag	1	-	Rubber Adhesive	1	-
Parachute Signals		4	02-2021	Floating Baller	1	-	Sea Anchor	2	-	Brush	1	-
Hand Flares		6	04-2021	Morse Torch	1	-	Spare Painter	1	-	Emery Cloth	1	-
Smoke Signals		2	02-2021	Batt. Bolth	1	-	Whistle	1	-	Small Roller	1	-
First Aid Kit		1	09-2019	Fishing Tackle	1	-	Hand Pump	1	-	Sponges	2	-
Anti Sea Sickness		150	07-2019	Manual Book	1	-	Floating Knife	1	-	Paddle Bag	1	-
Spare Battery		4	09-2019	Life Saving Signal	1	-	Emerg. Plug	2	-	B.P. Scissors	1	-
Sea Call	1			Tin Opener	1	-	Thermal Protective Aid	2	-	Signal Mirror	1	-

Notes :

DWI PUJI LESTARI
Penata Muda Tk. I (III/b)
Nip. 1981017 200812 2 001

Head Office :
Address : Jl. Perak Timur 564 Blok A-7 (Lt. 2)

CV. MITRA USAHA

Inflatable Liferaft,General Trade,Marine Supplier Fire & Safety Equipment
Jl. Teluk Aru Selatan No. I Telp. 62 31-3291404-62 31 3281918 Fax. 62 31 3291928
SURABAYA – INDONESIA
E-Mail : cv_mitush@yahoo.co.id

CERTIFICATE

RE-INSPECTION OF INFLATABLE LIFERAFT

Certificate No / *No. Certificate* : 92/MU/ILR/05/2018
Date / *Tanggal* : 28 MEI 2018

Name of the Ship / *Nama kapal* : KM. SATYA KENCANA - III

Owner and Adress / *Pemilik dan Alamat* : PT. DHARMA LAUTAN UTAMA

Manufacture / *Buatan* : MITSUBIHI
Type : MTA – 25 A / *Tipe*

Serial No / *Nomor Serial* : 8305
Date of Manufacture / *Tahun Pembuatan* : JANUARI 1992

Container with full / partial emergency pack for
Petikemas dengan kemasan darurat penuh / terbatas untuk

For / *Untuk* : 25 PERSONS
Date Next Inspection / *Pemeriksaan Berikutnya* : 28 MEI 2019

Co2 Bottle No / *No Tabung Gas Co2* : PO. 18673 & PO. 18634
Weight / *Berat* : 13. 160 & 12. 850

With modification / *Dengan perubahan* : ANTI SEA SICKNESS,SPARE BATTERIES,FIRST AID KIT

This is certify that above named life raft has been inspected contrlled and according to requiment from ship authorities and factory and log card has been filled in according ti this
Dengan ini menyatakan bahwa liferaft tersebut diatas telah diperiksa, diawasi dan dicoba sesuai dengan pernyataan inspector keselamatan pelayaran serta pabrik dan telah diisi sesuai dengan keterangan diatas

MENGETAHUI

Capt. RONI FAHMI, S.E., M.M., M.Mar
Penata Tk. I (III/d)
NIP. 19750722 200312 1 001

Inflatable & Raft Service Station

SABARUDDIN,SE.
SURVEYOR

NAUTICAL MERINUS

SERVICE LIFE RAFT & FIRE EXTINGUISHER

Certificate of Re-Inspection

INFLATABLE LIFERAFT

Nama Kapal *Name of Ship*	:	KM. SATYA KENCANA - III	Tanggal *Date*	:	13 - 11 - 2018
Pemilik & Alamat *Owner & Addres*	:	PT. DHARMA LAUTAN UTAMA	Sertifikat No *Certificate No*	:	NM-ILR.18.0636

Dengan ini menyatakan bahwa Liferaft tersebut dibawah ini telah diperiksa dan ditest sesuai peraturan dari pabrik dan telah memenuhi persyaratan SOLAS (safety of life at sea).

This is certify that under mentioned Liferaft has been inspected, serviced and tested in compliance to the requirements of the manufactures and complying full to the international SOLAS (safety of life at sea).

Raft Mark	:	JIANGSU HAINING	Serial Number	:	11542
Type	:	HNF - 25	Date of Manufacture	:	12 - 2011
Capacity	:	25 PERSON'S			
CO2 Cylinder No. 1	:	620405	Containing	:	14.750 Kg
CO2 Cylinder No. 2	:	613047	Containing	:	14.500 Kg

Dengan Penggantian *Modification carried out* : First Aid Kit (1), Anti Sea Sickness (150), Spare Battery (4).

Pemeriksaan berikutnya *The next inspection* : 13 NOVEMBER 2019

Catatan *Note* : RAFT GOOD CONDITION

Mengetahui,

ADIB ZUHAIRI, ST
Penata (III/c)
NIP. 19781130 200712 1 001

CV. NAUTICAL MERINUS

WAHYU KUSHENDRATNO
Service Station

Head Office :
Address : Jl. Perak Timur 564 Blok A-7 (Lt. 2), Surabaya - Jawa Timur, Indonesia
Telp / Fax : +62 31 3286288 / +62 31 3281003, Email : purchasing@nauticalmerinus.com

NAUTICAL MERINUS

SERVICE LIFE RAFT & FIRE EXTINGUISHER

Certificate of Re-Inspection

INFLATABLE LIFERAFT

Nama Kapal *Name of Ship*	:	KM. SATYA KENCANA - III	Tanggal *Date*	:	04 - 06 - 2018
Pemilik & Alamat *Owner & Addres*	:	PT. DHARMA LAUTAN UTAMA	Sertifikat No *Certificate No*	:	NM-ILR.18.0375

Dengan ini menyatakan bahwa Liferaft tersebut dibawah ini telah diperiksa dan ditest sesuai peraturan dari pabrik dan telah memenuhi persyaratan SOLAS (safety of life at sea).

This is certify that under mentioned Liferaft has been inspected, serviced and tested in compliance to the requirements of the manufactures and complying full to the international SOLAS (safety of life at sea).

Raft Mark	:	DUNLOP MARINE	Serial Number	:	A/50719
Type	:	DOT UA	Date of Manufacture	:	DESEMBER 2008
Capacity	:	25 PERSON'S			
CO2 Cylinder No. 1	:	DA.595012	Containing	:	14.750 Kg
CO2 Cylinder No. 2	:	DA.579210	Containing	:	14.500 Kg

Dengan Penggantian *Modification carried out* : Food Ration (25), Drinking Water (75), Parachute Signals (2), Hand Flares (6), Smoke Signals (2), First Aid Kit (1), Anti Sea Sickness (150), Spare Battery (4), Gasket.

Pemeriksaan berikutnya *The next inspection* : 04 JUNI 2019

Catatan *Note* : RAFT GOOD CONDITION

Mengetahui,

Capt. RONI PRIMI, S.E., M.M., M.Mar
Penata Tk. I (III/d)
NIP. 19760722 200312 1 001

CV. NAUTICAL MERINUS

WAHYU KUSHENDRATNO
Service Station

Head Office :
Address : Jl. Perak Timur 564 Blok A-7 (Lt. 2), Surabaya - Jawa Timur, Indonesia

NAUTICAL MERINUS

SERVICE LIFE RAFT & FIRE EXTINGUISHER

Certificate of Re-Inspection

FIRE EXTINGUISHER

Nama Kapal / *Name of Ship* : KM. SATYA KENCANA III
Pemilik & Alamat / *Owner & Address* : FT. DHARMA LAUTAN UTAMA
Tanggal / *Date* : 11 - 12 - 2018
Sertifikat No / *Certificate No* : NM-FE.18.0106

Jaminan 1 tahun sejak sertificate ini dikeluarkan sesuai dengan keterangan sebagai berikut :
We quarrented for 1(one) year since this certificate issued, according by :

No	Model	Volume	Quantity	Remarks
01.	FOAM A - E	9,0 Ltr	18 Tabung	INSPECT/REFILL
02.	FOAM AFFF	9,0 Ltr	1 Tabung	INSPECT/REFILL
03.	CO2 Fortable	6,8 Kg	1 Tabung	INSPECT/REFILL
04.	FOAM AFFF	45,0 Kg	1 Tabung	INSPECT/REFILL
05.	FOAM A - E	45,0 Kg	1 Tabung	INSPECT/REFILL
		TOTAL	22 Tabung	

Dengan ini menyatakan bahwa alat pemadam api ringan tersebut telah diisi/diperiksa dan memenuhi syarat untuk dipergunakan .

This is to certify that under mentioned fire extinguisher has been refilled / inspected pressure test and complete condition for use.

Pemeriksaan berikutnya / *The next inspection* : 11 DESEMBER 2019

Mengetahui,

...AP. M. Si
...(IV / a)
...13 195401 1 001

CV. NAUTICAL MERINUS

WAHYU KUS...ATNO
Service ...

Head Office :
Address : Jl. Perak Timur 564 Blok A 7 (Lt. 2)
Surabaya - Jawa Timur, Indonesia
Telp / Fax : +62 31 3280280 / +62 31 3281003
Email : purchasing@nauticalmerinus.com

Branch Office :
Address : Jl. MH. Thamrin 152 Lingkar Gesari
RT. 01 RW. 02 Kel. Penganringan
Banyuwangi - Jawa Timur, Indonesia

Branch Office :
Address : Jl. Pelabuhan Merak No. 42 Dk. Manggis
Pulo Merak Kp. Sukajadi RT. 01 RW. 01
Merak - Banten, Indonesia

NAUTICAL MERINUS

SERVICE LIFE RAFT & FIRE EXTINGUISHER

Certificate of Re-Inspection

FIRE EXTINGUISHER

Nama Kapal / *Name of Ship* : KM. SATYA KENCANA III
Pemilik & Alamat / *Owner & Address* : FT. DHARMA LAUTAN UTAMA
Tanggal / *Date* : 09 - 11 - 2018
Sertifikat No / *Certificate No* : NM-FE.18.0102

Jaminan 1 tahun sejak sertificate ini dikeluarkan sesuai dengan keterangan sebagai berikut :
We quarrented for 1(one) year since this certificate issued, according by :

No	Model	Volume	Quantity	Remarks
01.	DRY POWDER 9 (STORED PREASURE)	6,0 Kg	11 Tabung	INSPECT/REFILL
02.	FOAM AFFF	9,0 Ltr	8 Tabung	INSPECT/REFILL
03.	CO2 Fortable	6,8 Kg	2Tabung	INSPECT/REFILL
04.		TOTAL	21Tabung	

Dengan ini menyatakan bahwa alat pemadam api ringan tersebut telah diisi/diperiksa dan memenuhi syarat untuk dipergunakan .

This is to certify that under mentioned fire extinguisher has been refilled / inspected pressure test and complete condition for use.

Pemeriksaan berikutnya / *The next inspection* : 09 NOVEMBER 2019

Mengetahui,

...UNI FADMI, S.E., M.M., M.Mar
Pembina (IV / a)
NIP 19750722 200312 1 001

CV. NAUTICAL MERINUS

WAHYU KUSHUNDARTNO
Service Station

Head Office :
Address : Jl. Perak Timur 564 Blok A 7 (Lt. 2)
Surabaya - Jawa Timur, Indonesia
Telp / Fax : +62 31 3280280 / +62 31 3281003
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Address : Jl. MH. Thamrin 152 Lingkar Gesari
RT. 01 RW. 02 Kel. Penganringan
Banyuwangi - Jawa Timur, Indonesia
Email : Purchasing@nauticalmerinus.com

Branch Office :
Address : Jl. Pelabuhan Merak No. 42 Dk. Manggis
Pulo Merak Kp. Sukajadi RT. 01 RW. 01
Merak - Banten, Indonesia
Email : purchasing@nauticalmerinus.com

PT. "MELATY"

Jl. Laksda M. Nasir No. 18 Surabaya
Telp. (031) 3293258 Fax. (031) 3293258

CERTIFICATE

Fire Extinguisher
Fire Extinguisher Instalations
Fire Hoses Safety Ann Rescue Equipment

Vessel : KM.SATYA KENCANA - III
Owner / Address : PT.DHARMA LAUTAN UTAMA

Certificate No. : NO.03/MLY/PMK/4/2019

This is to certivy that Fire Extinguisher has been Inspected, refilling / Serviced according to requirement ship authorities and factory
We quarranted for 1 (one) year since certificate issued, accordingly :

Item	Model	Volume	Quantity	Remarks
1	EEBD	150 bar	6 TBG	REFILLED
2	BRATHING APARATUS	150 bar	6 TBG	REFILLED
3	BRATHING APARATUS	200 bar	1 TBG	REFILELD

Total : 13 TBG

The next inspection : " 01 APRIL 2020 "
Date of issue : " 01 APRIL 2019 "

MOH. ALI S, AP. M. Si
Pjabat (IV/a)

Ali Buang S.Sos.
Inspector

PT. "MELATY"

Jl. Laksda M. Nasir No. 18 Surabaya
Telp. (031) 3293258 Fax. (031) 3293258

CERTIFICATE

Fire Extinguisher
Fire Extinguisher Instalations
Fire Hoses Safety Ann Rescue Equipment

Vessel : KM.SATYA KENCANA - III
Owner / Address : PT.DHARMA LAUTAN UTAMA

Certificate No. : NO.02/MLY/PMK/4/2019

This is to certivy that Fire Extinguisher has been Inspected, refilling / Serviced according to requirement ship authorities and factory
We quarranted for 1 (one) year since certificate issued, accordingly :

Item	Model	Volume	Quantity	Remarks
1	CO2 SYSTEM ROOMS	45 KG	4 TBG	GOOD CONDITION
2	PILOT CYLINDERS	0.8 KG	2 TBG	GOOD CONDITION

Total : 6 TBG

The next inspection : " 01 APRIL 2020 "
Date of issue : " 01 APRIL 2019 "

MOH. ALI S, AP. M. Si

Ali Buang S.Sos.

REKAPITULASI
Hasil Pemeriksaan
Khusus Kapal Penyeberangan

Nama Kapal	: SATYA KENCANA III
Nama Panggilan	: POES
Pelabuhan Pendaftaran	: SURABAYA
Tonase Kotor / GT	: 2825
Tempat / Tahun Pembuatan	: JAPAN / 1989
Lama Pelayaran	: LOKAL

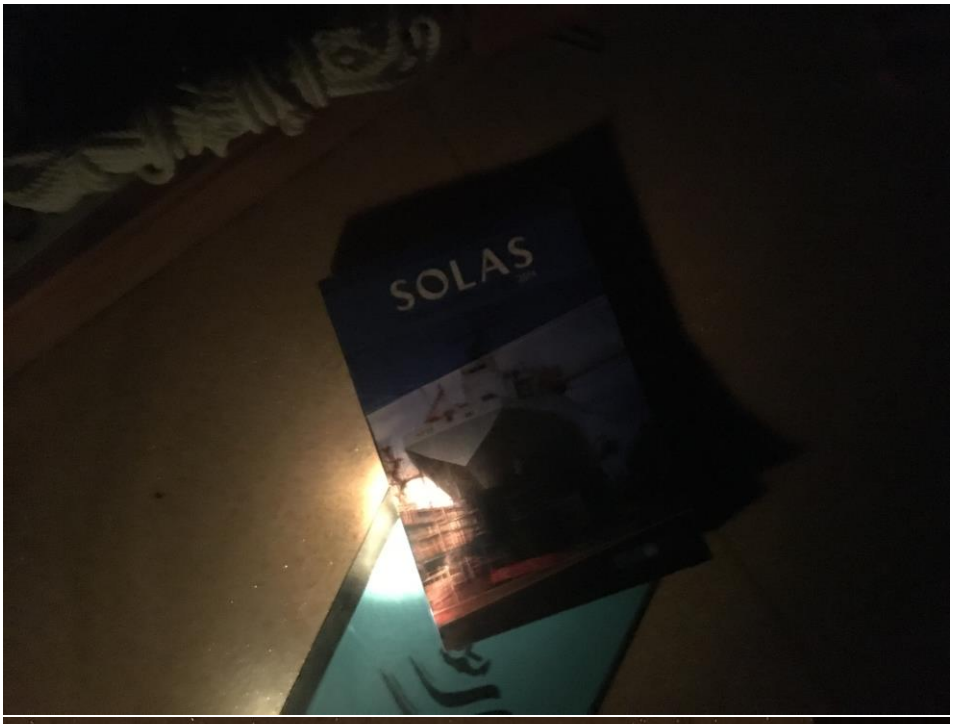
	KIRI	KANAN
Jumlah sekoci	-	-
Sekoci Penolong yang dapat berfungsi sebagai sekoci penyelamat	-	-
Kapasitas sekoci Penolong	-	-
Sekoci Penyelamat	1	1
Sekoci Kerja Bermotor	-	-
Jumlah Life Raft	13	14
Inflatable Life Raft	325	350
Kapasitas I L R	-	-
Rigid Life Raft	-	-
Jumlah Alat Apung	-	-
Kapasitas Alat Apung	-	-

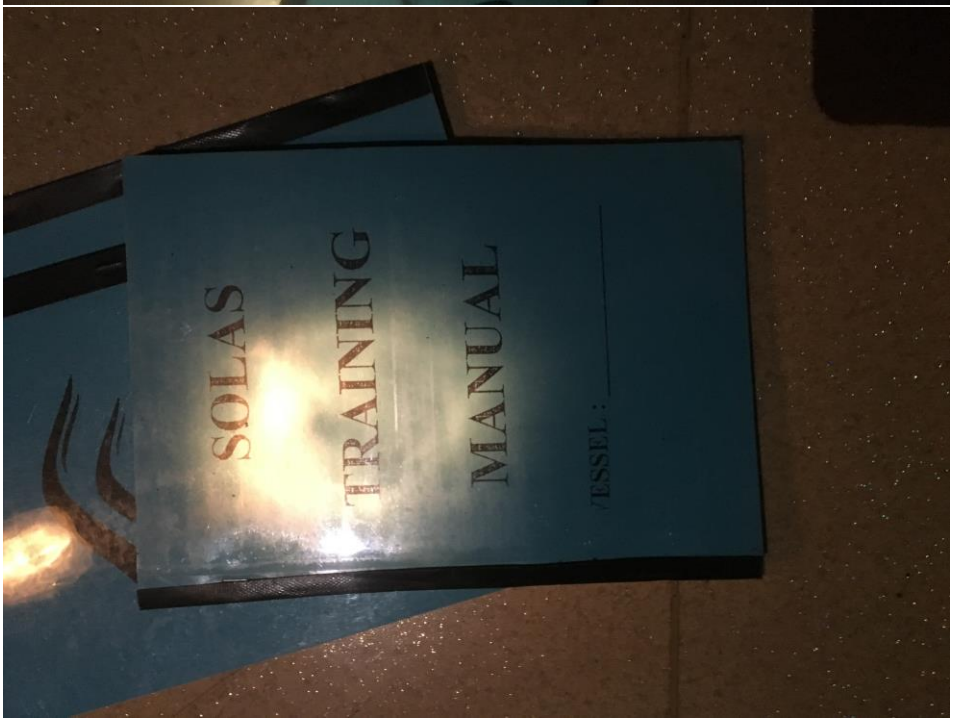
Jumlah baju renang	550
Baju berenang dewasa	500
Baju berenang Anak-anak	50
Jumlah Pelampung Penolong	12
Pelampung Penolong dengan lampu + asap	2
Pelampung Penolong dengan lampu + Tali	4
Jumlah Pelampung Penolong Biasa	6
Perangkat Telekomunikasi radio teleponi (SSB Tranceiver)	Ada
Perangkat Telekomunikasi VHF radio teleponi	Ada
Pesawat Penerima Frekwensi bahaya teleponi (standby Wachkeeping receiver)	-
Perangkat EPIRB	Ada
Radio telepon dua arah (two way radio communication)	Ada
Radar Transponder	Ada

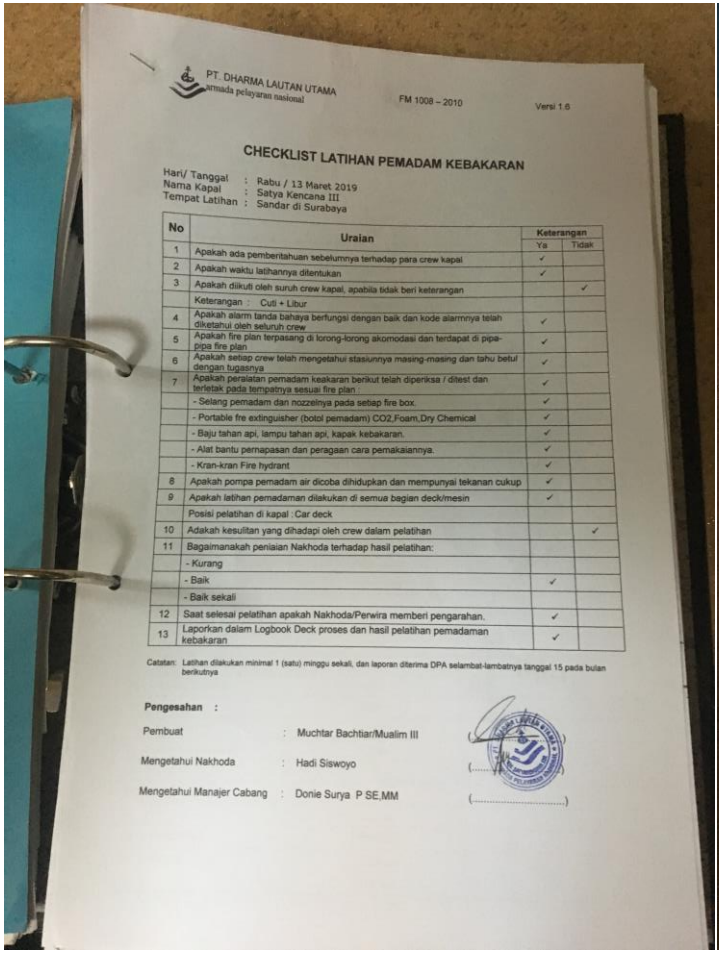
Diperiksa di PT PAL SURABAYA tanggal 21-03-2019

Pemeriksa Kapal I

HENDRIK JANUAR S.
Penata Muda (III/a)


SOLAS


SOLAS
TRAINING
MANUAL
/ESSEL :



PT. DHARMA LAUTAN UTAMA
armada pelayaran nasional

FM 1008 – 2010 Versi 1.6

CHECKLIST LATIHAN PEMADAM KEBAKARAN

Hari/ Tanggal : Rabu / 13 Maret 2019
Nama Kapal : Satya Kencana III
Tempat Latihan : Sandar di Surabaya

No	Uraian	Keterangan	
		Ya	Tidak
1	Apakah ada pemberitahuan sebelumnya terhadap para crew kapal	✓	
2	Apakah waktu latihannya ditentukan	✓	
3	Apakah diikuti oleh suruh crew kapal, apabila tidak beri keterangan		✓
	Keterangan : Cuti + Libur		
4	Apakah alarm tanda bahaya berfungsi dengan baik dan kode alarmnya telah diketahui oleh seluruh crew	✓	
5	Apakah fire plan terpasang di lorong-lorong akomodasi dan terdapat di pipa-pipa fire plan	✓	
6	Apakah setiap crew telah mengetahui stasiunnya masing-masing dan tahu betul dengan tugasnya	✓	
7	Apakah peralatan pemadam keakaran berikut telah diperiksa / ditest dan terletak pada tempatnya sesuai fire plan :	✓	
	- Selang pemadam dan nozzelnya pada setiap fire box.	✓	
	- Portable fre extinguisher (botol pemadam) CO2,Foam,Dry Chemical	✓	
	- Baju tahan api, lampu tahan api, kapak kebakaran.	✓	
	- Alat bantu pernapasan dan peragaan cara pemakaiannya.	✓	
	- Kran-kran Fire hydrant	✓	
8	Apakah pompa pemadam air dicoba dihidupkan dan mempunyai tekanan cukup	✓	
9	Apakah latihan pemadaman dilakukan di semua bagian deck/mesin	✓	
	Posisi pelatihan di kapal : Car deck		
10	Adakah kesulitan yang dihadapi oleh crew dalam pelatihan		✓
11	Bagaimanakah penilaian Nakhoda terhadap hasil pelatihan:		
	- Kurang		
	- Baik	✓	
	- Baik sekali		
12	Saat selesai pelatihan apakah Nakhoda/Perwira memberi pengarahan.	✓	
13	Laporkan dalam Logbook Deck proses dan hasil pelatihan pemadaman kebakaran	✓	

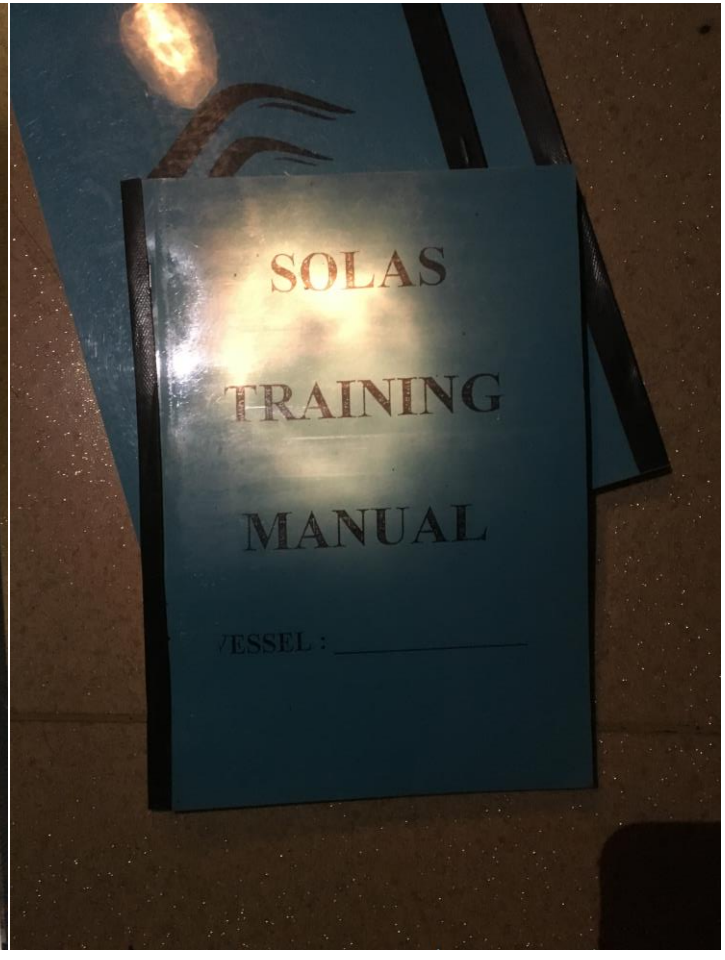
Catatan: Latihan dilakukan minimal 1 (satu) minggu sekali, dan laporan diterima DPA selambat-lambatnya tanggal 15 pada bulan berikutnya

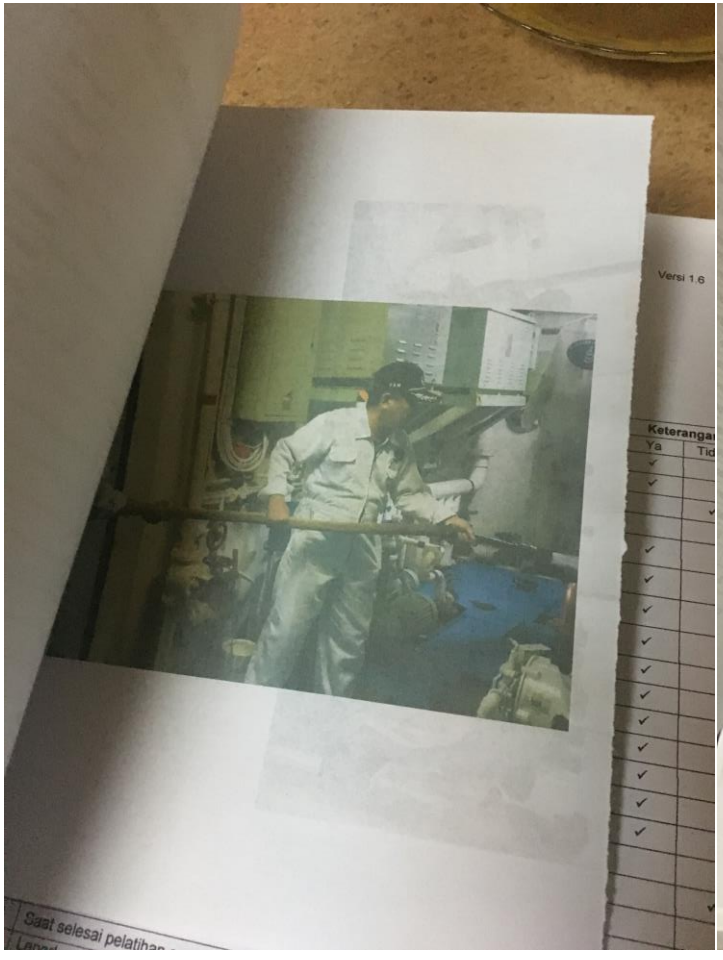
Pengesahan :

Pembuat : Muchtar Bachtiar/Mualim III (.....)

Mengetahui Nakhoda : Hadi Siswoyo (.....)

Mengetahui Manajer Cabang : Donie Surya P SE,MM (.....)





Versi 1.6

Keterangan

Ya	Tid
✓	
✓	
	✓
✓	
✓	
✓	
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✓	
✓	
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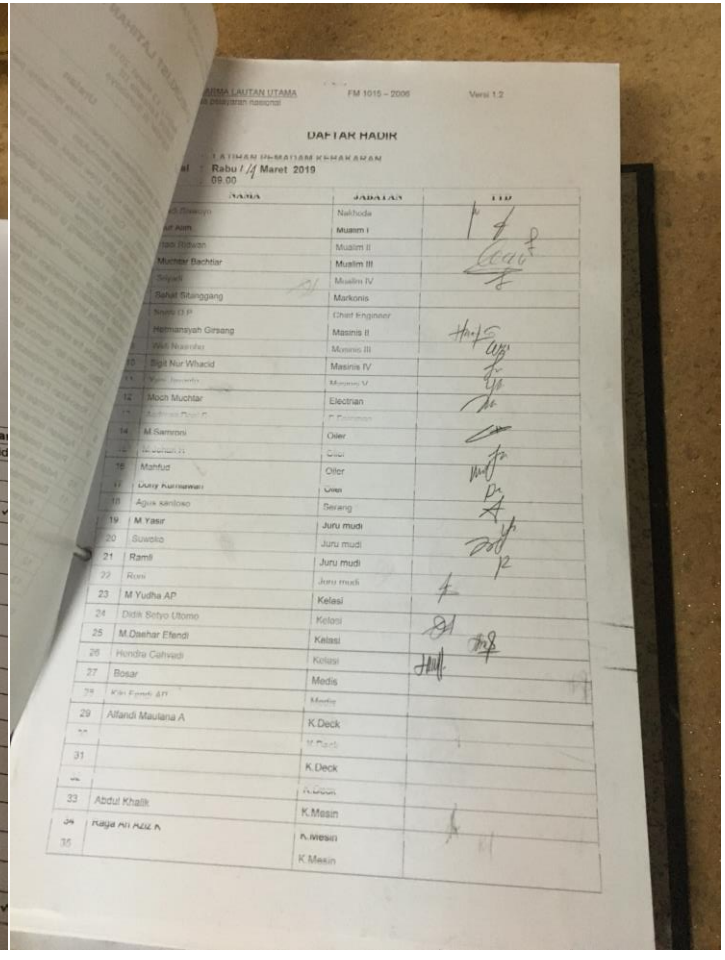
✓	
	✓

Saat selesai pelatihan



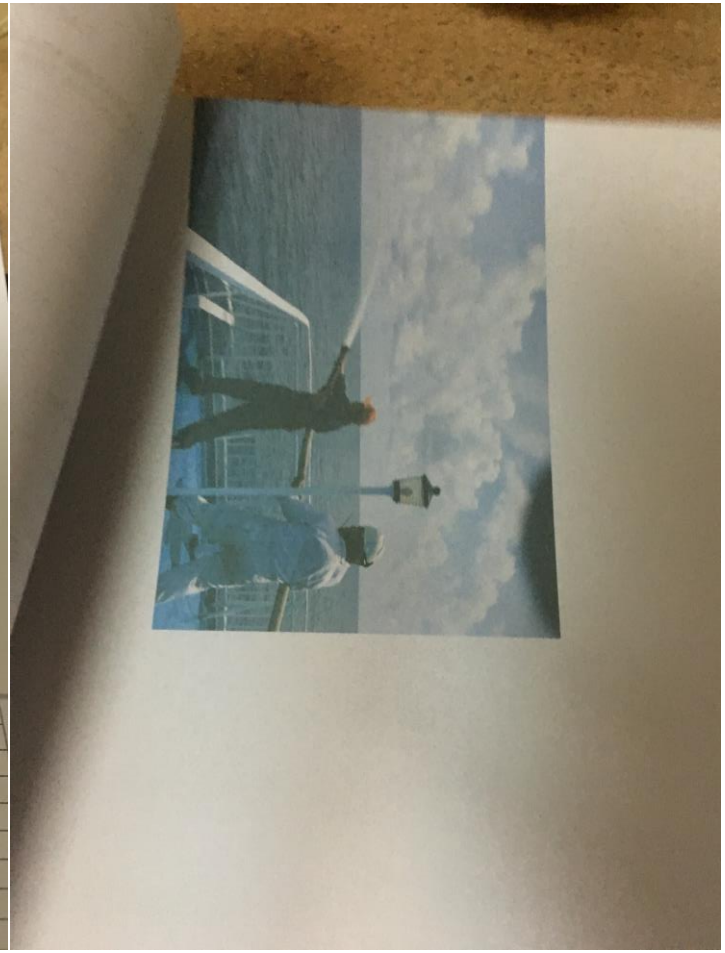
FM 1015 – 2006 Versi 1.2

DAFTAR HADIR

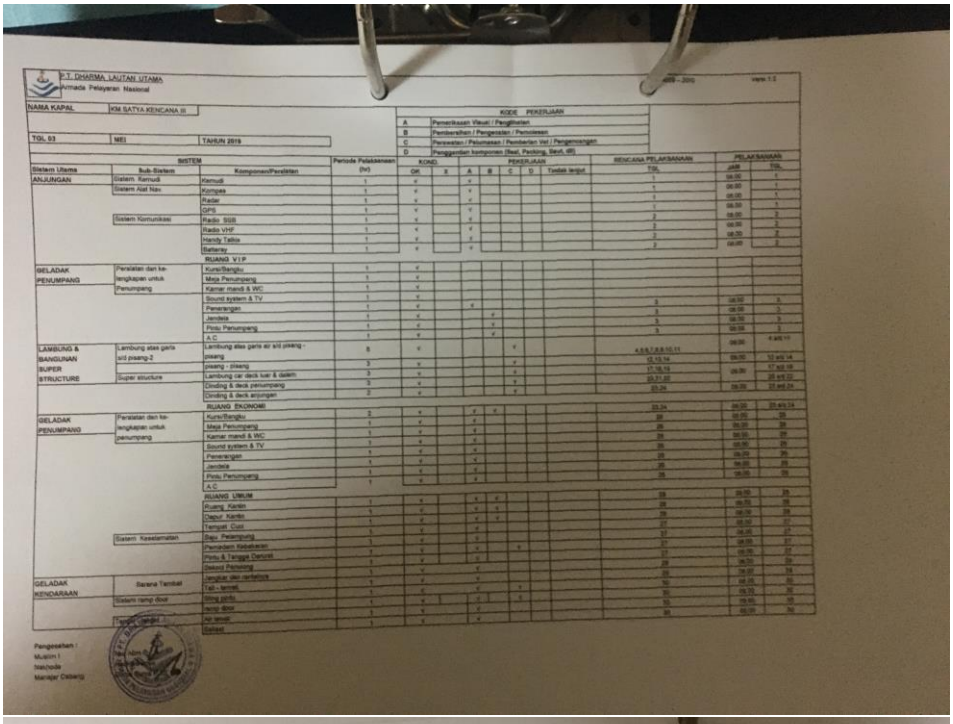
Rabu / 4 Maret 2019
09.00

	NAMA	JABATAN	TTD
		Nakhoda	
		Muallim I	
		Muallim II	
	Muchtar Bachtiar	Muallim III	
		Muallim IV	
	Bahat Tibanggang	Markonis	
		Chief Engineer	
	Hermansyah Girsang	Masinis II	
		Masinis III	
10	Sigit Nur Whacid	Masinis IV	
		Masinis V	
12	Moch Muchtar	Electrian	
14	M.Samroni	Oiler	
		Oiler	
16	Mahfud	Oiler	
17		Oiler	
18	Agus santoso	Serang	
19	M Yasir	Juru mudi	
20	Suwoko	Juru mudi	
21	Ramli	Juru mudi	
22	Roni	Juru mudi	
23	M Yudha AP	Kelasi	
24	Didik Setyo Utomo	Kelasi	
25	M.Dasher Efendi	Kelasi	
26	Hendra Cahyadi	Kelasi	
27	Bosar	Medis	
28		Medis	
29	Alfandi Maulana A	K.Deck	
		K.Deck	
31		K.Deck	
		K.Deck	
33	Abdul Khalik	K.Mesin	
34	Raja Ali Aziz A	K.Mesin	
35		K.Mesin	

	- Kran-kran Fire hydrant	✓	
8	Apakah pompa pemadam air dicoba dihidupkan dan mempunyai tekanan cukup	✓	
9	Apakah latihan pemadaman dilakukan di semua bagian deck/mesin	✓	
	Posisi pelatihan di kapal : Buritan		
10	Adakah kesulitan yang dihadapi oleh crew dalam pelatihan		✓
11	Bagaimanakah penialan Nakhoda terhadap hasil pelatihan:		
	- Kurang		
	- Baik	✓	
	- Baik sekali		




SATYAMEVA
JAYATE
SURYA DATTA



P.T. DHARMA LAUTAN UTAMA
Armada Pelayaran Nasional

NAMA KAPAL : KM SATYA KENCANA III

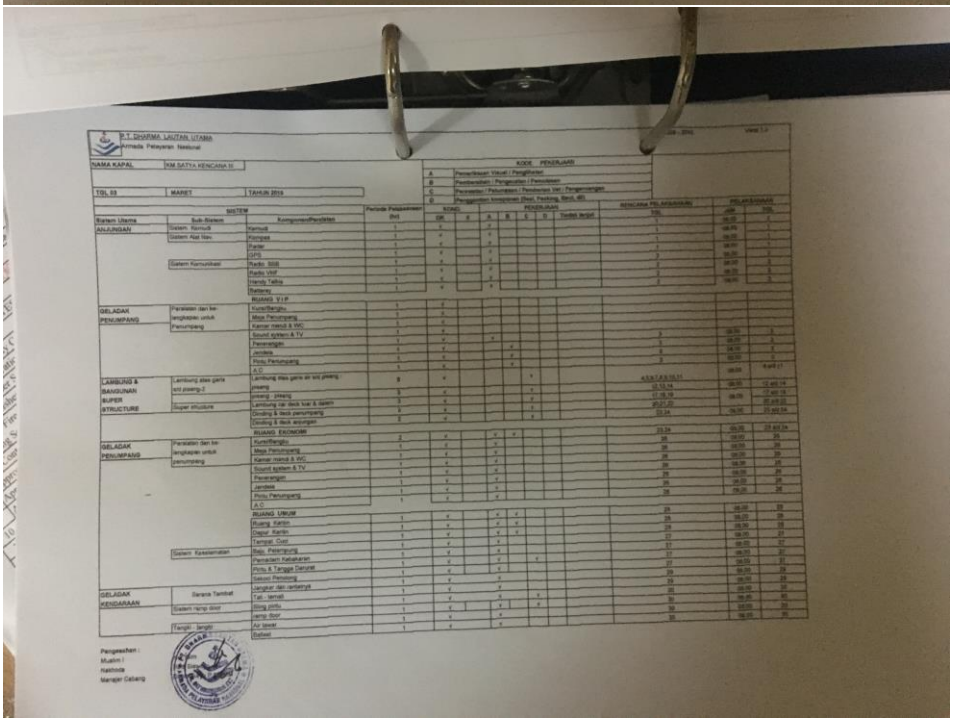
TGL 03 | MEI | TAHUN 2019

KODE PEKERJAAN
A Pemeriksaan Visual / Pengitheran
B Pemberesihan / Pengecatan / Pemulesan
C Perawatan / Pelumasan / Pemberian Vet / Pengencangan
D Penggantian komponen (Seal, Packing, Bevil, dll)

SISTEM			Periode Pelaksanaan (hr)	KOND.		PENJAJAN				RENCANA PELAKSANAAN	PELAKSANAAN	
Sistem Utama	Sub-Sistem	Komponen/Peralatan		OK	X	A	B	C	D	Tindak lanjut	TGL	JAM	TGL
ANJUNGAN	Sistem Kemudi	Kemudi	1	√		√					1	08.00	1
	Sistem Alat Nav.	Kompas	1	√		√					1	08.00	1
		Radar	1	√		√					1	08.00	1
		GPS	1	√		√					1	08.00	1
	Sistem Komunikasi	Radio SSB	1	√		√					2	08.00	2
		Radio VHF	1	√		√					2	08.00	2
		Handy Talkie	1	√		√					2	08.00	2
		Battarey	1	√		√					2	08.00	2
		RUANG V I P											
GELADAK PENUMPANG	Peralatan dan kelengkapan untuk penumpang	Kursi/Bangku	1	√									
		Meja Penumpang	1	√									
		Kamar mandi & WC	1	√									
		Sound system & TV	1	√									
		Penerangan	1	√		x					3	08.00	3
		Jendela	1	x			√				3	08.00	3
		Pintu Penumpang	1	√			x				3	08.00	3
		A.C	1	√			√				3	08.00	3
LAMBUNG & BANGUNAN SUPER STRUCTURE	Lambung atas garis sid.pisang-2	Lambung atas garis air sid.pisang - pisang	8	√				√			4,5,6,7,8,9,10,11	08.00	4 s/d 11
		pisang - pisang	3	√					√		12,13,14	08.00	12 s/d 14
	Super structure	Lambung car deck luar & dalam	3	√					√		17,18,19	08.00	17 s/d 19
		Dinding & deck penumpang	3	√					√		20,21,22	08.00	20 s/d 22
		Dinding & deck anjungan	2	√					√		23,24	08.00	23 s/d 24
		RUANG EKONOMI										08.00	23 s/d 24
GELADAK PENUMPANG	Peralatan dan kelengkapan untuk penumpang	Kursi/Bangku	2	√		√	x				23,24	08.00	23
		Meja Penumpang	1	√		√					24	08.00	24
		Kamar mandi & WC	1	√		√					24	08.00	24
		Sound system & TV	1	√		√					24	08.00	24
		Penerangan	1	√		√					24	08.00	24
		Jendela	1	√		√					24	08.00	24
		Pintu Penumpang	1	√		√					24	08.00	24
		A.C	1	√		√					24	08.00	24
		RUANG UMUM										08.00	24
		Ruang Kantin	1	x		x	x				24	08.00	24
		Dapur Kantin	1	√		√	√				24	08.00	24
		Tempat Cuci	1	√		√	√				24	08.00	24
	Sistem Keselamatan	Rak. Pelampung	1	√		√					24	08.00	24
		Pemadam Kebakaran	1	√		√		√			24	08.00	24
		Pintu & Tangga Darurat	1	√		√					24	08.00	24
		Sekoci Penolong	1	√		√					24	08.00	24
GELADAK KENDARAAN	Sarana Tambat	Jangkar dan perlengk	1	√		√					24	08.00	24
		Tali - tambat	1	√		√		√			24	08.00	24
	Sistem ramp door	Sling pintu	1	√		√		√			24	08.00	24
		Ramp door	1	√		√					24	08.00	24
	Tangki - tangki	Air tawar	1	√		√					24	08.00	24
		Ballast	1	√		√					24	08.00	24

Pengesahan :
Muslim I
Nakhoda

Manajer Cabang



P.T. DHARMA LAUTAN UTAMA
Armada Pelayaran Nasional

NAMA KAPAL : KM SATYA KENCANA III

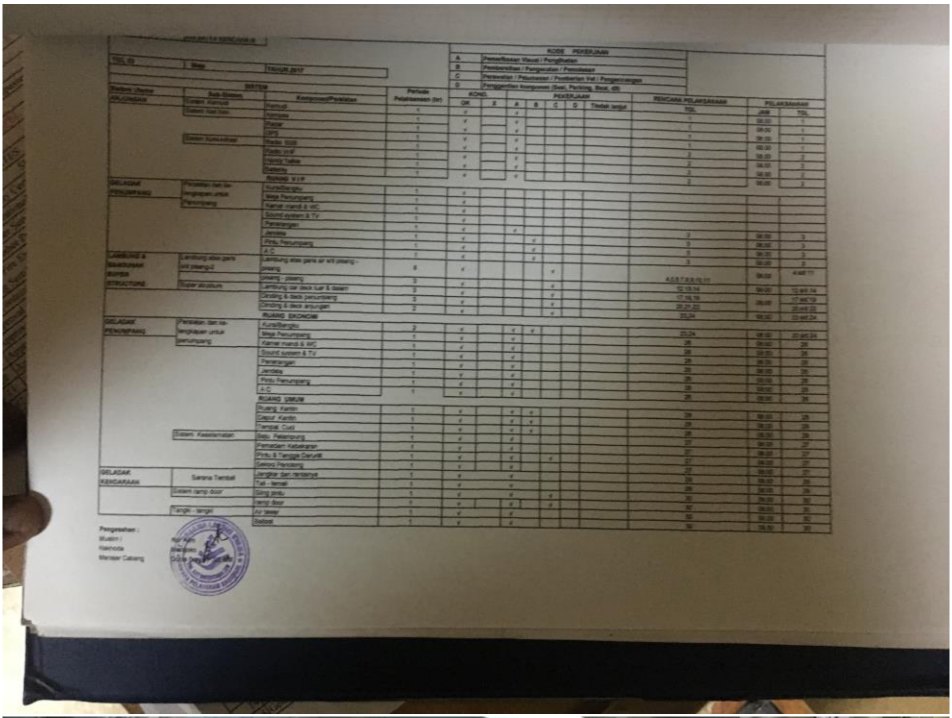
TGL 03 | MARET | TAHUN 2019

KODE PEKERJAAN
A Pemeriksaan Visual / Pengitheran
B Pembersihan / Pengecatan / Pemulesan
C Perawatan / Pelumasan / Pemberian Vet / Pengencangan
D Penggantian komponen (Seal, Packing, Bevil, dll)

SISTEM			Periode Pelaksanaan (hr)	KOND.		PENJAJAN				RENCANA PELAKSANAAN	PELAKSANAAN	
Sistem Utama	Sub-Sistem	Komponen/Peralatan		OK	X	A	B	C	D	Tindak lanjut	TGL	JAM	TGL
ANJUNGAN	Sistem Kemudi	Kemudi	1	√		√					1	08.00	1
	Sistem Alat Nav.	Kompas	1	√		√					1	08.00	1
		Radar	1	√		√					1	08.00	1
		GPS	1	√		√					1	08.00	1
	Sistem Komunikasi	Radio SSB	1	√		√					2	08.00	2
		Radio VHF	1	√		√					2	08.00	2
		Handy Talkie	1	√		√					2	08.00	2
		Battarey	1	√		√					2	08.00	2
		RUANG V I P											
GELADAK PENUMPANG	Peralatan dan kelengkapan untuk penumpang	Kursi/Bangku	1	√									
		Meja Penumpang	1	√									
		Kamar mandi & WC	1	√									
		Sound system & TV	1	√									
		Penerangan	1	√		x					3	08.00	3
		Jendela	1	x			√				3	08.00	3
		Pintu Penumpang	1	√			x				3	08.00	3
		A.C	1	√			√				3	08.00	3
LAMBUNG & BANGUNAN SUPER STRUCTURE	Lambung atas garis sid.pisang-2	Lambung atas garis air sid.pisang - pisang	8	√				√			4,5,6,7,8,9,10,11	08.00	4 s/d 11
		pisang - pisang	3	√					√		12,13,14	08.00	12 s/d 14
	Super structure	Lambung car deck luar & dalam	3	√					√		17,18,19	08.00	17 s/d 19
		Dinding & deck penumpang	3	√					√		20,21,22	08.00	20 s/d 22
		Dinding & deck anjungan	2	√					√		23,24	08.00	23 s/d 24
		RUANG EKONOMI										08.00	23 s/d 24
GELADAK PENUMPANG	Peralatan dan kelengkapan untuk penumpang	Kursi/Bangku	2	√		√	x				23,24	08.00	23
		Meja Penumpang	1	√		√					24	08.00	24
		Kamar mandi & WC	1	√		√					24	08.00	24
		Sound system & TV	1	√		√					24	08.00	24
		Penerangan	1	√		√					24	08.00	24
		Jendela	1	√		√					24	08.00	24
		Pintu Penumpang	1	√		√					24	08.00	24
		A.C	1	√		√					24	08.00	24
		RUANG UMUM										08.00	24
		Ruang Kantin	1	x		x	x				24	08.00	24
		Dapur Kantin	1	√		√	√				24	08.00	24
		Tempat Cuci	1	√		√	√				24	08.00	24
	Sistem Keselamatan	Rak. Pelampung	1	√		√					24	08.00	24
		Pemadam Kebakaran	1	√		√		√			24	08.00	24
		Pintu & Tangga Darurat	1	√		√					24	08.00	24
		Sekoci Penolong	1	√		√					24	08.00	24
GELADAK KENDARAAN	Sarana Tambat	Jangkar dan perlengk	1	√		√					24	08.00	24
		Tali - tambat	1	√		√		√			24	08.00	24
	Sistem ramp door	Sling pintu	1	√		√		√			24	08.00	24
		Ramp door	1	√		√					24	08.00	24
	Tangki - tangki	Air tawar	1	√		√					24	08.00	24
		Ballast	1	√		√					24	08.00	24

Pengesahan :
Muslim I
Nakhoda

Manajer Cabang



TAHUN 2017

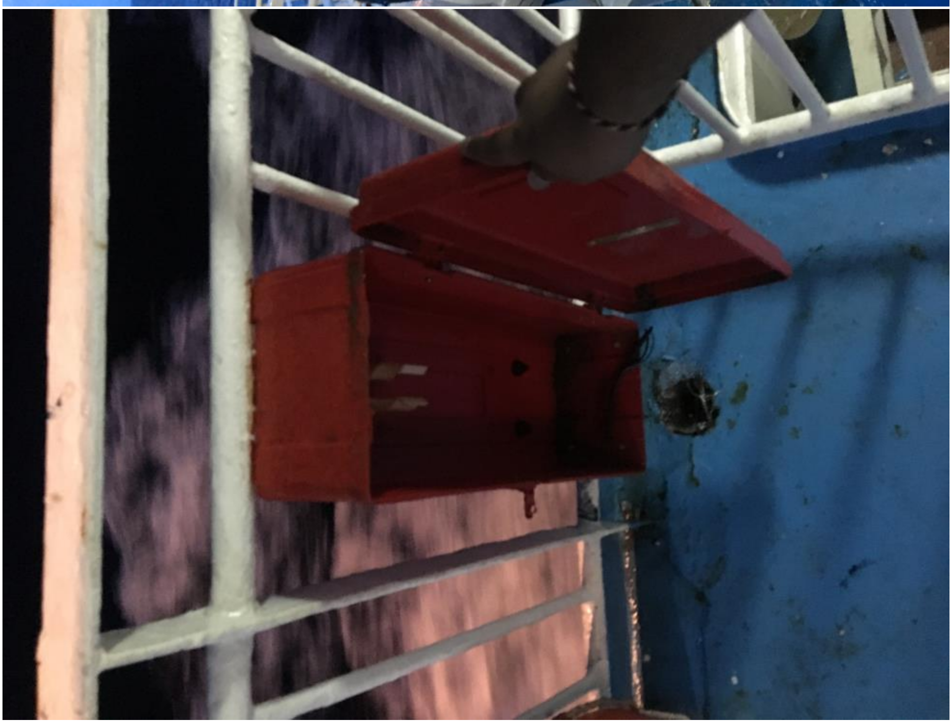
SISTEM

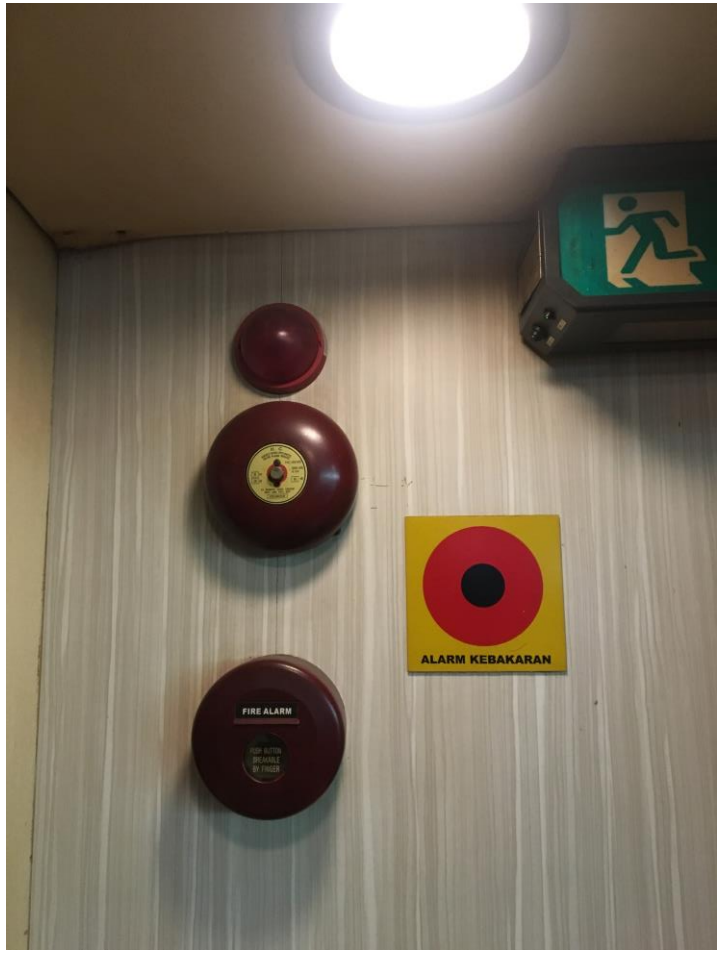
KODE	PEKERJAAN
A	Pemeriksaan Visual / Penglihatan
B	Pembersihan / Pengecatan / Pemolesan
C	Perawatan / Pelumasan / Pemberian Vet / Pengencangan
D	Penggantian komponen (Seal, Packing, Baut, dll)

Sistem Utama	Sub-Sistem	Komponen/Peralatan	Periode Pelaksanaan (bl)
NAVIGASI	Sistem Kemudi	Kemudi	1
	Sistem Alat Nav.	Kompas	1
		Radar	1
		GPS	1
	Sistem Komunikasi	Radio SSB	1
		Radio VHF	1
		Handy Talkie	1
		Battery	1
		RUANG V I P	
GELADAK PENUMPANG	Peralatan dan ke-lengkapan untuk Penumpang	Kursi/Bangku	1
		Meja Penumpang	1
		Kamar mandi & WC	1
		Sound system & TV	1
		Penerangan	1
		Jendela	1
		Pintu Penumpang	1
		A C	1
LAMBUNG & BANGUNAN SUPER STRUCTURE	Lambung atas garis air pisang-2	Lambung atas garis air s/d pisang - pisang	[illegible]
		pisang - pisang	3
	Super structure	Lambung car deck luar & dalam	3
		Dinding & deck penumpang	3
		Dinding & deck anjungan	2
		RUANG EKONOMI	
GELADAK PENUMPANG	Peralatan dan ke-lengkapan untuk penumpang	Kursi/Bangku	2
		Meja Penumpang	1
		Kamar mandi & WC	1
		Sound system & TV	1
		Penerangan	1
		Jendela	1
		Pintu Penumpang	1
		A C	1
		RUANG UMUM	
		Ruang Kantin	1
		Dapur Kantin	1
		Tempat Cuci	1
	Sistem Keselamatan	Baju Pelampung	1
		Pemadam Kebakaran	1
		Pintu & Tangga Darurat	1
		Sekoci Penolong	1
GELADAK KENDARAAN	Sarana Tambat	Jangkar dan rantainya	1
		Tali - temali	1
	Sistem ramp door	Sling pintu	1
		ramp door	1
	Tangki - tangki	Air tawar	1
		Ballast	1

Pengesahan :
Mualim I
Nakhoda
Manajer Cabang


NEXT INSPECTION
DEC - 2019
SATYAKENCANA
III




ALARM KEBAKARAN
FIRE ALARM

APPENDIX II

Analisa Kerentanan Kapal Ferry dan Ro-Ro terhadap Kebakaran

Kepada Saudara Responden,
Perkenalkan, saya Putu Gede Andhika Nidyatama, mahasiswa Departemen Teknik Sistem Perkapalan, Fakultas Teknologi Kelautan, Institut Teknologi Sepuluh Nopember. Saat ini, saya sedang mengerjakan penelitian tugas akhir saya dengan topik analisa kerentanan kapal ferry dan ro-ro terhadap kebakaran dengan menggunakan metode AHP. Adapun struktur AHP yang sudah saya rencanakan dapat dilihat pada akhir bagian ini.

Adapun tujuan atau GOALS dari AHP ini adalah untuk dapat memberikan bobot penilaian terhadap masing-masing komponen yang berpengaruh terhadap kemampuan kapal ferry dan ro-ro untuk melawan kebakaran. Maka dari itu, kuesioner ini berisi 29 sub-kriteria yang dibagi menjadi 7 kriteria.

Saudara responden tidak perlu merasa khawatir dengan data pribadi yang dicantumkan pada kuesioner ini dikarenakan data tersebut akan bersifat rahasia dan hanya dibahas dengan dosen pembimbing saya. Dimana dosen pembimbing saya adalah:
1. Dr. Eng. Trika Pitana, S.T., M.Sc.
2. Ir. Hari Prastowo, M.Sc.
Oleh karena itu saya mengharapkan kejujuran Saudara responden dalam pengisian kuesioner ini. Waktu yang dibutuhkan untuk mengisi kuesioner ini adalah sekitar 15-20 menit.

Jika ada pertanyaan, kritik, atau saran mengenai penelitian ini, dapat menghubungi peneliti melalui putugdandhika@gmail.com.

Terima kasih atas waktu dan bantuan Saudara responden, semoga hari Saudara menyenangkan.

Salam,
Putu Gede Andhika Nidyatama

* Wajib

Struktur AHP

Data Responden

Informasi yang dimuat akan dijaga kerahasiaannya dan hanya akan digunakan untuk tujuan akademis.

Nama *

Usia *
(Contoh: 22)

Pekerjaan *

Jabatan

Apakah anda mengetahui tentang prosedur atau tata cara memadamkan api? *
Tandai satu oval saja.

- Ya
- Tidak

Petunjuk Pengisian

Dalam kuesioner ini, digunakan skala penilaian -9 hingga 9 dengan definisi penilaian sebagai dibawah. Contoh pengisian kuesioner ini adalah sebagai berikut: Pertanyaan: Pelatihan ABK __ dibandingkan dengan (*). Petunjuk: Pada bagian __ diisikan dengan angka sesuai dengan definisi yang terdapat pada tabel dibawah. Lalu (*) akan di substitusi dengan pilihan yang tertera pada bagian bawah. Jawaban: Sebagai contoh, menurut anda Pelatihan ABK "Mutlak Lebih Penting" dibandingkan dengan Kondisi ABK. Maka, silahkan isi jawaban anda dengan nomor "9" pada opsi Kondisi ABK.

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Anak Buah Kapal (Crew)

Perbandingan berpasangan mengenai elemen-elemen "Anak Buah Kapal". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Kondisi ABK ___ dibandingkan dengan: (*) *

Berikan tanda sekali pada tiap baris.

Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Patroli ABK	○	○	○	○	○	○	○	○	○

	-9	-7	-5	-3	1	3	5	7	9
Pelatihan ABK									
Latar Belakang ABK									

Latar Belakang ABK ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Patroli ABK									
Pelatihan ABK									

Pelatihan ABK ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Patroli ABK									

Keselamatan Operasi (Safe Operation)

Perbandingan berpasangan mengenai elemen-elemen "Keselamatan Operasi". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Penempatan Kendaraan ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Penataan Muatan									
Perilaku Penumpang									

Penataan Muatan ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Perilaku Penumpang									

Emergency, Escape and Rescue

Perbandingan berpasangan mengenai elemen-elemen "Emergency, Escape and Rescue". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Search and Rescue ___ dibandingkan dengan: (*) *

Berikan tanda sekali pada tiap baris.

Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Pemadam Kebakaran Pelabuhan									
Rute Evakuasi									
Titik Kumpul									
Kesigapan Darurat									

Pemadam Kebakaran Pelabuhan ___ dibandingkan dengan: (*) *

Berikan tanda sekali pada tiap baris.

Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rute Evakuasi									
Titik Kumpul									
Kesigapan Darurat									

Kesigapan Darurat ___ dibandingkan dengan: (*) *

Berikan tanda sekali pada tiap baris.

Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rute Evakuasi									

	-9	-7	-5	-3	1	3	5	7	9
Titik Kumpul									

Rute Evakuasi ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Titik Kumpul									

Pendeteksi Kebakaran (Fire Detectors)

Perbandingan berpasangan mengenai elemen-elemen "Pendeteksi Kebakaran". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Alarm Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Sprinkles									
Pendeteksi Asap									
CCTV									

Sprinkles ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Pendeteksi Asap									
CCTV									

Pendeteksi Asap ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
CCTV									

Alat Pemadam Kebakaran (Fire Extinction)

Perbandingan berpasangan mengenai elemen-elemen "Alat Pemadam Kebakaran". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Pompa Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Hydrant Kebakaran	○	○	○	○	○	○	○	○	○
Portable Fire Extinguishers	○	○	○	○	○	○	○	○	○
Fixed Fire Extinguishers	○	○	○	○	○	○	○	○	○

Hydrant Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Portable Fire Extinguishers	○	○	○	○	○	○	○	○	○
Fixed Fire Extinguishers	○	○	○	○	○	○	○	○	○

Portable Fire Extinguishers ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Fixed Fire Extinguishers	○	○	○	○	○	○	○	○	○

Dokumen dan Sertifikat

Perbandingan berpasangan mengenai elemen-elemen "Dokumen dan Sertifikat". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Sertifikat Keselamatan Kapal Penumpang ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rencana Penanganan Kebakaran	○	○	○	○	○	○	○	○	○
Sertifikat Alat Bantu Pernapasan	○	○	○	○	○	○	○	○	○
Rekam Perawatan, Inspeksi dan Pengujian	○	○	○	○	○	○	○	○	○
Rekam Pemahaman ABK akan Kebakaran	○	○	○	○	○	○	○	○	○
Sertifikat Alat Pemadam Kebakaran	○	○	○	○	○	○	○	○	○

Sertifikat Alat Pemadam Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rencana Penanganan Kebakaran	○	○	○	○	○	○	○	○	○
Sertifkat Alat Bantu Pernapasan	○	○	○	○	○	○	○	○	○
Rekam Perawatan, Inspeksi dan Pengujian	○	○	○	○	○	○	○	○	○

	-9	-7	-5	-3	1	3	5	7	9
Rekam Pemahaman ABK									

Rencana Penanganan Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Sertifikat Alat Bantu Pernapasan									
Rekam Perawatan, Inspeksi dan Pengujian									
Rekam Pemahaman ABK akan Kebakaran									

Sertifikat Alat Bantu Pernapasan ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rekam Perawatan, Inspeksi dan Pengujian									
Rekam Pemahaman ABK akan Kebakaran									

Rekam Perawatan, Inspeksi dan Pengujian ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Rekam Pemahaman ABK akan Kebakaran									

Perlengkapan Darurat (Emergency Apparatus)

Perbandingan berpasangan mengenai elemen-elemen "Perlengkapan Darurat". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Baju Pemadam Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Alat Bantu Pernapasan Mandiri (SCBA)	○	○	○	○	○	○	○	○	○
Alat Bantu Pernapasan Darurat (EEBD)	○	○	○	○	○	○	○	○	○

Alat Bantu Pernapasan Mandiri (SCBA) ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Alat Bantu Pernapasan Darurat (EEBD)	○	○	○	○	○	○	○	○	○

Kriteria Umum

Perbandingan berpasangan mengenai elemen-elemen "Kriteria Umum". Bagaimana menurut pendapat anda mengenai tingkat kepentingan masing-masing elemen terhadap pasangannya?

Skala Penilaian Perbandingan Berpasangan

Tingkat Kepentingan	Definisi
-9	Amat Sangat Tidak Penting
-7	Sangat Tidak Penting
-5	Lebih Tidak Penting
-3	Sedikit Lebih Tidak Penting
1	Sama Pentingnya
3	Sedikit Lebih Penting
5	Lebih Penting
7	Sangat Penting
9	Amat Sangat Penting

Anak Buah Kapal ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Keselamatan Operasi	◯	◯	◯	◯	◯	◯	◯	◯	◯
Emergency, Escape and Rescue	◯	◯	◯	◯	◯	◯	◯	◯	◯
Pendeteksi Kebakaran	◯	◯	◯	◯	◯	◯	◯	◯	◯
Alat Pemadam Kebakaran	◯	◯	◯	◯	◯	◯	◯	◯	◯
Dokumen dan Sertifikat	◯	◯	◯	◯	◯	◯	◯	◯	◯
Perlengkapan Darurat	◯	◯	◯	◯	◯	◯	◯	◯	◯

Alat Pemadam Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Dokumen dan Sertifikat	◯	◯	◯	◯	◯	◯	◯	◯	◯
Perlengkapan Darurat	◯	◯	◯	◯	◯	◯	◯	◯	◯
Keselamatan Operasi	◯	◯	◯	◯	◯	◯	◯	◯	◯
Emergency, Escape and Rescue	◯	◯	◯	◯	◯	◯	◯	◯	◯
Pendeteksi Kebakaran	◯	◯	◯	◯	◯	◯	◯	◯	◯

Keselamatan Operasi ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Emergency, Escape and Rescue									
Pendeteksi Kebakaran									
Dokumen dan Sertifikat									
Perlengkapan Darurat									

Pendeteksi Kebakaran ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Dokumen dan Sertifikat									
Perlengkapan Darurat									
Emergency, Escape and Rescue									

Perlengkapan Darurat ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Emergency, Escape and Rescue									
Dokumen dan Sertifikat									

Emergency, Escape and Rescue ___ dibandingkan dengan: (*) *
Berikan tanda sekali pada tiap baris.
Tandai satu oval saja per baris.

	-9	-7	-5	-3	1	3	5	7	9
Dokumen dan Sertifikat									

Analisa Kerentanan Kapal Ferry dan Ro-Ro terhadap Kebakaran

Terima kasih sudah meluangkan waktu Saudara untuk mengisi kuesioner saya. Jawaban saudara terhadap semua pertanyaan diatas akan menjadi rahasia dan hanya digunakan untuk keperluan akademis. Apabila ada pertanyaan, kritik atau saran, Saudara dapat menghubungi peneliti melalui putugdandhika@gmail.com. Hormat saya, Putu Gede Andhika Nidyatama

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The author's name is Putu Gede Andhika Nidyatama, born in 29th April 1997 at Bekasi, West Java. As the eldest child from 3 siblings. Born of father named Nyoman Gede Widyatama and mother named Ni Nyoman Darmini. Spending his childhood in Depok, West Java, the author manage to have formal education at SD Pemuda Bangsa, SMPN 3 Depok and SMAN 4 Depok. In 2015, the author manage to proceed and pursue bachelor degree in Double-Degree Marine Engineering Program at the Department of Marine Engineering, Faculty of Marine Technology, Institut Teknologi Sepuluh Nopember. During college, the author manage to specialize in Marine Operation and Maintenance. Apart from the academic study, the author manage to join several other activities such as, joining Society of Petroleum Engineers as Staff of Internalization (2016-2017) and Board of Internal Affairs Department (2017-2018). Aside from the professionalism career, the author also contributes into spirituality organization called *Tim Pembina Kerohanian Hindu (TPKH).* In TPKH, the author manage to become Staff of Community Service (2016-2017). After the period ends, the author become Expert Staff of Community Service (2017-2018). In the early semester, the author held a Blood Donation event for PMI Surabaya by TPKH ITS (2017) and social service in Kediri, East Java with TPKH (2016). The author joins few event organizers, such as the GERIGI 2016 as the Event Coordinator which later manage to set a record in *Museum Rekor Dunia Indonesia* (MURI) by making the biggest puzzle in Indonesia.

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