CARGO AND DANGEROUS GOODS

Nur Rohmah
Winarno
Andi Prasetiawan

Translators

Rifatun Hasanah
Latifa Ika Sari

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Nur Rohmah
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Andi Prasetiawan

Politeknik Ilmu Pelayaran Semarang

MUATAN KAPAL DAN BARANG BERBAHAYA

Authors:
Nur Rohmah
Winarno
Andi Prasetiawan

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Latifa Ika Sari

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PREFACE

Praise and gratitude to Allah SWT, this book can be completed because of His grace. This book is intended to be a reference for university students or cadets in maritime education. We hope that this book can enhance the insight of the readers of port activities as a part of goods distribution.

As an archipelago country, sea transportation in Indonesia plays a very essential role. Most of the industrial goods and commodities are distributed through sea transportation. For this reason, we need human resources who can manage the transportation effectively and appropriately because the progress of the port determines the progress of a region.

The authors thank many parties who supported the completion of this book. The authors hope that this book will bring benefits to all parties involved in the sea transportation system in Indonesia. Criticisms and suggestions are very much appreciated for the perfection of this book in the future.

Semarang, June 2018

Authors

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SHIP CARGO

1.1. Definition of Cargo

Cargo is an object of freight in the sea transportation system. By transporting cargo, a shipping company can obtain profit in the form of freight determining the survival of the company and maintaining activities at the port. Cargo, according to Sudjatmiko (1995:64), is all kinds of goods and merchandise delivered to the carrier to be transported by ship to be delivered to people/goods at the port or designated port.

PT Pelindo II (1998:9) defines cargo as all types of goods that can be loaded onto ships and transported to other places either in the form of raw materials or final result of the production process. In addition, Arwinas categorizes cargo according to the type of shipment, type of packaging, and characteristics of the cargo.

The classifications of cargo by the type of shipment are:

1.1.1. Homogeneous cargo

It is the cargo that is evenly distributed in compartments or holds and not mixed with other cargo without any bulkheads and loaded in bulk or in certain packages.

Figure 1. Ship with homogenous cargo.

1.1.2. Heterogenous cargo

This cargo consists of various types and most of them use packaging or in the form of units (bag, pallet, drum). It is also called general cargo.

Figure 2. Ship with heterogenous cargo.

1.2. Definition of Cargo from Cargo Handling Aspects

The followings are explanations related to the principles of handling and arranging cargo:

1. Protecting the ship.

   Protecting the ship means creating a situation where in handling and arranging cargo, the ship always remains in a stable, good, safe, and seaworthy condition. According to a book entitled Port Management written by Lasse (2012:169) container terminal is a terminal providing a container stacking yard at the waterfront or on the dock facing the ship. To achieve this purpose, it is important to consider the cargo distribution that must be arranged proportionally, either vertically, transversely, longitudinally or special cargo distribution on the tween deck.

   a. Vertical cargo distribution.

      Vertical cargo distribution means the distribution of cargo from row to row or tier to tier. This can affect the stability of the ship. If the weight is too much on the deck, the ship will have little or big stability. On the other hand, the stability of the ship will increase if the weight is too much in the bottom of the hold. It will be difficult for the ship to adjust to the conditions at sea where the swaying movement is very fast and this can affect the passengers as well as the cargo in it. The ship's stability is the nature of the ship to return to its upright position after listing due to external forces.

   b. Longitudinally cargo distribution.

      Longitudinally cargo distribution means the distribution of cargo from bay to bay of the ship. The effect of this kind of distribution is the ship trim (the difference between fore and aft draft) that affects the ship's speed while sailing and also the maximum depth of the ship when it passes through shallow water. In addition to that, the ship will bend upwards (or hogging) if the weight of the cargo is placed at each tip of the ship. In other conditions, the ship can bend down (or sagging) if the weight of the cargo is placed in the middle of the ship. These two conditions can cause the ship to break while sailing against the forces of the waves.

c. Transversely cargo distribution.

   Transversely cargo distribution involves the ship's listing and rolling. The ship will experience listing if transversal cargo distribution is disproportional to the centerline. If the cargo is equally distributed transversely to the centerline but centered on the wings, the ship's rolling will be slow (tender) and vice versa if it is centered on the centerline, then the rolling of the ship will be fast (stiff).

d. Specific cargo distribution on the tween deck concerns on deck load capacity problem. The arrangement of cargo on the tween deck needs special attention, especially for heavy cargo, so that the weight of the cargo on deck does not exceed the deck capacity limit. Therefore, the officers and the master must understand and be able to calculate the capacity of each deck to avoid damage to the deck. Deck Load Capacity is expressed in tonnes/m2, which refers to the amount of weight that can be accommodated by a deck for each square meter.

2. Protecting the cargo.

   The second principle that must be considered in loading cargo on board is protecting the cargo. Each cargo has a different characteristic and shape so it should not be mixed or gathered. Besides that, the ship's compartments (either the wall or the floor) are made of iron plates which are highly affected by friction and humidity due to weather changes. This condition might cause damage to the cargo. In addition to that, the movement of the ship while sailing can cause the cargo to be displaced.

   There are three ways to prevent the cargo from being damaged:

   a. Cargo segregation.

      According to Basukarno, the operational manager of PT Pelayaran Nusantara Panurjwan/Mediterranean Shipping Company (MSC), cargo segregation is a cargo separation based on its type in order to prevent damage or contamination when

shipped. Due to their characteristics that can potentially damage or contaminate other cargo when being put together, the following cargoes must be segregated:

1) Liquid cargo such as milk, paint, and oil.
2) Dry cargo such as cloth, rice flour, and paper.
3) Cargo such as dry food, tv, computer, and radio.
4) Cargo such as ash, coal, nickel, cement, and clinker.
5) Sensitive/delicate cargo such as coffee, flour, and tea.
6) Cargo that has a strong odor such as leather, kerosene, and gas.

b. Dunnaging.

Dunnaging is putting dunnage between cargos, or between cargos and floor or bulkhead, that serves as a support to protect the cargo. Dunnaging is divided into two categories:

1) Permanent dunnage.

Permanent dunnage has been installed on the ship since the ship was built. The installation is fixed and cannot be removed from its position. It is usually mounted on joists, watertight bulkheads, on the floor of the hold, and on the wooden frame covering the pillars and pipes in the hold.

2) Non-permanent dunnage.

Non-permanent dunnage is prepared on board in accordance with the type and nature of the cargo. It can be in the form of wooden boards, sacks, braids, plastic, wooden blocks, nylon net, and paper.

c. Lashing

Lashing is a method of fastening goods for the security of goods being shipped so that the goods are safe and do not move when the ship is hit by waves at sea. The arrangement of cargo holds must be done as effectively as possible. This is related to the broken stowage. The arrangement of the cargo must be done in

such a way that the available cargo space can be used as much as possible so that it will leave unused cargo space as less as possible.

Broken stowage is the percentage (%) of the number of lost or unused space during cargo arrangement in a hold. The percentage of Broken stowage of a hold can be calculated by using the formula:

Broken stowage = hold vol - cargo vol / hold vol x 100%

When arranging cargo, broken stowage is unavoidable in the following locations:

1) The corners of the hold.
2) The end of the hold.
3) Bilge.
4) At the top of the cargo (Top tier).
5) Between cargos.

CHAPTER II. CATEGORIZATION OF CARGO AND TYPES OF PACKAGING

2.1. Bulk Cargo

The bulk cargo includes large plastic goods, semi-finished goods from steel/other metals (pipes, rods, plates), etc.

2.2. Cargo in Container

There are several types of containers: Flat racks consist of a base and end walls, ventilated containers are provided with ventilation, half-height containers for heavy loads, tank containers for liquid or gas cargo, open or canvas-top container that can be loaded from above, high-cube container.

Based on Custom Convention Containers (1972), Containers are specially designed packaging with a certain size and standardized based on international standards. They are made of steel so that they can be used repeatedly. They are used to store and transport cargo at the same time.

Gurning and Budiyanto in their book 'Port business management' (2007:113) explained the types of containers as the followings:

1. Dry Cargo Container/General Cargo is a container to transport a variety of cargo that does not require special treatment.
2. Reefer Container is a container to transport cargo that must be refrigerated to -30 degrees Celsius such as meat, fish, fruits, drugs, and drinks.

3. Bulk Container is a container to transport dry bulk cargo, e. g. rice, wheat. At the destination, this container is emptied by using hydraulic equipment.
4. Open Side Container is a container that can be opened from the side. It is also provided with a door (one of the sides) for easy exit/entry of normal size goods. The side that can be opened is equipped with a strong tarpaulin to protect the cargo more effectively.
5. Open Top Container is a container used to transport very large goods where the loading of the cargo is from the top of the container.
6. Flat Rack Container is a container used to transport heavy cargo such as machines and spare parts. The shape is flat with no walls on the right, left, and top.
7. Tank Containers are steel containers built within a container frame used to transport tanks filled with dangerous goods, such as gas, oil, and explosive chemicals.

2.3. Types of Loading and Unloading Equipment

Containers require special facilities and infrastructure for handling. A container terminal requires a set of equipment to support the movement process of the container. Some of the equipment in the terminal container to support loading and unloading activities and container handling according to Gurning and Budiyanto (2007:91) are as follows:

1. Harbor mobile crane is a tool to unload or load containers to or from the ship.
2. Intermodal handling is the equipment to lift containers of various sizes.
3. Chassis is the back of the truck that is connected to the head of the truck to put the container.
4. Head Truck is a truck to transport containers from ships in the dock which is moved via quay crane to the stacking yard (Container Yard/CY) or vice versa.
5. Container Crane (CC) is a crane or a tool used to move a container from the truk onto the ship or vice versa.

6. Rubber Tire Gantry Crane (RTG) is a crane or a tool used to move the containers from the top of the truck to the stacking yard and stack them in a predetermined stacking field (slot) or vice versa. Basically, RTG is the same as RMG but RMG is operated by using rails like a train. The RMG uses electricity as an energy source while the Rubber Tire Gantry Crane uses wheels and solar fuel.
7. Information system to record the location and all transactions is done to all containers. This process is carried out via Hand Held Terminal (HHT) and Vehicle Mounted Terminal (VMT) which are connected to the LAN system through RF waves.
8. Top Loader, Side Loader, and Reach Staker are tools used to lift and move containers at the container yard.
9. Electrical Forklift is a tool used to assist in the stuffing and stripping of cargo into containers used in CFS warehouses.

2.4. Standard Container Size

1. Container 20 feet x 8 feet x 8 feet.
2. Container 40 feet x 8 feet x 8 feet.

2.5. Solid Bulk Cargo

Large bulk cargo carried by large ships: -iron - coal- grain- bauxite and aluminum-phosphate. (BelajarKapal.blogspot.com)

2.6. Liquid Bulk Cargo

Crude oil is the main commodity. Other major commodities include refined petroleum products, liquid chemicals, vegetable oil, and wine (beverage) (Kapal.blogspot.com).

2.7. Merchant Ship Cargo

Cargo can be classified into liquid bulk cargo, solid bulk cargo, containerized cargo, packaged cargo (cartons, crates, drums, etc.), refrigerated cargo, and loose cargo (without packaging).

2.8. Cargo Classification

1. Liquid bulk cargo.
2. Solid bulk cargo.
3. Containerized cargo.
4. Packaged cargo (cartons, crates, drums, etc.).
5. Refrigerated cargo.
6. Loose cargo (without packaging).
7. Heavy load.
8. Passenger.

CHAPTER III.
PACKAGING CARGO

3.1. Packaging

The history of packaging in trading has been started in conventional trading. Historical evidence shows that the Chinese (about 8,000 years ago) made various kinds of ceramics for packing solids and liquids. Indonesians, traditionally use natural materials, such as bamboo, coconut leaves, etc for wrapping merchandise to be sold at the market.

Packaging is the protective wrapper of the goods which is directly attached. It is given identification color and an appealing brand. The advancement of human civilization has created new innovations in packaging technology. Packaging materials are improving and becoming varied.

3.2. Forms of Packaging

Sellers have made various forms and packaging materials according to the products that are going to be sold.

1. The advantages of packaging.
   The term packaging refers to a container or media to store goods for maintaining their quality. In general, the advantages that can be obtained from the use of packaging, are:
   a. Protecting the goods from physical, chemical, and microbiological damage (e.g. perishable goods).
   b. As a storage and transportation medium (e.g. drums, tanks, gallons, etc.).

c. As a means of saving space (for example: placing bottles on shelves or crates will save more space).

d. As a means of providing information and promotion (e.g. electronics goods are packed in special cartons with interesting labels).

2. The types of packaging.
   Packaging can be classified based on the forms or the materials. Here are several examples of packaging commonly used in international trade:

   a. Box.

      In general, it is made of plain or corrugated cardboard.

   b. Crate, wooden barrels, pallets, wooden dunnage.

      In general, the material for wooden packaging comes from low-quality wood so it has a risk to be a carrier of some destructive organisms, such as insects, and some kinds of fungi. In international trade, some countries apply strict requirements for plant quarantine against wooden packaging.

Figure 3. Packaging in the form of crates.

   c. Drums, cylinders, tanks, pots, and other packaging types.

      They are generally made of metal or plastic. This packaging type is used to pack liquids and gases.

Figure 4. Packaging in the form of drums.

d. Metal and plastic shelves, crates, and containers.

It is mainly used to pack bottles and cylinders to save storage space.

Figure 5. Container.

e. Bag and pouch.

Both can be made of jute fiber and of various types of plastic. They are used to pack goods in bulk for example cement, flour, fertilizer, rice, sugar, etc.

Figure 6. Packaging in the form of bags.

f. Bundle.

A bundle is a package to unite a number of goods in order not to be scattered (such as pipes, sawn woods, etc).

g. Reel and roll.

They are generally made of wood and used specifically for rolling very long objects (e.g. wires, sheet plates, etc).

h. Bales

Bales are made of canvas and tied with metal or rope for example for packing cotton, rubber, jute, etc.

CHAPTER IV.
TYPES OF CONTAINERS

4.1. Container

Imported or exported goods are sent by ship, plane, or truck. The world trade development demanding time efficiency has led to new innovations in terms of packaging in transporting goods. In 1956, American transportation entrepreneur Malcom Mc Lean introduced the first container. Mc Lean's cargo ship, Ideal X carried 58 containers on a voyage from New York to Houston, USA (German Marine Insurer, 2009).

The first container design could be easily moved from trains, trucks, and ships and designed in such a way as to ease the mobility. During the transfer process from one means of transportation to another, the packaging did not need to disassemble or the cargo needed to be moved. Since then, new container innovations appeared and became increasingly varied in shape and material of manufacture.

The philosophy behind this is to wrap or carry cargo in the same containers and make all vehicles able to transport it as a unit, whether it is a ship, train, truck, or other transportation, and can deliver the cargo quickly, safely, and efficiently or, if possible, door to door.

4.2. Definition of Container

In general, a container is defined as a box made of metal of a certain standard size, which is used as a medium for the loading and transporting of goods that are aimed to facilitate mobility. The formal definition of container was made during Customs Convention on Container held on December 2nd, 1972 in Geneva, Switzerland.

The definition agreed in the convention is that the container is a means of transporting goods with characteristics as follows:

1. Permanent and sturdy, so it can be used repeatedly for the transportation of goods.
2. Wholly or partially closed, so it has the form of a box or crate and is intended to be filled with transported goods.
3. Designed in such a way as to facilitate the mobility of its transport, thus enabling the transfer of goods between means of transportation without unloading the cargo first.
4. Equipped with a device that makes it easy to handle, especially when moving from one mode of transportation to another.
5. Designed in such a way that it is easy to fill and empty the cargo.
6. Has volume. When measured from the inside, it has at least one cubic meter or more.
7. Made of steel, aluminum, and fiberglass and equipped with a door that can be locked from the outside.
8. Including the equipment that is transported together with the container.

Indonesia as part of the World Customs Organization (WCO) has participated to ratify the convention. The statement of ratification was confirmed in the Decree of President Number 45 1989 about the ratification of the Customs Convention on Containers, 1972.

Furthermore, The International Standard Organization (ISO), stipulates Container as a means of transportation, which is:

1. Strong enough to be used repeatedly.
2. Especially designed as a facility to carry goods with the available mode of transport.
3. Provided with tools that allow it to be used at any time or to transfer from one means of transportation to another.
4. Designed in such a way as to make it easy to fill and empty the cargo.
5. Have an internal volume of at least 1 m^3 = 35.3 Cuft.

Thus, a container can be defined as a means of transportation specially designed with a certain size and can be used repeatedly to store and simultaneously transport the cargo in it.

4.3. The Use of Containers

The use of containers as a protective medium as well as a transport medium of goods has provided great benefits to the world of commerce. Several benefits of using containers as packaging and transporting media are as follows (Amir MS, 2005):

1. The process of unloading and loading goods can be faster (time efficiency).
2. Reduce the risk of damage to the cargo, because the goods can be well and carefully arranged in the container space.
3. Reduce the risk of loss and theft. The tight closed and locked container structure will minimize the risk of loss or theft during the journey of delivery.
4. Facilitate supervision at the time of stuffing (loading goods) into containers as well as at the time of stripping (unloading goods) from containers. This condition is possible since containers are easier to be moved, that stuffing can be done in the exporter's own warehouse and stripping can be done at the importer's warehouse.
5. Prevent the risk of mixing up goods with other exporters' belongings.

CHAPTER V. APPLICATION OF PACKING AND LABELING

Labels

After the goods are packed by the shipper, then on each packaging is given a simple but clear brand and identification mark using colored paint that will not fade during the voyage. This identification sign is commonly called a label.

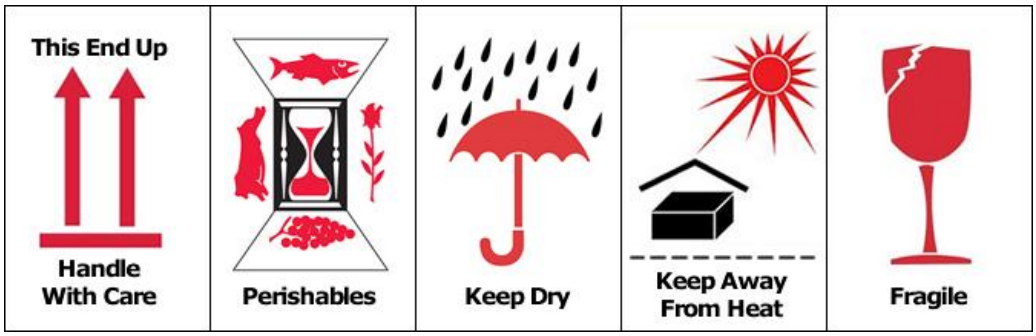

Figure 7. Packaging labels.

Labels can be found on the goods (attached to the goods), on the packaging (if the goods are packaged in a container (tank, bottle, etc.), and/or on the container/means of transport. A label can be made of a piece of paper, polymer, cloth, metal, or other material attached to a container or item.

A label contains information about the product, manufacturer's address, brand, composition of the material (especially food or chemicals), danger (drugs and chemicals), instructions in case of an emergency, etc. Labels are used as information for consumers or officers handling the

goods. By knowing the label of an item, at least an officer handling the item knows how to handle the item properly, in order to avoid damage to the goods or the risk of danger to officers or users themselves.

For chemicals, labels on goods/packaging and markings on containers can help to identify the chemicals. Especially for hazardous and toxic chemicals (B3), the container or label usually contains the symbol B3, trade name (sometimes accompanied by chemical name), physical/chemical properties (although not detailed), the characteristic of the danger, etc. The regulation of the Minister of Environment on Procedures for Giving Symbols and Labels of Hazardous and Toxic Materials states that Label is any information regarding Hazardous Materials (B2) in the form of pictures, writings, a combination of both, or other forms that contain information about B2 and company information as well as other information in accordance with the Laws and Regulations, which is included in the product, included into, placed on or part of the package.

For details about the danger symbol, you can look for more information in other literature on hazardous materials or a short course on hazardous materials handling.

CHAPTER VI.
CARGO HANDLING SYMBOL

6.1. Cargo Handling Instructions

1. A Broken stowage is the percentage of cargo space that is not filled with cargo because of the shape and type of the cargo.
2. Stowage plan is a part of the ship where the cargo is placed, equipped with data of destination, quantity, the weight of cargo, and port of loading respectively.
3. Stowage factor is the amount of effective space which is used to load 1 tonne of cargo.
4. Full & Down is a condition where the ship is loaded up to the entire cargo space full & reaches the maximum allowed conditions.

Bay is a longitudinally number sign from fore to aft with an odd number note for 20 feet and even number for a 40 feet container.

Row is a transverse number sign starting from the middle and viewed from the back,

1. To the right - Row 01, 03, 05, 07, 09, and so on.
2. To the left - Row 02, 04, 06, 08, 010, and so on.

Tier is an upright number sign starting with the numbers

1. On deck → Tier 82, 84, 86, 88.
2. On hold → Tier 02, 04, 06, 08.

FCL/FCL (Full Container Load) is a container containing cargo belonging to one shipper.

LCL/LCL (Less than Container Load) is a container containing cargo belonging to several shippers.

The use of ventilation on board:

1. To flow clean/dry air into the hold.
2. To remove damp, dirty, hot, smelly air from the hold.

6.2. Kinds of Ventilation in Vessel

1. A natural system, usually in the form of a swan neck, and it works based on air pressure in the cargo hold and outside.
2. Artificial systems, also called mechanical ventilation because dry air is filled into the hold by force with the help of other equipment.

One way of ventilation:

By placing both funnels below the wind so that the space remains cool because the heat is removed. This method depends on the condition of the air outside.

CHAPTER VII.
DANGEROUS CARGO

7.1. Definition of Dangerous Cargo

9 Classes of Dangerous cargo According to Solas 1974. Humans are often tested, whether it's loss of goods or fire and loss of life caused by objects that are very harmful to the environment. Before we discuss the nine types and classes of dangerous cargo, you must first know the types of containers often filled with goods.

There are two types of container sizes, namely TEU: L x W x H = 20' x 8' x 8.6' and FEU : L x W x H = 40' x 8' x 8.6'.

The advantages of container transportation compared to general cargo are:

1. Transporting throughout the world.
2. Faster loading and unloading.
3. More simplified Packing.
4. Less risk of damage & theft.
5. Less insurance costs.
6. Low labor costs.
7. Simpler cargo management.
8. The way of loading and administration can be controlled by a computer.

The disadvantages are:

1. Huge investment.
2. Lots of space loss in containers (15 - 20%).
3. Not all kinds of cargo can be carried.
4. Having a maximum cargo weight.

5. The greater possibility of sweat loss.
6. Require a stacking yard and special equipment.

7.2. Class of Dangerous Cargo According to SOLAS 1974

1. Class 1.
   Explosives.
2. Class 2.
   Gases are compressed, liquefied, or dissolved under pressure.
3. Class 3.
   Flammable liquids.
4. Class 4.
   a. Flammable solids.
   b. Substances liable to spontaneous combustion.
   c. Substances which, in contact with water, emit flammable gases.
5. Class 5.
   a. Oxidizing substances
   b. Organic peroxides or quickly flammable substances
6. Class 6.
   a. Poisonous or toxic substances.
   b. Infectious substances.
7. Class 7 = radioactive materials
8. Class 8 = Corrosive materials
9. Class 9 = miscellaneous dangerous substances which present a danger not covered by other classes.

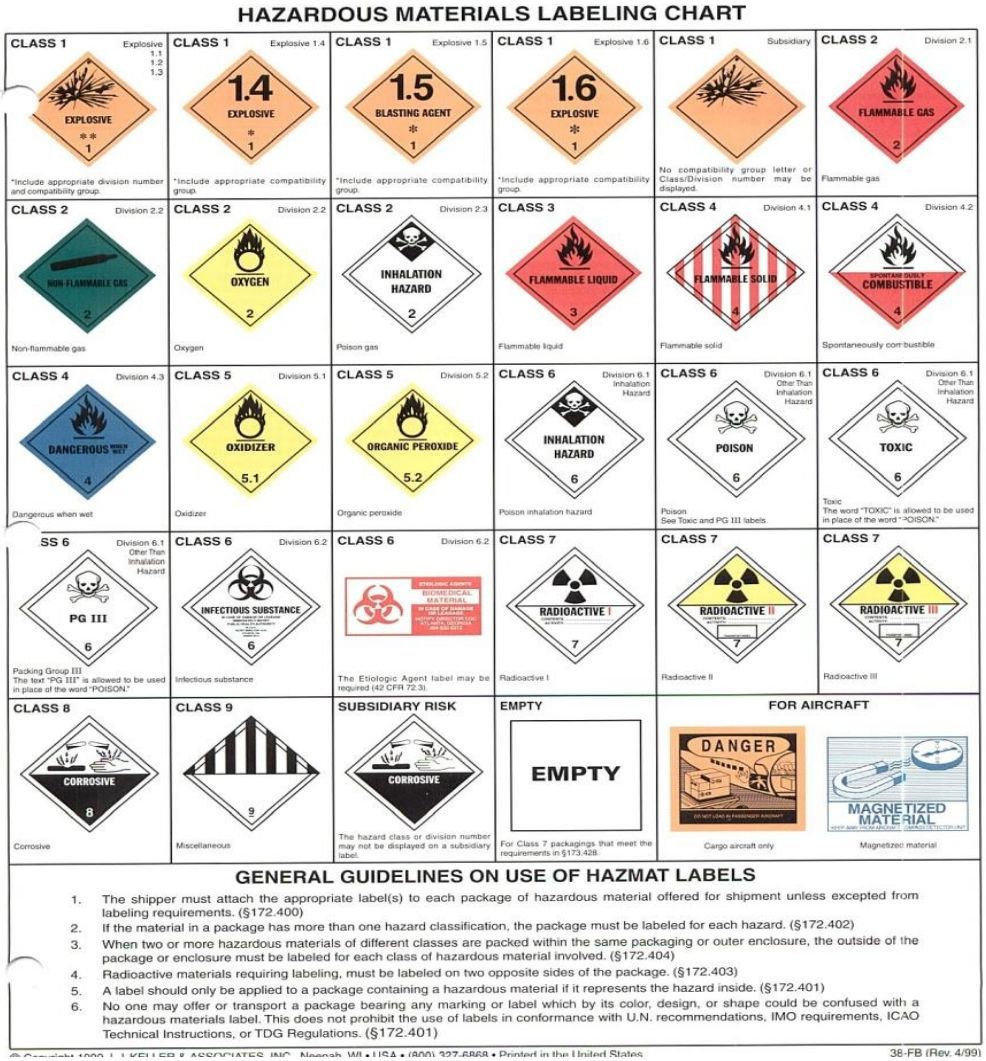

Figure 8. Hazardous material labeling chart.

7.3. Regulation for Handling Dangerous Cargo

Before loading dangerous cargo, it is important to consider the following things:

1. Recognize the traits of the danger.
2. Treat them very carefully.

The safety of transportation highly depends on the appropriateness of the packaging and the accuracy of identification of the type of dangerous cargo.

Recommendations regarding handling, arrangement, and transport procedures have been improved with the issuance of regulations both nationally and internationally. Every personnel involved in the handling and arrangement of dangerous cargo is responsible for knowing the regulations and ensuring that these rules are fully complied with.

The list of the Dangerous Cargoes, arranged by its category, can be read in the book entitled “Dangerous Cargoes Handbook” popularly known as the ‘BLUE BOOK’.

In that book, there is information about the international regulations regarding the transport of each type of cargo, the important characteristics of each type of cargo and the safety measures that need to be taken, the types of wrapping/packaging, and how to give code or mark for each category of cargo.

The transport of dangerous cargo is also regulated in “The Merchant Shipping” (Dangerous goods) Rules, which requires each Shipper to notify The master of the ship in writing about the Name of the Dangerous Cargo, its Category, and dangerous traits that may arise, including the common name and chemical name that must be in accordance with the Code and IMDG-Code (International Maritime Dangerous Good Code) issued by the IMO (International Maritime Organization).

7.4. Class and Classification of Dangerous Goods

9 Classes of Dangerous Goods.

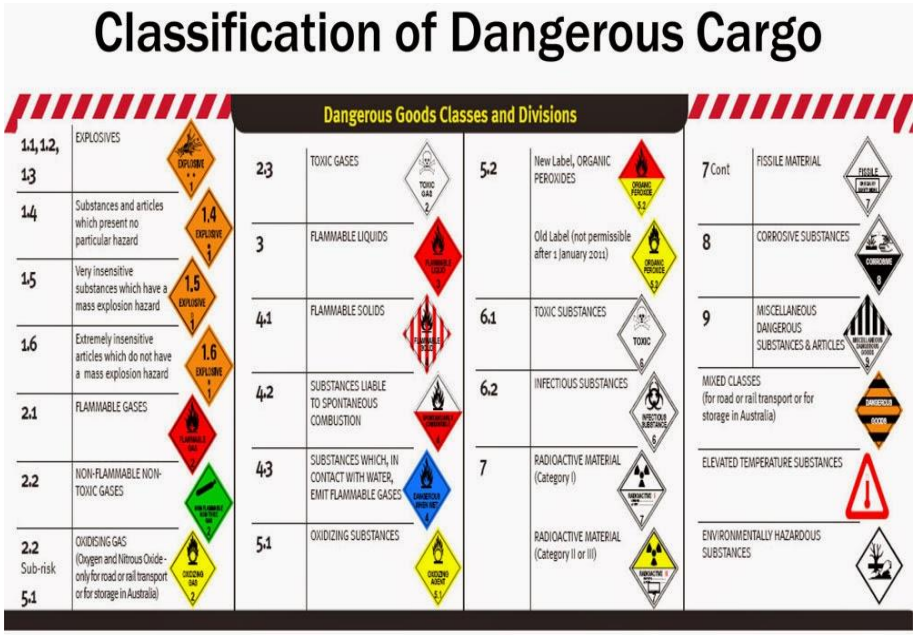

Figure 9. Classification of dangerous goods.

'Dangerous goods' are materials or goods with hazardous characteristics which, if not properly controlled, have the potential to endanger human health and safety, infrastructure, and/or transportation facilities. The transport of dangerous goods is controlled and governed by a variety of different regulations, both at the national and international levels.

Prominent regulatory framework for the transportation of dangerous goods including United Nations Recommendations on the Transport of Dangerous Goods, ICAO Technical Instructions, IATA Dangerous Goods Regulations, and IMO International Maritime Dangerous Goods Code. Collectively, this regulation covers the means by which dangerous goods must be handled, packaged, and labeled for transport. The regulatory framework incorporates a danger comprehensive classification system to provide a taxonomy of dangerous goods. Dangerous goods classification is divided into nine classes according to the type of hazardous material or goods.

Class:

1. Explosives.
2. Gas.
3. Flammable liquids.
4. Flammable solids.
5. Oxidizing.
6. Toxic & infectious substances.
7. Radioactive substances.
8. Corrosive material.
9. Various dangerous goods.

7.5. General Segregation of Dangerous Goods

Sometimes, we forget some of the materials that we have learned in the past. So, it's better if we review them to refresh our memory. Do you still remember the classification of cargo?

I want to review the materials that we obtained from the lecturers when we were on campus. "Segregation of cargo based on the cargo class is one of the ways to protect the cargo".

Good segregation must be done by considering the differences in forms, types, and characteristics of cargoes so they do not damage each other. For example, wet cargo must not be mixed with dry cargo.

Classification of cargo types:

1. Wet cargo.
2. Liquid cargo.
3. Dry cargo.
4. Dirty cargo.
5. Clean cargo.
6. Odorous cargo.
7. Delicate cargo.
8. Dangerous cargo.

Figure 10. Wet cargo.

7.5.1. Wet Cargo

Wet cargo is wet or liquid cargo shipped in packages, as in drums, cans, barrels, etc. For example drinks in cans/bottles, lubricating oil in cans.

Figure 11. Liquid cargo.

7.5.2. Liquid Cargo

Liquid cargo is liquid cargo loaded in bulk in Deep Tanks or tankers. For example: CPO (Crude Palm Oil), fuel, latex, molasses, etc.

Figure 12. Dry cargo.

7.5.3. Dry Cargo

Dry cargo is a type of cargo that does not damage but can be damaged by other cargoes, especially by wet cargo. Therefore, these two types of cargoes cannot be mixed. For example rice, flour, packaged cigarettes, etc.

Figure 13. Dirty Cargo

7.5.4. Dirty Cargo

Dirty cargo is the type of cargo that generates dirt or dust during loading/unloading, which can damage other cargoes, especially clean and delicate cargo. It is suggested to avoid mixing between the dirty cargoes because they can damage each other. For example cement, coal, etc.

Figure 14. Clean cargo.

7.5.5. Clean Cargo

Clean cargo is the type of cargo that does not damage other cargoes because it does not cause dirt or dust. Example: cotton, grocery goods, yarn, etc.

Figure 15. Cloves as odorous cargo.

7.5.6. Odorous Cargo

Odorous cargo is the type of cargo in which the odor can damage other cargoes and the cargo itself. For example latex, ammonia, fish, wet wood, cloves, fleece, cinnamon, cassia vera, etc.

Figure 16. Wheat flour as delicate cargo.

7.5.7. Delicate Cargo

This type of cargo is easily damaged because of wet, dirty, and odorous cargo. For example tea, wheat flour, rice, milk powder, and other dry ingredients. Tea should not be mixed with Cassiavera or put in the bottom of the drum containing patchouli oil.

Figure 17. Dynamite as dangerous cargo.

7.5.8. Dangerous Cargo

Dangerous cargo refers to all types of cargo that require special attention because they can cause danger of fire or explosion. This dangerous cargo is divided into 9 (nine) groups/classes. For example dynamite, coal, etc.

CHAPTER VIII. PACKAGING AND LABELING OF DANGEROUS GOODS AND PLACEMENT ON THE SHIP

8.1. Labels

Labels (signs/symbols) for transportation of hazardous materials/B3 (Toxic and hazardous materials) generally refer to the US Department of Transportation (DOT).

Labels are generally installed on transport vehicles as well as on packaging whether it is land, air, and sea transportation or other special transportations.

8.2. Classification of hazardous materials

In general, there are 9 (nine) classifications of hazardous materials/B3 (Toxic and hazardous Materials) as follows:

1. Class 1 - Explosive.
    a. Substances and articles which have a mass explosion hazard (whole cargo).
    b. Substances and articles that have a projection hazard but not a mass explosion hazard.
    c. Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
    d. Substances and articles which present no significant hazard.

e. Very insensitive substances which have a mass explosion hazard.

f. Extremely insensitive articles which do not have a mass explosion hazard.

2. Class 2 - Gases.
    a. Flammable gases.
    b. Pressed gas (non-flammable).
    c. Toxic gas.
    d. Corrosive gases (Canada only).
3. Class 3 - Flammable Liquid/Vapour.
4. Class 4 - Flammable Solids.
    a. Flammable solids.
    b. Spontaneous combustion.
    c. Harmful in contact with water (emit flammable gases).
5. Class 5 - Oxidizing.
    a. Oxidizing substances.
    b. Organic peroxides.
6. Class 6 - Toxic.
    a. Toxic substances.
    b. Infectious substances.
7. Class 7 – Radioactive material.
8. Class 8 – Corrosive substances.
9. Class 9 – Miscellaneous Dangerous Substances and Articles.

CHAPTER IX. SERVICE PROCEDURES OF DANGEROUS GOODS IN PORT

Ship Berthing Process

It is related to understanding the storage places and port facilities for dangerous goods.

1. Ship readiness.
2. Before entering the port, every ship carrying dangerous goods must meet the requirements in accordance with the port regulations.
3. While at the port, any ship or other floating transportation is forbidden to berth barges or other ships for loading and unloading dangerous goods, without the permission of the port administrator/port authority.
4. Every ship is obliged to meet the following requirements:
    a. Complete administrative documents.
    b. Provide safety equipment to prevent fires, pollution, and other hazards.
    c. There must be a PBM (stevedoring company) who is in charge of the activity.
    d. Guarantee the packaging condition of the dangerous goods.
    e. The means of transport, barges must meet the requirements.
    f. If the loading and unloading activities are done in the evening, approval from the authorized officer must be obtained.
5. Fire fighting equipment on board and onshore must be prepared according to the class type of dangerous goods.

6. Follow the dangerous goods handling procedures.
7. The loading and unloading of dangerous goods after obtaining permission from the port authority can be done in 4 ways. Those are:
    a. TRUKLOOSING, unloading/loading directly from the ship to the truck or vice versa.
    b. Loading and unloading into fire/special warehouse (OVERBRINGEN).
    c. Loading and unloading to warehouse/field LINI I.
    d. Loading and unloading to/from barges.
8. Required loading and unloading equipment.
    a. Sling, Net, pallets, etc.
    b. Fire extinguisher (the hose must be ready to use, the water temporarily directed into the sea).
    c. Personal Protective Equipment for the personnel such as masks, gloves, etc.
9. The flag B (BRAVO) is raised on the ship and at the port as a sign of danger, all people who are nearby are prohibited from smoking.
10. Security supervision from the Port administrator and Pelindo officer.
11. Stockpiling space at the port.
12. Stockpiling space on barges.

The followings are for dangerous goods class 1 Explosive and class 7 Radio Active.

a. Stockpiling onshore
    1) Warehouse fire for classes 1, 2, 3, 4, 5.
    2) Special warehouse for classes 2, 3, 4, 5, 6, 8.
    3) General warehouse on LINI for classes 2.5 (LOW), 6 (LOW), 8 (LOW), and 9 (LOW).
b. Stockpiling space for dangerous goods in warehouses.
c. Closed, means that it has walls and roofs with sufficient ventilation.

The warehouse is intended for dangerous goods that should not be exposed to direct sunlight or water because of rain.

The warehouse is intended to store dangerous goods that should not be exposed to direct sunlight or wet due to rain/water but should not be stored in an enclosed space because it will cause evaporation/gas.

This place is generally used to store dangerous goods that can damage other goods or buildings but are not affected by the heat of the sun or by water/rain.

CHAPTER X.
PORT FOR DANGEROUS GOODS

Activities for handling dangerous cargo to and from ships in ports have the risk of mishandling which can cause a larger risk and loss of goods/property (ships and their cargo, port facilities and infrastructure, etc.), threaten the maritime environment, the lives of personnel handling hazardous materials/goods as well as the crew of the ship carrying the goods.

To ensure the safety of personnel, property, and the environment when handling hazardous materials/goods, the Government of Indonesia has enacted a regulation regarding the International Maritime Dangerous Goods Code (IMDG Code), which is an implementation of the Convention on the Safety of Live at Sea (SOLAS) and the Convention on the Marine Pollution from the Ship (MARPOL) ratified by Decree of President Number 46 of 1985 concerning the ratification of the "International Convention on the Prevention of Pollution from the Ship 1973 and Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from the Ship 1973".

Considering the high risk of handling dangerous goods, every person who handles the service of goods and ships at the ports, whether directly related to the handling of dangerous goods or not, should understand how to handle the dangerous goods. This training is held to provide knowledge about the meaning, types, and procedures of handling dangerous goods so that the potential hazard can be eliminated or minimized.

This training is good for managers, supervisors, and workers in companies/institutions related to the handling of dangerous goods,

especially shipping companies, warehousing, etc. This training certificate is issued by the Directorate General of Sea Transportation because this training was carried out in collaboration with the Directorate General of Sea Transportation.

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AUTHOR'S PROFILE

Nur Rohmah

Nur Rohmah, SE., MM, is one of the lecturers in the Port and Shipping Management study program, Politeknik Ilmu Pelayaran Semarang. She was born in Boyolali on March 18, 1975. She completed her Elementary School, Junior High school, and Senior High School in Boyolali. In 1996, she graduated from Education Center for Maritime Training (BPLP) now Politeknik Ilmu Pelayaran (PIP) Semarang with Diploma III degree. In 2009 she completed her undergraduate degree at the University of Semarang majoring in Management Economics. Then in 2011, she completed her master's degree at the same university, majoring in Management. Currently, the author is a Lecturer as well as Secretary of the Port and Shipping Management Study Program at the Politeknik Ilmu Pelayaran Semarang.

Winarno

Dr. Winarno, S.S.T., M.H. was born in Yogyakarta on February 8, 1976. He graduated from Education Center for Maritime Training (BPLP) now Politeknik Ilmu Pelayaran (PIP) Semarang with Diploma IV in 2001. He then completed his Master's degree in Law/MIH at Sultan Agung Islamic University (UNISSULA) Semarang in 2006 and graduated from the Doctoral Program in Law/PDIH (S3) UNISSULA Semarang in April 2016. Besides working as a Lecturer at the Politeknik Ilmu Pelayaran (PIP) Semarang, he also teaches at the Akademi Maritim Yogyakarta (AMY) and Postgraduate (S2) Master in Coastal Resources (MSDP) at the Faculty of Fisheries and Marine Sciences (FPIK) Diponegoro University (UNDIP) Semarang.

Some of the training and seminars that have been attended include the Port and Shipping Summer Course at Hochschule Bremen Germany, international journal training at the International Islamic University Malaysia (IIUM), Comparative Studies at the Singapore Maritime Academy, Integrated Simulation Center of Singapore, Pekerti and AA at Semarang State University (UNNES), Training for Caretakers of Cadets for BPSDM Transportation Cadets at the Magelang Military Academy, QSS Auditor Training, TOT IMO Model Course 609, TOT IMO 312, Certification of Experts on Government Procurement of Goods and Services at LAN RI, Level IV Leadership Training of the Ministry of Transportation at the Development Center for Transportation Apparatus in Bogor, Competency Assessors of the National Professional Certification Agency (BNSP), LSP Quality Management Implementation Training at BNSP, Academic World International Conference in Singapore, ICMET International Conference at PIP Semarang, and many more.

Andi Prasetiawan

Andi Prasetiawan, S.Si.T, was born in Tegal on January 3, 1981. Currently, the author is active as a Lecturer in the Port and Shipping Management study program in Politeknik Ilmu Pelayaran Semarang. He went to elementary school, junior high school, and high school in Tegal. He obtained his Diploma I degree from Politeknik Negeri Semarang in 2000. He continued his education in Politeknik Ilmu Pelayaran Semarang majoring in Port and Shipping Management and obtained a Diploma IV degree. He completed his Master's degree in 2010 majoring in Marketing Management at Institut Bisnis Informatika Indonesia, Jakarta. The author has written various books for teaching and learning of the Port and Shipping Management study program at Politeknik Ilmu Pelayaran Semarang.

TRANSLATOR'S PROFILE

Rifatun Hasanah

Rifatun Hasanah has become a part of the Language Unit of Politeknik Ilmu Pelayaran Semarang since 2020. She has been active as a Language instructor and translator since her undergraduate program.

Rifatun was born in Sumenep, December 22 1991. She got a graduate degree in English Education from UIN Walisongo in 2012. Before she joined PIP Semarang, she was a lecturer assistant in UIN Walisongo and UNISSULA. During her time teaching across majors (Medicine, Pharmacy, Islamic Education, Management, etc), she is also active as a Korean-English translator and interpreter for Korean businessmen around Semarang. She also translated the document of PT. Kawasan Industri Kendal in promoting the industrial area to the investors' side. Besides that, she is active in translating and proofreading the Indonesian articles to be published in International Journal, especially in Islamic education, Communication, and psychology. Along with her job in PIP Semarang, she handles some work in translating documents such as company profiles, official letters, lesson plans, and Port and Shipping management documents. Recently she finished translating the syllabus and course outline of IMO 1.39 regarding leadership and teamwork.

Latifa Ika Sari

Latifa Ika Sari is an English lecturer at Politeknik Ilmu Pelayaran (PIP) Semarang. Born in Semarang, on July 31, 1985, she has a great passion for the field of English Education and Psychology. In 2006, Latifa completed her Diploma III majoring in English for Office Management at Universitas Dian Nuswantoro Semarang. In 2008, She completed her Bachelor's Degree in Psychology at Universitas Diponegoro (UNDIP) Semarang. In 2014, he obtained a Bachelor's degree in English Education from Universitas Terbuka, Jakarta. Her Master's degree in English Education was achieved in 2017 from Universitas Negeri Semarang (UNNES). Her best achievement was in 2021 when she completed her doctoral degree in English education from the same university.

Latifa joined the Ministry of Transportation in 2008. Starting her career as a counselor for cadets at Balai Pendidikan dan Pelatihan Ilmu Pelayaran Tangerang (now Politeknik Pelayaran Banten), she was then assigned to teach Maritime English in 2009. In 2015, Latifa moved to Politeknik Ilmu Pelayaran (PIP) Semarang and was appointed to become a lecturer in 2019.

Latifa actively participates in various scientific meetings (seminars, conferences) related to English language teaching and learning. She has written several research articles published in various proceedings and journals. Her research interests include English for Specific Purposes (ESP), Maritime English, evaluation, and social semiotics.

CARGO AND DANGEROUS GOODS

As an archipelago country, sea transportation in Indonesia plays a very essential role, Most of the industrial goods and commodities are distributed though sea transportation, For this reason, we need human resources who are able to manage the transportation effectively and appropriately because the progress of the port determines the progress of a region.

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Penerbit Politeknik Ilmu Pelayaran Semarang
Jl. Singosari 2 A Semarang
Telp. 024-8311527
Email: penerbit@pip-semarang.ac.id

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