PORT SERVICES, FACILITIES AND OPERATIONS

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Politeknik Ilmu Pelayaran Semarang

JASA DAN FASILITAS PELABUHAN
DAN OPERASIONAL PELABUHAN

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Published by:
Politeknik Ilmu Pelayaran Semarang
Jl. Singosari 2A Semarang

ISBN: 978-602-5694-12-7
e-ISBN: 978-602-5694-62-2

TRANSLATED
PORT SERVICES, FACILITIES, AND OPERATIONS

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Editor: Khaira Dewi

ISBN : 978-623-8141-19-7
e-ISBN : 978-623-8141-20-3

Published by:
Politeknik Ilmu Pelayaran Semarang
Jl. Singosari 2A Semarang
IKAPI Member, 2021

PREFACE

All praise to the Almighty God, because of His blessings, the book entitled "PORT SERVICES, FACILITIES, AND OPERATIONS" can be completed.

This book was arranged and intended as a reference for maritime students of POLITEKNIK ILMU PELAYARAN (PIP) Semarang. We hope that students can learn and understand the principles of port services, facilities, and operations.

We arranged this book in a simple manner to help the readers understand the contents easily.

Any critiques and suggestions are welcomed for the betterment of this book in the future.

Semarang, June 2018

Authors

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CHAPTER I.
PORT

1.1. Definition of Port

Indonesia is an archipelagic country comprising thousands of islands which leads to the fact that the country's territory is mostly water. Due to this geographical special condition, a ship is a fundamental means of transportation for this country. A port as a place for berthing the ship, boarding and disembarking passengers, and cargo loading activities is also inevitably needed.

According to Law Number 17 of 2008 concerning shipping, a port is a place consisting of land and/or waters with certain boundaries used for government and business activities. The port is used as a place for berthing the ships, boarding and disembarking the passengers, and/or loading and unloading cargo, in the form of terminals and berths equipped with safety and security facilities and supporting facilities. It is also used as a place for intermodal transportation exchange. Therefore, the port plays a very vital role in the development of the nation's economy.

The development of the maritime sector may contribute to the following aspects:

1. Economic integration of the islands with the free movement of commodities and labor between the islands.
2. Successful competition with other nations to supply various processed or unprocessed commodities to the world market.
3. Minimizing the cost of imports for additional domestic supplies to increase the national standard of living.

4. Socio-political and political integration of the nation with the free movement of citizens between the islands for various purposes.
5. Increasing the service sector by obtaining foreign exchange income in service industries such as shipping, ship repair services, and tourism.
6. Self-sufficiency in the maritime sector to avoid the decrease in the general government revenue, which can be allocated for social services such as education and health.

Port management refers to the implementation of port functions to support the continuity, safety, and the order of ships traffic, passengers and/or goods, shipping safety and security, places of intra-and/or intermodal transportation exchange as well as to support the national and regional economy in a sustainable manner by considering the regional spatial planning.

The National Port Management consists of roles, functions, and port hierarchies. In Law Number 17 of 2008 regarding shipping, ports have the roles of:

1. The nodes in the transport network according to their hierarchy;
2. Gateway to economic activity;
3. The place of exchange activities of transportation modes;
4. Supporting element of industrial and/or trade activities;
5. Place of distribution, production, and consolidation of cargo or goods;
6. Achieving Indonesian archipelagic vision and state sovereignty.

Port has a function as a place for government and business activities. Basically, there are 2 (two) types of ports, namely sea ports and river and lake ports. The seaport consists of main ports, collecting ports, and feeder ports (regional feeders and local feeders).

1. Main port.
   The main functions of the main port are to serve domestic and international shipping activities, to transfer and exchange large quantities of cargo, as the origin or destination for passengers

and/or goods, as well as to provide ferry transportation with an inter-provincial shipping range.

Based on the hierarchy of the main ports in Indonesia, there are currently 39 (thirty-nine) main ports, including 2 (two) main ports that function as international hubs (Bitung and Kuala Tanjung). In determining the plan for the main port location, the following things need to be considered:

a. Geographical proximity to international market destinations;
b. Proximity to international shipping lanes ± 500 miles and national shipping ± 50 miles.
c. Having a distance of at least 200 miles from other main ports;
d. Having a certain area of land and water and is protected from waves.
e. Having a minimum depth of port pool -9 mLWS.
f. Serving as a place to transfer and exchange containers/bulk/ general cargo/international passengers.
g. Serving container transportation of around 300,000 TEUs/year or other equivalent transportation.
h. Having at least one container/bulk/general cargo quay, loading and unloading equipment for containers/bulk/general cargo as well as adequate stacking/storage yards.
i. Serving as a distribution center for containers/bulk/general cargo/passengers at the national level and international container transportation services.

2. Hub port.

A hub port has the main function to serve domestic sea transportation activities. It is a place for exchange activities of loading and unloading of domestic and international sea transportation in medium quantities, and as the origin or destination for passengers and/or goods, as well as providing ferry transportation with inter-provincial shipping range. Currently, there are at least 240 (two hundred and forty) hub

ports throughout the country. In determining a hub port, it is important to consider the following criteria:

a. Government policies covering equitable distribution of national development and increasing regional growth.
b. Having a distance of at least 50 miles from other hub ports.
c. Located close to national shipping lanes ± 50 miles.
d. Having a certain area of land and water and is protected from waves.
e. Adjacent to the growth center of the provincial capital and the national growth area.
f. Having a minimum depth of -7 mLWS.
g. Having at least 1 multipurpose dock and loading and unloading equipment.
h. Acting as a national container/bulk/general cargo/passenger transport collector.
i. Serving as a place for boarding and embarking passengers; and loading and unloading national general goods.

3. Feeder port.

A feeder port has the main function to serve domestic and sea transportation activities. It is a place for exchange activities of loading and unloading of domestic sea transportation in limited quantities, a feeder for main ports and hub ports, and as the origin or destination for passengers and/or goods, as well as providing ferry transportation with inter-provincial shipping range.

Based on the hierarchy, the feeder ports are divided into 2 (two) namely Regional Feeder Ports (PR) and Local Feeder Ports (PL). Currently, there are around 235 Regional Feeders and 726 Local Feeders. In its establishment, the following technical criteria must be considered:

a. Regional feeder port.
    1) Referring to provincial spatial planning and equitable distribution of interprovincial development.
    2) Referring to the spatial layout of the regency/city as well as equitable distribution and improvement in the development of the regency/city.
    3) Located around the center of economic growth in the province.
    4) Acting as a feeder for the Hub Port and Main Port.
    5) Acting as a place for boarding and embarking passengers; and loading and unloading goods from/to the Hub Port and/or other Feeding Port;
    6) Playing a role in serving sea transportation between regencies/cities within the province.
    7) Having a certain area of land and waters and is protected from waves.
    8) Serving the service for passengers and goods between districts/cities and/or between sub-districts within 1 (one) province.
    9) Located close to inter-island shipping lanes ± 25 miles;
    10) Having a maximum port depth -7 mLWS.
    11) Having a dock with a maximum length of 120 m.
    12) Having a distance of 20 – 50 miles from other Regional Feeder Ports.
b. Local feeder port.
    1) Referring to the spatial layout of the regency/city as well as equitable distribution and improvement in the development of the regency/city.
    2) Located around the district/city economic growth center.
    3) Having a certain area of land and water and is protected from waves.

4) Serving the service for passengers and goods between districts/cities and/or between sub-districts within 1 (one) district/city.
5) Acting as a feeder to the Main Port, Hub Port, and/or Regional Feeding Port.
6) Serving as a place that provides the service for passengers in remote, isolated, border areas and limited areas that are only supported by sea transportation modes.
7) Providing sea transportation services to support the local community and has multi-functions (besides functioning as a terminal for passengers, it also serves the loading and unloading of goods for the local community's daily needs).
8) The location cannot be reached by using regular sea transportation routes except for pioneers.
9) Having a maximum depth of port -4 mLWS.
10) Having a mooring and dock facility with a maximum length of 70 m.
11) Having a distance of 5-20 miles from other Local Feeder Ports.

1.2. Port Facilities

In supporting the continuity and sustainability of port activity operation, some important facilities are needed. The existing facilities in a port can describe the condition of the port. Port facilities indeed can be seen from the designation of the area. Based on the Government Regulation of the Republic of Indonesia Number 64 of 2015 concerning Ports and the Ministry of Transportation Regulation PM 146 of 2016, the area design plan is divided into 2 (two) namely land area designation and water area designation, which each of the area designation has basic facilities and supporting facilities. These facilities include:

1. Land area.
    a. Main facilities.
        1) Dock.

            In providing services for the ships which enter the port, a dock is needed. A dock is a place where ships can berth in order to carry out their activities such as loading/unloading goods, boarding and embarking passengers, and/or other activities.

Figure 1. Dock.

        2) Warehouse line 1.

            Warehouse line 1 is also known as transit-shed or deep-sea godown. The goods in it are still under the supervision of Customs and Excise because they have not completed the Customs and Excise or other requirements.

Figure 2. Warehouse line 1.

3) Stacking yard line 1.

A stacking yard or commonly called open storage is a yard that has the same function as a warehouse. It is a place to store/put cargo that is resistant to weather changes. This yard is similar to warehouse line 1. The goods are still under the supervision of the Customs and Excise and have not completed their customs and excise affairs and/or other requirements.

Figure 3. Open storage.

4) Passenger Terminal.

The passenger terminal is a terminal where passengers' boarding and embarking activities take place. For

example, the passenger terminal in Surabaya has facilities which are similar with airport facilities.

Figure 4. Passenger terminal.

5) Container terminal.

A container terminal is equipped with facilities such as moorings, docks, and container yards (CY) and adequate equipment to assist the process of loading and unloading containers.

Figure 5. Container yard.

6) Liquid bulk terminal.

Liquid bulk terminal is where the loading and unloading of liquid cargo takes place. This terminal is usually

equipped with pipes and hoses as a means of loading and unloading from and/or to ships.

Figure 6. Liquid Bulk Terminal.

7) Dry bulk terminal.

A dry bulk terminal is used to carry out loading and unloading activities of dry bulk goods (such as rice, fertilizer, soybean, corn, etc).

Figure 7. Dry bulk terminal.

8) Ro-ro terminal.

Ro-ro terminal (roll-on, roll-off) is usually used for ro-ro vessels, such as ferries and car carriers. It is used for loading and unloading goods on wheeled vehicles.

Examples of ro-ro terminals are the Merak-Bakauheni port and other ferry ports.

Figure 8. Ro-Ro terminal car terminal.

Car terminal is used to carry out loading and unloading activities of cars. A special ship that has a ramp door as a means of loading and unloading from and/or to the ship is used.

Figure 9. Car terminal.

9) Multipurpose terminal.

As the name suggests, a multipurpose terminal is a terminal that can be used for loading/unloading activities from and/or to ships for general cargo, liquid bulk, dry bulk, containers, etc. At the terminal we can find various

types of loading and unloading equipment according to the type and needs for loading and unloading activities.

Figure 10. Multipurpose terminal.

b. Waste collection and disposal facilities.

The waste collection and disposal facility is a waste management center at the port and is located within the port's Working Environment Area (DLKr) and Environmental Interest Area (DLKp). Based on MARPOL 73/78 and Decree of Directorate General of Sea Transportation No. PK.101/1/4/DJPL-13 of March 28, 2013, every port must provide and start preparing waste storage or Reception Facilities (RF).

Figure 11. Waste collection and disposal facilities.

c. Bunkering Facility.

The bunkering facility provides refueling services for ships. In the bunkering process, a ship can be used to refuel a docking ship. Land vehicles such as fuel tanker trucks can also be used.

Figure 12. Bunker facilities.

d. Firefighting facility.

Firefighting facility is also needed at the port in order to extinguish fires that might occur in the port area, either on land or on ships.

e. Warehouse facility for Hazardous and Toxic Materials/Goods (B3).

Warehouses for hazardous and toxic materials/goods are used to temporarily stow cargo or goods that are flammable or chemical substances that are harmful to the environment. The place to stow hazardous cargo must be protected and separated. However, it can be closed or opened based on the type of the cargo.

Facility for maintenance and repair of port facilities and Marine Aids to Navigation (*Sarana Bantu Navigasi Pelayaran* or *SBNP*);

Marine aids to navigation are equipment or systems located outside the ship which are designed and operated to improve the safety and efficiency of ship navigation and/or ship traffic.

Other basic facilities according to technological developments.

f. Supporting facilities.

1) Office area.

Office areas are needed to support the operation of port activities, including from the government sector and the industrial sector, etc.

2) Postal and telecommunication facilities.

3) Tourism and hospitality facilities.

Installation of clean water, electricity, and telecommunications.

4) Road and rail network.

Roads and railways network is very much needed for the flow of goods from and out of the port.

d) Water waste, drainage and garbage network facilities.

This facility is needed to keep the port area clean and protected from puddles due to rain.

e) Port development area.

This area is very much needed for future port development on the mainland side, either for short term (5 years), medium term (10 years) and long term (20 years) development plan.

f) Vehicle waiting area.

Parking area is provided in regards with the necessity to avoid any traffic problems due to careless parking management.

g) Trading area.

h) Industrial area.

Other public facilities such as mosque or other worship place, park, recreation area, sport area, green lines and health facility.

2. Water area.
   a. Main facilities.
      1) Shipping lane.

      A shipping lane is part of natural or artificial waters that are used as passages for ship traffic flows where the depth, width, and other shipping barriers are considered safe for navigating.

      2) Anchorage area.

      The anchorage area is the ship's waiting area before it berths.

      3) Port basin for ship's berthing and maneuvering;

      A port basin is a special location in the port water area where ships can berth and carry out the loading and unloading process and fill the supplies safely.

      4) Ship's load transfer area.

      This area is intended as a place to transfer cargo from large ships to smaller ships or vice versa. This activity is also often referred to as *ship-to-ship* transfer.

      5) Area for ships carrying Hazardous and Toxic Materials/Goods (B3).

      This area is reserved for ships carrying dangerous and toxic goods.

      6) Area for quarantine.

      This area is prepared for ships that need to be inspected by port quarantine officers.

      7) Intra-port connecting lane.

8) Pilotage compulsory area.

   Due to its special condition, a pilot is compulsory in this area.

9) Area for government ships.

10) Floating terminal.

b. Supporting facilities

1) Water area for long-term port development.

   This area is needed to ensure that future water area development plans can be carried out. Development plans are divided into 3 (three) stages: short term (5 years), medium term (10 years), and long term (20 years).

2) Water area for ship docking and maintenance facilities.

   This area is used for repairing damaged ships. It is placed outside the channel so it will not disrupt any port operations.

3) Sea trial area.

   This area is used for sea trials for the ships that have been repaired.

4) Water area for wrecks.

   This area is used for mooring stranded ships and wrecks. It is placed outside the channel so it will not disrupt any port operations.

5) Water area for emergency purposes;

   This area is preserved for SAR vessels for evacuation purpose, fireboat and other rescue activities in the event of a ship accident.

6) Water area for tourism and hospitality activities

1.3. Functions And Roles of Port

Port has an important role to facilitate the movement of intra and intermodal transportation, as a center for sea transportation service activities, and as a goods distribution and consolidation center.

1. Port functions include:
   The port is seen as one of the links in the transportation process which connects the place of origin to the place of destination. The port has a function as a LINK which means that in carrying out its services, a port must be able to create a system in such a way that facilitates other nodes to carry out their activities, either in the aspect of ship services or other means of transportation. The port functions as a link which means that the port is a link in the process of transportation of cargo from the producer (origin of goods) to the receiver or consumer.
2. The port has an INTERFACE function which means that the port provides various facilities and services needed for the transfer of land transportation modes to ships or vice versa in transshipment activities. Schematically the interface function is as follows: ports function as an interface, meaning that ports with all available facilities can carry out cargo transfer activities from sea transportation (ships) to land transportation or vice versa.
3. The port functions as a GATEWAY which means that the port carries out procedures and regulations that must be followed by ships that enter the port. In addition, the port also functions as a gateway for the entrance and exit of goods. It is called as a gateway of a country or region because a ship can enter a country/region through the port.
4. The port functions as an INDUSTRY ENTITY/ESTATE/ZONE (Industrial Zone) which means that the port has a dynamic work environment. Thus, the port facilities need to be developed including facilities for industry, especially industries related to shipping and other sea transportation.

1.3.1. Roles of Port

The main roles of a port are:

1. To facilitate the needs of international trade from the hinterland where the port is located.

2. To assist the regional trade and industrial development.
3. To accommodate an increasing market share from international traffic both the transshipment and inland routing.
4. To provide a transit facility for hinterland destinations or neighboring regions/countries.

1.3.2. Type Of Ports

There are several types of ports, namely:

1. Public Port. This port is operated for the benefit of public service.
2. Special Port. This port functions to support special activities and is common for the benefit of certain individuals or groups.
3. Seaport. This is a place used to carry out sea transportation services.
4. Ferry Port. This port is used specifically for crossing activities from one port to another that has connections.
5. Inland Port. It is a port that serves transportation services in the lake or river area.
6. Dry Port. It is a place on the mainland with clear boundaries, equipped with loading and unloading facilities, stacking yards, and warehouses as well as infrastructure and means of freight transportation by means of special packaging and functioning as a public port.

In addition, the type of port can be seen from 2 (two) aspects, namely:

1. In terms of the usage:
    a. Ports open for foreign trade.
    b. Ports that are not open for foreign trade.
2. In terms of its administrator:
    a. Public Ports (organized by the Government or Port Business Entities).
    b. Commercial port.
    c. Non-commercial port.

3. Special ports,
   The port is organized and operated by an Indonesian legal entity, which is used to serve its own activities, for example, Fishing Port, and Krakatau Steel Port in Cilegon-Banten.

1.3.3. Related Institutions at The Port

1. Sea transportation / harbor master.
   The functions of the harbormaster are:
   a. Supervise ship traffic in the port water area and the fair way.
   b. Supervise the loading and unloading activities in the port area, salvage activities and underwater work, and piloting.
   c. Carry out ship accident inspections.
   d. Provide information about weather from the Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG).
   e. Check the ship's documents before sailing.
2. Customs.
   According to the law, the customs is authorized to supervise the in and out traffic of goods within the Indonesian customs territory including prohibited goods, and dangerous drugs. It also collects duties on goods that are subject to the tax. In addition, customs also has several other functions, including:
   a. Prevent the entry of goods from abroad without official documents.
   b. Directly supervise the export and import of goods.
   c. Execute the necessary actions in the case of exported or imported goods that are not equipped with official documents.
   d. Withdraw import and export duties on the related items.
   e. Take legal action against carriers of prohibited goods entering Indonesia’s territory.

3. Immigration.
   The function of immigration is to monitor the people who are entering and departing Indonesia with or without visas. It has the authority to check everyone's passports who enters and leaves the country's territory, and has the following tasks:
   a. Formulating technical policies, providing guidance, coaching and licensing immigration affairs.
   b. Executing immigration-related affairs in accordance with the main duties, namely as a security apparatus and law enforcer.
   c. Conducting technical security in the realization of the Directorate General's main duties.
4. Quarantine.
   The function of the quarantine is to quarantine infectious diseases either for animals or plants. The quarantine has the authority to examine every animal and plant that arrived in the territory of Indonesia and can hold it to quarantine if there are symptoms of infectious diseases indicated during the examination. Besides that, the quarantine also serves the following roles:
   a. Protection of domestic plants and animals from the threat of organisms from abroad.
   b. Further supervision and observation of plants, animals, and their parts.
   c. Prevention against the spread of plant and animal diseases to the territory of the country.
   d. Providing services in accordance with the requirements as requested.
5. Health.
   The health agency has the role of an examiner whether there is a human-related disease that might be brought by humans via the port. Thus, they have to examine every human who enters

Indonesian territory and can detain them if it is proven that they have the disease. Health agencies also have the authority as follows:

a. Checking the ship's documents related to the health of the ship's crew.
b. Detaining crew members who are proven to have a disease.
c. Preventing any diseases from abroad spread in Indonesia territory.
d. Conducting routine inspections that are carried out on ship crews who come from abroad.

6. State-owned enterprises (Badan Usaha Milik Negara - BUMN).
   PT. (Persero) Pelabuhan Indonesia is the provider and manager of port services.

7. Private agencies.
   Private agencies are the users of port services, for example: Shipping Companies, Stevedoring Companies, Freight Forwarders, etc.

1.3.4. Type of Port Management

1. Landlord port type.
   The Port Manager (Government Agency) provides basic port facilities (Infrastructure) and then rents them to the Terminal Operator. These Terminal Operators complete Additional Facilities (Superstructure) as well as carry out loading and unloading, cargodoring, storage, and receiving/delivery.

2. Tool port type.
   The Port Manager consists of Government Agency that provides Basic and Additional Facilities (Superstructure), then rents them to Terminal Operators to carry out loading and unloading, cargodoring, storage, and receiving/delivery.

3. Operating port type.

Besides providing basic and additional facilities, the Port Manager (Government Agency) also functions as the port operator, which carries out loading and unloading activities, cargodoring, storage, and receiving/delivery.

CHAPTER II.
OPERATIONAL OF CONTAINER TERMINAL

2.1. Main Business Activities According to The Company's Statute

1. Providing and/or giving services of port basins and water areas for ship maneuvering and berthing.
2. Providing and/or giving services related to pilotage and ship towing.
3. Providing and/or giving services related to docks and other facilities for mooring, loading and unloading of containers, liquid bulk, dry bulk (general cargo), and vehicles;
4. Providing and/or giving services related to container terminal services, liquid bulk, dry bulk, multipurpose, passenger, public shipping, and Ro-Ro;
5. Providing and/or giving service related to warehouses and stacking yards and tanks/places for storing goods, airport transportation, loading and unloading equipment, and port equipment;
6. Providing and/or giving services related to land services for various buildings and yards, industries, and buildings related to the running of multi-modal transportation;
7. Providing and/or giving services related to electricity, drinking water, and waste installations and waste disposal;
8. Providing and/or giving service related to the refueling of ships and vehicles in the port area;

9. Providing and/or giving services related to the consolidation and distribution of goods including animals;
10. Providing and/or giving services related to consultancy, education and training related to ports;
11. Operation and services of container depots and repairs, cleaning, fumigation, and logistics services;

In addition to the main activities above, it can carry out other business activities that can support the achievement of the Company's goals and in the context of optimizing the utilization of the Company's resources including:

1. Transportation services.
2. Facilities and equipment rent and repair services.
3. Ship and equipment maintenance services related to the port sector.
4. Ship to ship transfer services, including other accompanying services.
5. Properties other than the main port activities.
6. Tourism and hospitality services.
7. Port consultant and surveyor services.
8. Communication and information services.
9. Port construction services.
10. Forwarding /expedition services.
11. Health services.
12. Supplies and catering.
13. Waiting areas for vehicles and shuttle bus.
14. Diving services (salvage).
15. Tally services.
16. Port pass services.
17. Weighing services.

2.2. Container Operational System

The container operational system can be seen from several aspects, including:

2.2.1. Ship owner point of view

From the shipowner's point of view, the goal is for obtaining maximum profit through maximum revenue. To achieve these targets, several operational performances that must be achieved include:

1. The ship is loaded optimally (near full) so that the transportation costs and profits are proportional to the cargo carried by ship.
2. Maximum mileage to maximize the ship's cycle in sending goods to a destination. The faster the ship's cycle in sending goods at one time, the more goods sent will also have an effect on income.
3. The cost spent at the dock is made as low as possible to reduce operational costs and reduce ship cycle times in port.
4. The ship's berthing time at the port is made as short as possible to shorten the cycle time of the ship at the port.

   Apart from that, to achieve a good performance, ship owners must also be supported by a good level of service at the port which is indicated by:

1. The dock waiting time is kept as short as possible.
2. The cost at the port is kept as small as possible.
3. Loading and unloading of goods should be as quickly as possible.
4. The ship's berthing time is kept as short as possible.

2.2.2. Container terminal management point of view

From Container Terminal Management's point of view, the goal is to get the maximum possible revenue and profit.

Therefore, the desired business performance is:

1. Throughput the container as many as possible.

2. The amount of investment in container handling should be kept to the minimum.
3. Container handling operating costs should be kept to the minimum. Operational performance to be achieved in this service is:
    a. Loading and unloading ships is made as quickly as possible so that more containers can be served in one unit of time.
    b. The duration of the ship berthing is made as short as possible so that the berthing cycle of the container ship will be fast which will result in an improvement in container traffic.
    c. The level of accidents and damage is kept as low as possible to provide the best service to consumers without complaints and requests for compensation for damage to goods which will certainly reduce profits.
    d. Fast response to the equipment needs and other needs to speed up container handling.
    e. Able to apply tariff as low as possible.

The loading and unloading of goods at the dock is a cycle of activities from unloading the ship and delivering it to the next destination, collecting goods at the dock which are then transported to the ship.

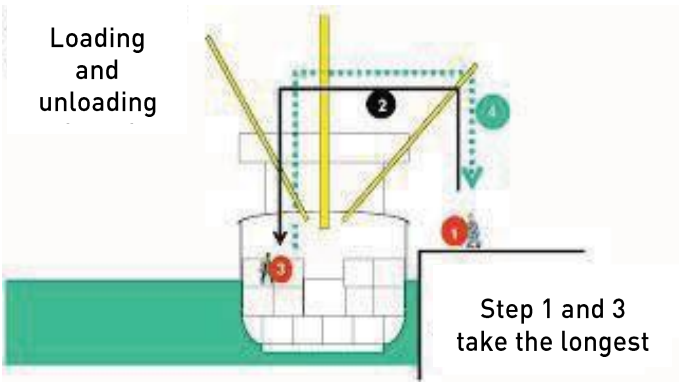


Figure 13. Loading and unloading of goods cycle.

This cycle can be shortened by doing several activities that are not affected by other activities, for example in the picture below:

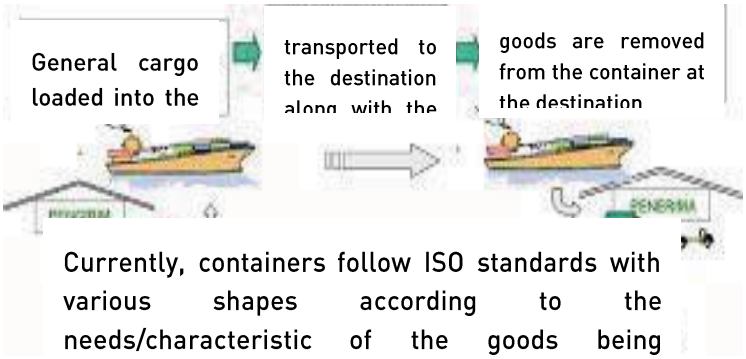


Figure 14. Loading and unloading of goods cycle.

As seen above, the time savings can reduce the time of loading and unloading of goods, by preparing the cargo before the ship arrives without waiting for the ship to dock first (number 1).

The shipped goods already have good packaging so that the goods no longer need to be parsed/or arranged to make them easier to transport. An example of packaging is the containers.

Here, we can conclude that the packaging of goods plays an important role in the speed of the loading and unloading cycle, hence, various efforts have been taken to improve this performance through various kinds of packaging. This kind of method is commonly called Palletization or Unitization.

Due to the consideration, the container is made so that the collection of goods, the unification of the packaging of the goods, the handling of the goods to the ship, the security of the goods and the quality of the goods can be guaranteed.

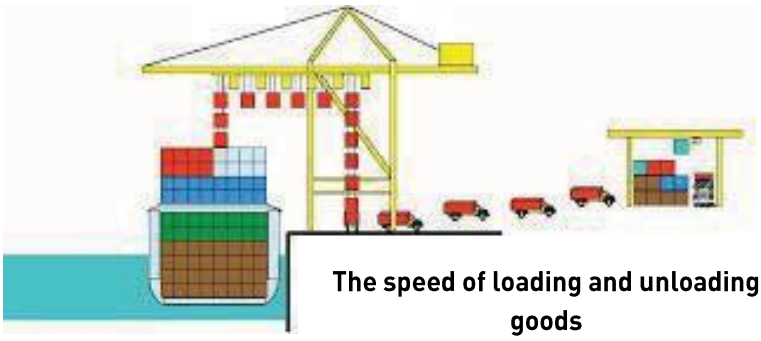


Figure 15. The cycle of loading and unloading of goods.

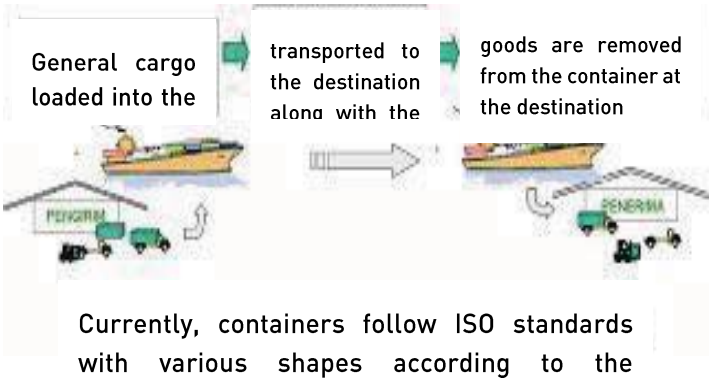


Figure 16. The cycle of loading and unloading of goods.

The advantages of using container:

1. Able to increase loading and unloading speed.
2. The cargo is not directly touched at the time of transportation exchange.
3. During the trip, the cargo is more protected.
4. The cargo wrap does not need to be very strong.
   It can be upgraded to automatic. Consequences of using container:
   a. Needs a big capital.
   b. Requires high-skilled human resources and managers.
   c. Risk of workforce reduction.
   d. There are fewer ports that can be visited by container ships.
   e. The monopoly of market share by giant companies.

2.3. How to Ship Goods with A Container

1. Based on the use of container space
   a. Full Container Load (FCL) means that one container only contains goods from one sender (SHIPPER) and receiver (CONSIGNEE)
   b. Less than Container Load (LCL) means that one container contains goods from more than one shipper (SHIPPER) or more than one receiver (CONSIGNEE)

2. Based on the location of receipt/delivery of goods
   a. Container Yard (CY) is a place where the container is stacked.
   b. Container Freight Station (CFS) is a place where the process of packing and unloading takes place.
3. Based on the location of the use of containers
   a. From the sender door to the receiver door (door to door).

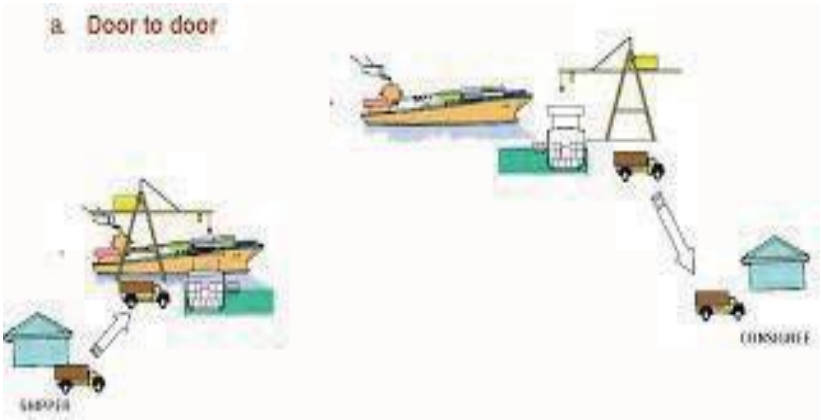


Figure 17. Door to door.

   b. From the sender door to the port door (door to port).

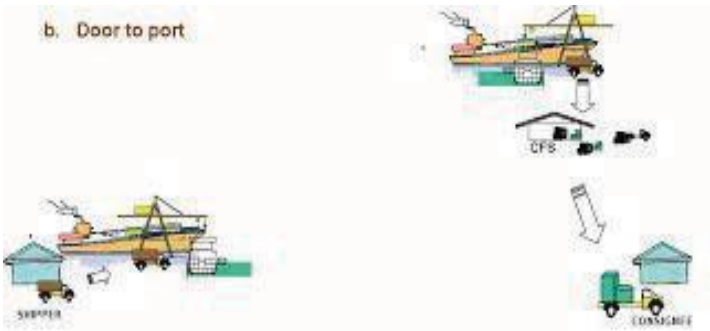


Figure 18. Door to port.

c. From loading port to unloading port (port to port).

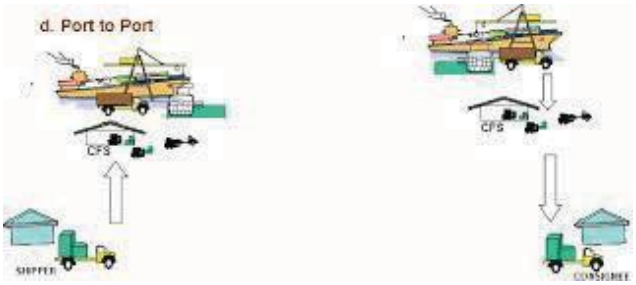


Figure 19. Port to port.

d. From loading port to the receiver door (port to door).

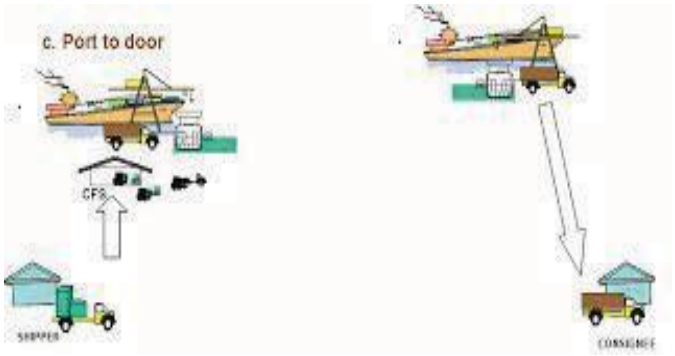


Figure 20. Port to port.

2.4. Scope of Work

The loading and unloading of goods are a business activity engaged in the loading and unloading of goods from and to ships at the port.

2.4.1. Container Unloading Service

The container unloading service procedure is as follows:

1. Planning; the customer needs to complete the following documents:
   a. Master cable.
   b. CVIA (Container Vessel Identification Advice).
   c. Statement of fact.
   d. Statement letter.
   e. Import summary list.

f. Dangerous Cargo List.
g. Approval from Harbor Master.
h. Reefer list.
i. Crane sequence list.
j. Discharge stowage plan.
k. Discharge bay plan.
l. Manifest.
m. Special cargo list.

2. Yard and Berth Planning Sub-department checks the documents. They hold daily meetings, together with the Engineering Department and with the Shipping Company, to plan the schedule of container handling services.
3. Vessel Berth Planning Sub-department processes the unloading plan into the computer system based on the data sent by the Shipping Company via email, and prints the Discharge List and submits it to Berth Operations.
4. Based on the *Discharge List*, *Berth Operations Superintendent* instructs the CC Operator, through the Berth Tally Officer, to unload the containers from the ship and load them onto the Head Truck chassis, bring them to the Container Stacking Field, and confirm the unloading position into the computer system (HHT/Teklogix).
5. After the Head Truck arrives at the Container Stacking yard, the Yard Operations Superintendent orders the RTG Operator, via the Yard Tally Officer, to stack the containers, and confirm the position of the containers in the computer system (HHT/Teklogix). The Yard Tally Officer orders the Head Truck driver to return to the berth to pick up the next container to be unloaded.
6. At the end of the shift, the Yard Tally Officer reports the work results to the Yard Operations Superintendent, while the Berth Tally Officer reports the work results to the Berth Operations Superintendent.

2.4.2. Container Loading Service

The container loading service procedure is as follows:

1. Planning; the customer needs to complete the following documents:
    a. Master cable.
    b. CVIA (Container Vessel Identification Advice).
    c. Statement of fact.
    d. Export summary list.
    e. Dangerous cargo list.
    f. Crane sequence list.
    g. General loading plan.
    h. Loading bay plan.
    i. Manifest.
2. *Yard and Berth Planning Sub-department* checks the documents. They hold daily meetings, together with the Engineering Department, and with the Shipping Company, to plan the schedule of container handling services.
3. *Berth Planning Sub-department* enters data into a computer system (baplie), that has undergone customs inspection, based on the pre-storage plan, received from the Shipping Company, prints the *Loading Work Quay*, based on container data in the computer system, and submits it to the Yard Supervisor and Wharf Supervisor.
4. Based on LWQ (Loading Work Quay), Yard Operations Superintendent instructs RTG Operator, via the Yard Tally Officer, to move the containers from Container Stacking Field, loads them to the chassis Head Truck, and bring them to the berth. The Yard Tally Officer confirms the position of the containers to the computer system (HHT/Teklogix). Those containers are then loaded to the ship based on the data on TMV (Terminal Mounted Vehicle).
5. Wharf Supervisor instructs the CC Operator, via the Berth Tally Officer, to load the containers from the chassis Head Truck onto the ship, based on the data previously planned on the Loading

List. The Berth Tally Officer confirms the position of the containers to the computer system (HHT/Teklogix). The berth Tally Officer instructs the Head Truck driver to go back to the Stacking Yard to pick up the next containers which will be loaded.

6. At the end of the shift, the Yard Tally Officer reports the work results to the Yard Operations Superintendent, while the Berth Tally Officer reports the work results to the Berth Operations Superintendent.

2.4.3. Container Reception Service

The procedure of container reception service is as follows:

1. Planning; customer needs to complete these documents:
   a. Application for Container Reception Request
   b. *Warkat Dana*/Upfront Payment Receipt (4 copies) to be submitted to the Export Service Staff, within 96 to 24 hours before the ship's arrival.
2. Export Service Officer prints Job Order/CEIR (Container Equipment Interchange Receipt) that has been approved by Export Superintendent. The 1st, 2nd, and 3rd sheets of CEIR are handed to the Customer. The customer hands it over to the Head Truck driver.
3. The driver of the Head Truck proceeds to In-Gate (Entrance Gate), with the containers and submits the Job Order/CEIR and a copy of the Surveyor Identification Record/Export declaration to the Gate Officer.
4. The Gate Officer checks the physical condition of the containers and prints the In-Gate Terminal Job Slip, based on the Job Order/CEIR, and returns the 3rd and 4th sheets to the Head Truck driver.
5. The Head Truck driver hands in the In-Gate Terminal Job dan JobOrder/CEIR to the Yard Tally Officer.
6. The Yard Tally Officer instructs the RTG Operator to lift the containers from the Head Truck chassis to the Container Stacking

Yard at the position as stated in the In-Gate Terminal Job Slip. Yard Tally Officer confirms the position of the containers to the computer system (HHT/Teklogix).

7. Head Truck Driver receives Job Order/CEIR and In-Gate Terminal Job Slip from Yard Tally Officer and proceeds to Out-Gate (Exit Gate*)* and submits the 3rd sheet to the out-gate staff (Exit Gate Staff). The customer hands in *Export Declaration* to the Container Terminal after the containers are stacked in the Container Stacking Yard.

2.4.4. Container Clearance Out Service

The procedure of container clearance out service is described as follows:

1. Planning; customer needs to complete the following documents:
   a. Application of containers issuance request (Surat Permohonan Pengeluaran Petikemas)
   b. Original copy of Delivery Order
   c. *Warkat Dana/* Upfront Payment receipt (4 copies) to be submitted to the Import Service Staff.
   d. Letter of approval for issuance of goods *(Surat Persetujuan Pengeluaran Barang*) and Declaration of Ban and Prevention (*Surat Pernyataan Pencekalan dan Pencegahan*) from the Customs.
   e. Power of attorney from the importer.
2. The Import Service Officer prints a CEIR/Job Order that has been approved by the Import Superintendent. The 1st, 2nd and 3rd sheets of CEIR are handed to the Customer. The customer hands it over to the Head Truck driver.
3. Head Truck Driver proceeds to In-Gate (Entrance Gate) and submits Job Order/CEIR to In-Gate Staff (Entrance Gate Officer).
4. In-Gate Staff prints In-Gate Terminal Job Slip based on Job Order/CEIR and returns sheets 1 and 2 to Head Truck driver.

5. Head Truck Driver submits In-Gate Terminal Job Slip and Job Order/CEIR to Yard Tally Officer.
6. The Yard Tally Officer instructs the RTG Operator to lift the container from the Stacking Field onto the Head Truck chassis according to the position stated in the In-Gate Terminal Job Slip.
7. The Head Truck Driver receives the Job Order/CEIR and In-Gate Terminal Job Slip from the Yard Tally Officer, then proceeds to the Out-Gate (Exit Gate) and submits the In-Gate Terminal Job Slip and Job Order/CEIR 3rd sheet to the Out-Gate Officer, and Declaration of Ban and Prevention (*Surat Pernyataan Pecekalan dan Pencegahan*) to the Customs Officer.
8. The Out-Gate Officer confirms the Head Truck license number and the Head Truck work reference number based on the In-Gate Terminal Job Slip into the computer system by attaching the 1st CEIR sheet to the Head Truck driver.

2.4.5. Stevedoring

This is an activity of unloading goods from ships to docks/barges/ trucks or loading goods from docks/barges/trucks into ships until they are arranged in the ship's hull by using ship cranes or shore cranes.

2.4.6. Cargodoring

Cargodoring is an activity of releasing the cargo slings from the ship's cargo hook and moving the cargo from the dock to the warehouse or stacking yard (or vice versa).

2.4.7. Receiving/Delivery

Receiving/delivery refers to the activity of receiving goods at the warehouse/stacking yard and handing them over to the consignee's truck for the unloaded cargo, on the other hand, for cargo to be loaded onto the ship, it is handed over to the ship. (The stevedoring company is in charge of the cargo until it is unloaded into the consignees' truck, or until the cargo is arranged in the ship's hull).

2.4.8. Customs Inspection (behandle)

1. The customer submits the Goods Behandle Application to Container Terminal through the Administrative Service Officer equipped with Original Documents, Upfront Payment Receipt, and Delivery Order.
2. The Administration Officer checks and prints the Job Order and submits it to the Customer, with a copy of the Delivery Order, and submits 2 copies to the Operations Service Officer.
3. Customer submits Job Order to CFS Operations Assistant Manager.
4. Assistant CFS Operations Manager or designated Staff examines the documents and issues a Container Movement Job to pull containers from the Stacking Yard to CFS.
5. After the container has been transferred to CFS, the physical condition of the container will be checked before the Behandle inspection is carried out.
6. After the clearance out of goods has been completed, a report must be prepared and reported to the CFS Officer, and approved by the Customer.

2.5. Container Loading and Unloading Equipment

1. HMC (Harbour Mobile Crane) is a loading and unloading equipment/ crane in the port that is removable and flexible. It can be used for loading/unloading containers and bulk/general cargo with a lifting capacity/SWL (safety weight load) up to 100 tons.

Figure 21. Harbour mobile crane.

2. RS (Reach Stacker). It is a mobile device that has a spreader used to raise/lower (lift on/lift off) containers in CY (container yard) or Container Depo.

Figure 22. Reach stacker.

3. FL (Fork Lift). It is a mobile device and has a fork that is used to raise/lower (lift on/lift off) containers/general cargo in CY or Depo Container. It has the capacity to lift cargo up to 32 tons.

Figure 23. Forklift.

d. RTG (Rubber Tyred Gantry). It is equipment for container loading and unloading that can move in the stacking yard/CY which functions to raise/lower containers from and to the top of the

trailer or vice versa in the stacking area according to the block, slot, row, and tier.

Figure 24. Rubber tyred gantry.

e. CC (Container gantry Crane) is equipment for container loading and unloading that is permanently installed on the side of the dock by using a rail. It can be moved right and left and can reach a farther range/area.

Figure 25. Container gantry crane.

f. Straddle Carrier

Figure 26. Straddle carrier.

CHAPTER III. CFS (CONTAINER FREIGHT STATION)

3.1. CFS (Container Freight Station)

CFS refers to a mode of delivery from the LCL Warehouse of the origin country to the LCL Warehouse of the destination country. CFS-CFS indicates that the mode of delivery of the goods is by LCL.

Figure 27. Container freight station.

3.2 CY (Container Yard)

Container yard is a mode of delivery from the Container Stacking Yard of the origin country to the Container Stacking Yard of the destination country. CY-CY indicates the mode of delivery of the goods by FCL.

FCL = Full Container-Load

LCL = Less than Container-Load

CY = Container Yard

3.3. Container Status

1. CY/CFS = what to do with cargo delivery and receiving locations
2. CY/CFS = door-to-port service, a full container from shipper's place to carrier's CFS at the destination, consignee arranges LCL collection
3. CFS / CY = port-to-door service, loose cargo from the origin CFS is packed into all containers and delivered to the consignee
4. CFS / CFS = port-to-port service, LCL cargo from origin CFS is packed into an entire container and delivers CFS to this destination, consignee arranges LCL collection
5. FCL/FCL = The shipper is responsible for packing and unpacking from the container
6. LCL/LCL = Delivery of goods carried out by several people who are filled in the container, in this case, the carrier or shipping company is responsible for packing and unpacking of the container
7. LCL/FCL = Transportation by FCL, the carrier is responsible for packing into the container and the shipper is responsible for unpacking from inside the container
8. FCL/LCL = Transportation by LCL, the shipper is responsible for packing into the container and the carrier or shipping company is responsible for the unpacking of the container.

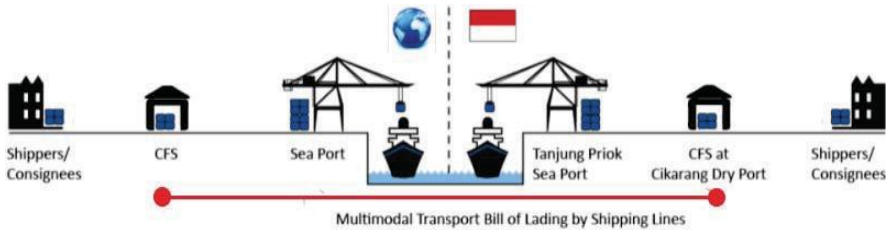


Figure 28. Multi-mode Transport B/L.

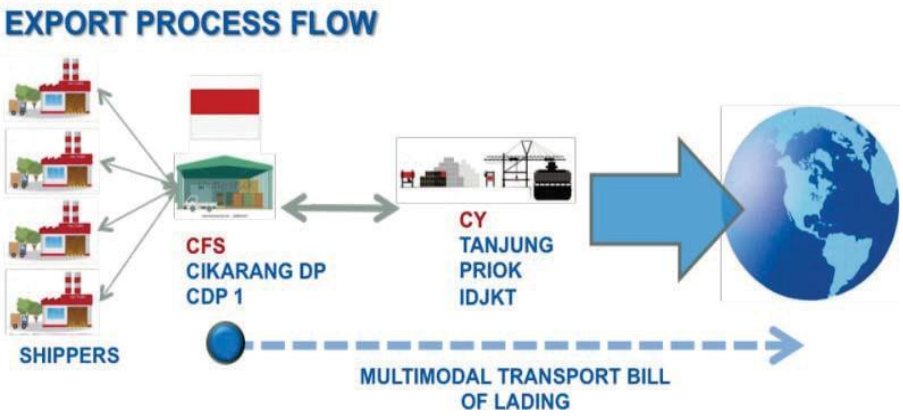


Figure 29. Export process flow.

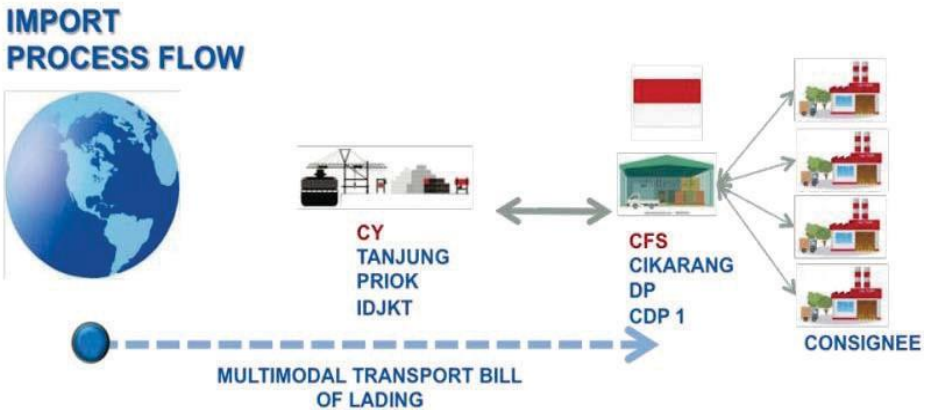


Figure 30. Import process flow

3.4. Container Activity

3.4.1. Stuffing

Stuffing refers to an activity of monitoring the loading of export goods into containers. A stuffing officer is an employee in charge of

supervising the loading activities of export goods. A load executor is an employee of a shipping warehouse.

The procedure of stuffing is described as follows:

1. Preparation Before Stuffing
    a. Prepare the documents for goods loading control tools and those for fiat loading to the port.
    b. An invoice contains the number of goods, name of the goods, price per unit, the value of the overall goods, type of packaging (packing), packaging brand (shipping mark), and others for 3 copies = 2 copies for fiat load, 1 copy for archives.
    c. The Packing List contains details of the contents of each package, the gross weight and the net weight of each package. 3 copies are needed: 2 copies for fiat load, and 1 copy for archives.
    d. Make sure that we have at least 1 copy of documents for archives.
    e. Prepare meal accommodation/tip for the container driver according to company regulations. It can be claimed to the Marketing Cashier by using a receipt.
    f. Check the readiness of the goods
        1) Make sure the goods that will be sent have been sorted by warehouse personnel to avoid any errors.
        2) Count the number of packaging, and make sure it matches the data on the invoice and packing list. If it doesn't match, ask/report to the person in charge to prepare the goods.
    g. Check the readiness of the vehicles (truck or container), record the vehicle registration number, container number and seal; because it will be useful for publication of SPB, insurance, etc.

Figure 31. Stuffing container.

2. During the stuffing.
    a. Count and record the number of packaging that has been loaded into the vehicle/container.
    b. The bale/carton packing number should match the data in the Packing List.
    c. Check the writing of the shipping mark. If it is not correct, immediately report it to the head of the team/shipping affairs for correction.
    d. For fabric printing, if the shipping mark includes a design number, make sure it is written correctly/matches the real condition of the goods or in the document.
    e. In the delivery of goods, if a production sample is included, make sure that the sample has been included either in the incorporated or separate packaging.
    f. When the loading process has been completed, close the container door. Don't forget to seal it with the seal of the container. Sealing should be on the outermost and last door latch. Sealing can be done by the head of Shipping affairs as well as the stuffing personnel. Non-container vehicles do not need to be sealed.
3. Stuffing completed.
    a. Hand in documents (invoice, packing list, copy L/C if any) for fiat load at the port to the driver of the vehicle.

b. Give meal accommodation/tip in envelopes along with the documents according to company regulations.

c. Fax the Invoice to the freight forwarder. When it is close to the closing time of the ship, fax the Invoice and Packing List for the basis of the issue of Export Declaration. Complete the data needed including the transportation costs, insurance, container numbers, HS numbers, etc.

d. If the price condition is CIF, make an application for the closure of the insurance policy to the Insurance Company attached with an invoice.

e. Applications and attachments are faxed to the Insurance Company. Price conditions CNF, CFR does not need to be insured.

4. Stripping.
   Stripping is the job of unloading goods from containers to be stored and arranged in the warehouse/CFS

5. Lift on/lift off.
   The work of lifting/lowering containers from one chassis to another chassis, or from the chassis to the stacking yard, or from the stacking yard to or chassis.

6. Haulage.
   The work of transporting containers using trailers/chassis in the port work area, from one CY to another CFS or from the ship hull to the CY or vice versa.

7. Documentation/Clearance/Tally.
   Administering, calculating, and completing permits to carry out the transfer of filled/empty containers from the ship hull to CFS/CY or vice versa, emptying/loading goods from and into containers, and carrying out shifting of containers to ships.

8. Shifting.
   The work of moving a container from one place to another place within the same Bay or to another Bay in the same ship or from bay to the quay and then placing it back into the same Bay.

9. Terminal operation.
   All activities that occur at the time of carrying out the movement of containers from the ship hull to the CFS / CY, Inter Charge Area, and field warehouses that have been designated or vice versa in the port area.

10. Repositioning.
    Lifting, transporting and placing empty containers from the place where the empty containers are located to the Container Depot or other open field.

11. Stevedoring.
    The work of unloading containers from the deck of the ship/ship to the warehouse/onto the chassis, or loading from the dock/chassis to the deck/into the ship using a ship crane/shore crane (gantry crane).

12. Non-containerized cargo and overheight cargo.
    It refers to the loading and unloading of items that can only be done with a Hook Container Quay Crane, and with a special tool or sling that is only done by hand.

13. Overheight cargo.
    The loading and unloading containers can only be done with a quay container spreader, with a special overheight gear tool.

14. Transshipment.
    The unloaded containers from the first carrier are stacked on the container yard for re-shipment by the second carrier, under these conditions:

    a. If the containers are stacked for more than 28 days since being unloaded by the first carrier, then the container is subject to rent from the day of unloading.

b. Filled or empty containers must be reported in writing as transshipment containers 24 hours before the container ship arrives

c. Every transshipment container sent by CFS/CY to be unstuffed/stuffed will be charged L.C.L.

Documents related to Stuffing Stripping Activities must be completed before the execution of stuffing stripping service activities at the CFS warehouse of the Semarang Container Terminal. Service users are required to include several documents as a condition for the service process to be carried out at the container terminal. There are also documents printed or issued by the container terminal. The documents are as follows:

1. Delivery Order (DO).
   DO refers to a document of delivery or collection of goods from the shipping company that states that the goods are the correct property listed in the D.O.
2. Warkat Dana or Upfront Payment Receipt.
   Warkat Dana refers to the certificate of payment of services that have been carried out at the Container Terminal
3. The request for status change, acknowledged by the shipping company or shipping agent. This document refers to a statement from the shipper that the container status has changed from LCL to FCL.
4. Manifest.
   This is a document that provides a detailed description of the container and its contents.

e. Job Order.
   This document is a work order issued by the customer service department and used in accordance with the work order stated on it.

CHAPTER IV. OPERATION OF LASHING AND UNLASHING CONTAINER

4.1. Definition Of Lashing

4.1.1. Definition of Lashing

Lashing refers to security supervision of the "fastening" of cargo/goods for the transportation process so that it is safe to arrive at the destination. Lashing securing is securing the cargo either through land, sea, or air transportation.

Figure 32. Container lashing.

Figure 33. Heavy equipment lashing.

4.1.2. Types of Container Lashings and Their Functions

To avoid cargo on the hatch moving or falling into the sea during the voyage, the cargo that is on the hatch is secured to the ship. So that even if the ship goes through a storm with high waves during the voyage, the cargo remains in place and does not fall into the sea. There are three ways that are commonly used to secure the containers, namely:

1. Lashing to the ship's hull using steel cables, fastening rods, or chains that can be tightened.
2. A key system, commonly called a twist lock that locks two adjoining containers or those on it.
3. Buttress system, usually used in large container ships, is a support device that prevents the container from shifting at the time of sailing. The support is installed before sailing after all containers have been loaded.

4.2 Lashing/Unlashing Equipment

4.2.1. Turnbuckles

A turnbuckle is a tool used to adjust slings' tension. The slings here refer to Wire Rope Sling, Chain Sling, Rope Sling, Webbing Sling, and other tools that require tension adjustment. Another name for Turnbuckle in Indonesia is widely known as *Jarum Keras* and some people also called it as *spanskrup*.

Types of Turnbuckle:

1. Hook & hook.

2. Hook & eye.

3. Eye & eye.

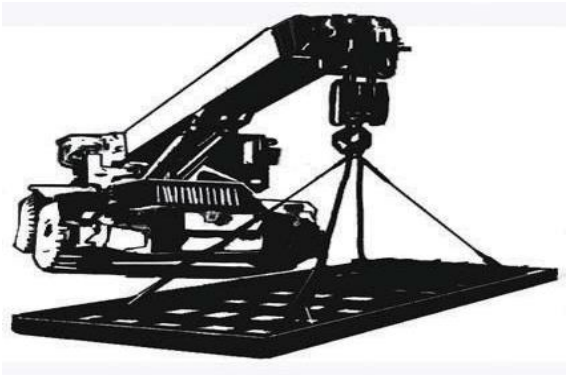
4. Jaw & eye.

5. Jaw & jaw.

5. Stub & stub.

4.2.2. Rigging

Rigging is a method for handling heavy cargo by using ropes, either made of synthetic fibers or steel fiber ropes or slings.



4.2.3. Shackle

A shackle is a tool made of mild steel, carbon steel, alloy steel, and Stainless steel 304 & 316. Shackle is functioned to connect or hook the sling with the lifting object. Shackle is usually used to lift goods, baskets, beams, machines, and other heavy objects. In this case, slings and shackles are important to be used as lifting aids.

Please note that this shackle can be divided into several types according to its raw material, its shape, and also its locking shape.

The detail about the types of shackles will be explained one by one:

1. Shackle Type Based on Its Raw Material.
   Based on the raw material, shackles can be divided into 2 types, namely:

   a. Shackle JIS type.

      This shackle is often referred to as galvanized shackle or galvanized D shackle. This type of shackle is made of mild steel / Malleable Steel. This shackle has the characteristic of not having a breaking load value which means it cannot be used to lift heavy goods or heavy objects. Because shackles of this type are not suitable for heavy applications, then this shackle is suitable for *fender*, *railings*, and Lashing (tie) applications.

   b. Shackle SWL.

      This type of shackle is made of carbon steel raw material which means a mixture of steel and carbon that has strong characteristics and has a breaking load value. Carbon iron is iron that contains between 0.5% to 1.5% carbon with small amounts of manganese, sulfur, phosphorus, and silicon. Because the raw materials have stronger characteristics, this type of shackle can be used for heavy applications, namely lifting and towing.

2. Shackle type based on its shape.
   Based on the shape, shackles can also be divided into 2 types, namely:

   a. D shackle.

This type of shackle is shaped like the letter D, therefore this shackle/seal is called D shackle. This type is only suitable for lifting applications that use chains or chain slings as lifting aids. Its shape which resembles the letter D makes the chain can be properly attached to the hole. This means that the chain cannot move or shake when installed and used to lift goods using this shackle.

b. Omega shackle.

This type of shackle is shaped like a horseshoe, but more precisely this type of shackle is shaped like an omega symbol "Ω". Therefore, this shackle is called the "omega" shackle. This type is mostly used by users for lifting or towing applications that use wire rope, such as wire rope sling. This omega shackle is designed to have a hook hole larger than the D shackle because it is adjusted to the size of the wire rope that is larger in diameter compared to the chain. This type of shackle can also fit more slings (1 shackle can be used with 2 wire rope slings). The hook hole that is almost circular makes the wire rope installed properly so as to reduce friction between shackle and wire rope when used. For additional information, this type of shackle can also be used for applications that use a webbing sling as a lifting tool with certain standard terms of use.

3. Shackle type based on its lock shape.
   Based on the shape of the lock, shackles can be divided into 3 types, namely:

a. “Screw Pin” Shackle.

This type of shackle uses a pin shape with a screw handle without using a lock. It just needs to be tightened to the maximum limit of the thread so as not to be detached. This shackle is used for Non-permanent applications (Applications that require shackles that can be disassembled easily).

b. “Round Pin” Shackle.

This type of shackle uses a pin shape with a lock at the end without using thread as a fastener.

This shackle is also used for non-permanent applications.

c. “Bolt & Nut Type” Shackle.

This type of shackle has a pin shape like a bolt head with bolt lock and pin lock. This type of shackle is safer because it is not easy to open. This shackle is used for more permanent applications, for example in offshore applications.

4.2.4. Wire Rope Sling

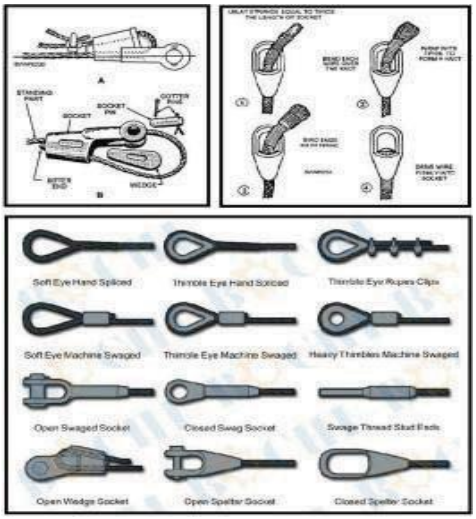
Wire rope is a steel rope made of several WIRE twisted to form STRAND, then some strands are twisted around the CORE to form a wire rope.

Wire Rope Sling is a wire rope that one or both ends have been terminated or customized as "eye". Wire rope sling is widely used in the field for lifting, towing, mooring vessels, lashing, and many more.

The manufacture of wire rope sling is customized, which means that this wire rope sling can be produced according to the specifications and needs of users in the field. Because it is made based on the user's request, some information is needed to make the wire rope sling, including:

1. Specifications of Wire Rope itself (Construction, Core, Origin, Size, Spin, Finishing)
2. Type of Termination you want to use.
3. The number of terminations to be made on the wire rope sling later, only at one end or at both ends.
4. For eye termination: (The size of the diameter of the eye, using thimble or not, using additional accessories or not such as Hook, Masterlink, Ring).
5. The length as requested by the user.
6. For Multi Legged Sling, the number of legs required.
7. The number of sling sets needed.

The following are the various types of terminations from Wire Rope Sling:



4.2.5. Round Sling

The next type of Sling is the round Sling. The round sling is a synthetic sling that is wrapped with a synthetic wrapper and formed circularly. The advantages of this Round Sling are as follows:

1. It is more durable.
2. If lifting with a choker position, the lifting position is more perfect. The webbing sling image above illustrates an example of lifting in a choker.
3. For a larger lifting capacity, the round Sling is thinner and lighter compared to other Synthetic Slings.

4.2.6 Chain Sling

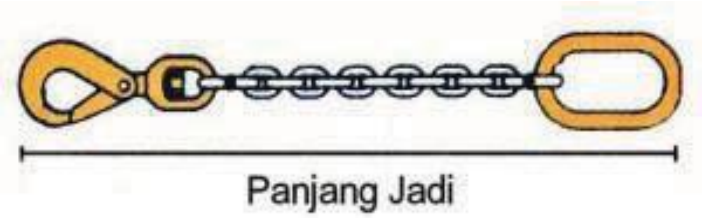
Chain sling in Indonesian is also called *rantai* sling. According to Wikipedia, chains are a series of connected links usually made of metal. A chain can consist of 2 or even more than 2 stringed links. There are several uses of chain, including:

1. Chains are designed to lift, pull, tie (choker) and secure something.
2. Chains are designed to help drive the machine (commonly used on machine rollers).

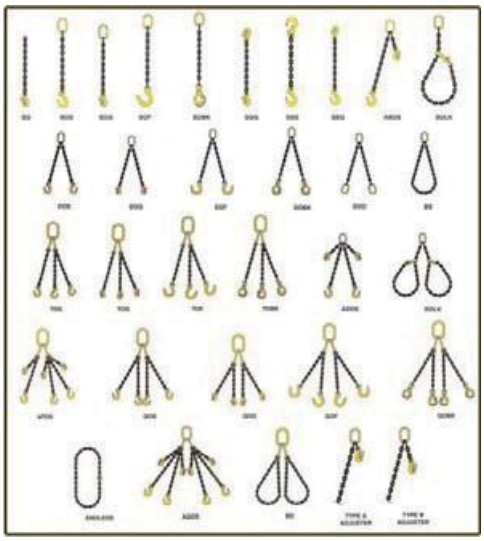
While Chain Sling is a chain whose ends are given accessories as lifting aids (Masterlink, Hammerlock and Hook). Chain sling is usually used for lifting and pulling. To make a Chain Sling, accurate information is needed so that the chain sling ordered by the customer will not be in the wrong size and accessories used or other factors. The information needed before making a chain sling is as follows:

1. Chain diameter size or chain sling capacity.
2. The number of sling legs in the chain sling.
3. The overall length of chain sling.
4. Accessories or other fittings needed or added to the chain sling (Hook, Ring, Masterlink, Shackle, etc.)

   To find out the overall length in accordance with point 3, an example with the picture is provided. Here's how to calculate the overall length of Chain sling:



While the various types of chain sling are as follows:



4.2.7 Webbing Sling

The third lifting tool is the webbing sling. The webbing sling or often referred to as a sling belt can replace a wire rope sling or chain sling in lifting and lashing (Choker). The webbing sling has more advantages compared to other tools. The advantages of webbing sling are:

1. It is lighter so it is easy and safe to use.
2. It is more flexible.
3. Rust resistance.
4. Do not cause damage or dirt to the cargo.
5. Easy to be inspected.

Various types of webbing slings and specifications are illustrated as follows:

Webb Sling Working Load Limits (Duplex)

Safety Factor 7:1						
Multi-Layer Slings Type	Webbing	Straight x 1	Choked x 0.8	Basket x 2	45° Basket x 1.8	90° Basket x 1.4
Duplex	Width	WWL KGS	WWL KGS	WWL KGS	WWL KGS	WWL KGS
Violet	50mm	1000	800	2000	1800	1400
Green	60mm	2000	1600	4000	3600	2800
Yellow	75mm	3000	2400	6000	5400	4200
Grey	100mm	4000	3200	8000	7200	5600
Red	125mm	5000	4000	10000	9000	7000
Brown	150mm	6000	4800	12000	10800	8400
Blue	200mm	8000	6400	16000	14400	11200
Orange	250mm	10000	9600	20000	18000	14000

4.2.8. Twist Lock

A twist lock is a locking hook used for locking the container when it will be lifted. A spreader has four twist locks. The twist lock receives a very large tensile load at the time of lifting the container. A container with a size of 40 ft, has a maximum total weight of 40 tons. The 40-ton load is attributed to the twist locks and is evenly distributed throughout the twist locks. The spreader has four twist locks, so each twist lock receives a load of 10 tons.

Twist Lock is a hook found in the spreader. It functions to lock the container when the container will be lifted/moved or stacked.

The twist lock on the gantry crane works hydraulically supported by electricity. The process of opening and locking the twist lock is done by using a switch located in the operator's cabin and when the twist lock is correctly positioned into the lifting hole, the twist lock can be locked.

The twist lock has a press sensor at every corner of the spreader. This sensor is useful to find out whether the twist lock has been correctly inserted into the container hole and is ready to be locked. If the twist lock has not properly entered the container hole, then the sensor will not give the signal, and the operator cannot order the twist lock to lock.

4.2.9. Hatch Cover On Board

Hatch cover is a very important equipment that the construction and mechanism must be regulated by the Classification regulation and International Load Line Convention 1966. This equipment serves as a cover for the hatch on the ship, and to protect the cargo inside from seawater that can enter the hold.

In its construction, the hatch cover is installed above the threshold of the hatch which has a minimum height of 600 mm (according to International Load Line regulation). In construction, certain types of hatch covers have a design that can sustain the container above.

Hatch covers are found on freighters, bulk carriers, or other types of ships that have cargo holds. Based on the design and function, the hatch covers are categorized into several types:

1. Pontoon Type Hatch Cover.
   This type consists of a hatch beam, a hatch cover, and a tarpaulin cover. The size of the hatch beam depends on the length of the pedestal (width of the hatch threshold), the distance between the hatch beam, and the distance from the hatch threshold transversely. The shape of the hatch beam construction is a beam with two blades. On the threshold of the longitudinal hatch, the hatch beam is placed in such a way on the pedestal of the hatch beam and locked with various types of locks.

   On top of the hatch beam, a hatch cover made of wood or metal is placed. The maximum weight of a hatch cover is 50 kg. The length of the hatch cover of the wood is determined by the distance between the hatch beam and the transverse hatch threshold. The wooden hatch cover is lifted and installed in a predetermined place therefore it is necessary to put a mark or number on each hatch cover to avoid any mistakes.

   According to classification regulation, all hatch thresholds on the weather deck and the upper deck should be covered with two layers of tarpaulin tied to the hatch threshold using clamp plates and wooden hatch pegs.

2. Sliding Pontoon Type Hatch Cover
   The system of opening or closing the hatch is done by pushing or pulling each section of the hatch cover and arranging it in a special place. The arrangement of the hatch cover sections can be made towards the transverse hatch (the longitudinal direction of the ship) or towards the threshold of the longitudinal hatch (transverse direction of the ship).

   Each section rotates 90 degrees, when the section is covered in hatches it is arranged and not used. One example of this system

is the Mac - Gregor hatch cover, a type of Single Pull Hatch Cover consisting of five sections of hatch cover that are connected to each other by chains or small straps. The hatch cover is opened with the help of a series motor, a steel rope through a roll placed on the main mast, and the steel rope ends up connected with the last hatch cover section.

After the steel rope is pulled, each section of the hatch cover will push each other and start to derail on the wheels and special rails. On the side of each section, three wheels are installed and the wheels at the end derail on the inner rail while the outer rail has a continuation of the hatch boundary. Conclusions:

1. Pontoon Type Hatch Cover still requires a tarpaulin so that water does not enter through the gaps of the hatch covers which are made of wood.
2. Sliding Pontoon Type Hatch Cover usually requires the support of motor series, so this type of hatch cover is very uneconomical.

CHAPTER V.
PORT SERVICES

Based on the Law on Shipping No. 17 of 2008 and Government Regulation No. 64 of 2015 regarding Port Management, the function of regulation and construction, control, and supervision of port activities is carried out by port organizers, namely port authorities and port organizing units.

5.1. Ship Services

Before carrying out activities at the port, shipping companies, stevedoring companies, and freight forwarders jointly submit requests for ship and cargo services by filling in the form of PPKB (Application for Ship and Cargo Services), which contains the following requests:

1. Ship anchoring/mooring service;
2. Ship water service;
3. Ship pilotage service
4. Service of cargo; by completing the supporting documents, among others:
    a. Master cable.
    b. Certificate of Tonnage and Measurement.
    c. Ship's particular.
    d. Manifest.
    e. Loading list.
    f. Stowage plan.

g. Work order for loading and unloading activities (*Surat Perintah Kerja Bongkar Muat/SKBM*).
h. Ship Berthing Permit (*Keputusan Penetapan Penyandaran Kapal/KPKK*).
i. Operation planning (OP).
j. Affidavit of commitment to maintaining the cleanliness of the port.
k. 1B1 special for tanker integrated pipeline service.
l. Truck losing license.
m. Upper payment receipt.

After completing the documents, the process of service of ships and goods is established at the PPSA forum, which is attended by:

1. PT (Persero) Pelabuhan Indonesia as the port manager.
2. Port administrator as general supervisor.
3. Shipping company as user.
4. Stevedoring Company (PBM) as the executor of loading and unloading activities at the port.
5. Freight Forwarder (EMKL) as the representative of the owner of the goods.
6. Customs and excise as an inspection officer for the completeness of documents.
7. Quarantine of animals and plants as an inspection officer for the implementation of human, animal, and plant quarantine to prevent disease transmission.
8. Surveyor as a survey officer for goods to be unloaded or loaded on the ship.
9. *Ban* to facilitate service at the port.

The implementation of the service was mutually agreed and signed by PT (Persero) Pelabuhan Indonesia as the port manager and the harbormaster as the coordinator of the Integrated Service Center. Then, the results of the P2T are disseminated to relevant agencies, including Harbormaster, Customs and Excise, Quarantine, shipping

companies, stevedoring companies, Freight Forwarders, and other relevant agencies.

After the determination in PPSA, operationally the service of ships and cargo can be described as follows:

1. Ship berthing service.
    a. Periodically (weekly) the shipping company submits *ship arrival lists* (SAL) for one-week planning of ships that will arrive at the port.
    b. Shipping companies submit requests for arrival ship services with the Application for Ship and Cargo Services (PPKB) form attached with the upper payment receipt.
    c. PPSA issues the ship berthing permit.
2. Ship mooring service.
    a. No later than 1 x 24 hours before the ship arrives, the shipping company together with the stevedoring company submit a request for ship mooring service, loading and unloading activities, and cargo stacking with the Application for Ship and Cargo Services (PPKB) form to PPSA attached with the upper payment receipt.
        a) For the ship that is required to pay the upper.
        b) Not attaching an upper payment receipt if it has met the conditions.
    b. Port (one-stop service office/PPSA) plan, assign, and approve ship mooring services, loading and unloading activities, and cargo stacking based on the order of arrival and priority scales.
    c. Technical service of mooring vessels, the loading and unloading of cargo, and stacking of cargo.
3. Mooring transfer service.
    a. Shipping companies together with stevedoring companies submit requests for mooring transfer services and loading

and unloading activities with the Application form for Ship and Cargo Services (PPKB) to the Port Integrated Service Center (P2T).

b. The Port Integrated Service Center (P2T) plans, decides, and approves mooring transfer service, loading and unloading activities, and cargo stacking based on priority.

c. Technical services of mooring transfer service, loading and unloading activities, and goods stacking.

4. Unberthing service.

   a. The shipping company submits a request for unberthing ship service using the Application for Ship and Cargo Services (PPKB) form to the port.

   b. Unberthing ship technical service.

   c. Issuance of the completed bill.

   After completing the administration at the Port's One-Stop Service Office (PPSA), the ship services are given, including pilotage, tugboat, mooring, and ship berthing service. The services are mainly categorized into 2: ship services, namely pilotage services (pilotage, tugboats, and mooring) and ship mooring services (quays used by ships for mooring/berthing).

5. Pilotage Services (Pilot boat and Tugboat)
   The pilotage service will be processed if the customer brings the Application form for Ship and Cargo Services (PPKB) that has been granted by the Port Integrated Service Center (P2T). The ship is then permitted to berth and unberth with the following procedures:

   a. Based on requests for ship and cargo services, the Pilotage and tugboat division provide work orders for each work squad.

   b. After the service is given, the evidence of the use of pilotage and tugboat service in the form of 2.A1 will be issued.

c. Based on form 2.A1, the pre-receipt is made and sent to the Commercial Division.

d. Commercial Division issues bill receipt.

e. The customer makes the payment for pilotage and tugboat service.

The calculation of pilotage service is described as follows:

Fixed rate: Fixed rate x visits x GT ship (based on GT ship)
Variables rate : GT x variables rate
+
Total : Rp.....

While the calculation of tugboat service is described as follows:

Fixed rate: Fixed rate X GT X hours of service use (based on GT ship)

Variables rate : GT ship x hours of tugboat use x variables rate + Total :
Rp.....

6. Berthing and Mooring Service.

Berthing and mooring services are also related to the pilotage and tugboat services mentioned previously. Before the ship moored, she has to wait for several services, such as pilotage service, and tugboat service. Most of them wait for mooring and the order from the ship agent that the ship is anchored first before berthing.

All of them are related to the procedure which is in line with the services set out in the PPSA forum by submitting requests for ship and goods services.

As for the form or payment receipt for mooring services with the issuance of pre-receipt of 2A2, the basis of the calculation is as follows:

a. Calculation of berthing services.

Formula : GT ship x rate x visits (1 – 10 days =1 visit)

b. Calculation of mooring services

Calculation of mooring service rates based on ship berthing hours, namely the ship's *last line* – the ship's *first line*

= the number of etmal (1 etmal = 24 hours)

Formula : GT ship x etmal x rates

Pre-recipt of 2A2 is made by the Pilotage and Tugboat Service Agency (Dinas Pemanduan dan Penundaan Kapal), then forwarded to the commercial division, and the bill receipt is made. Then the service users make payment, and the service process is completed.

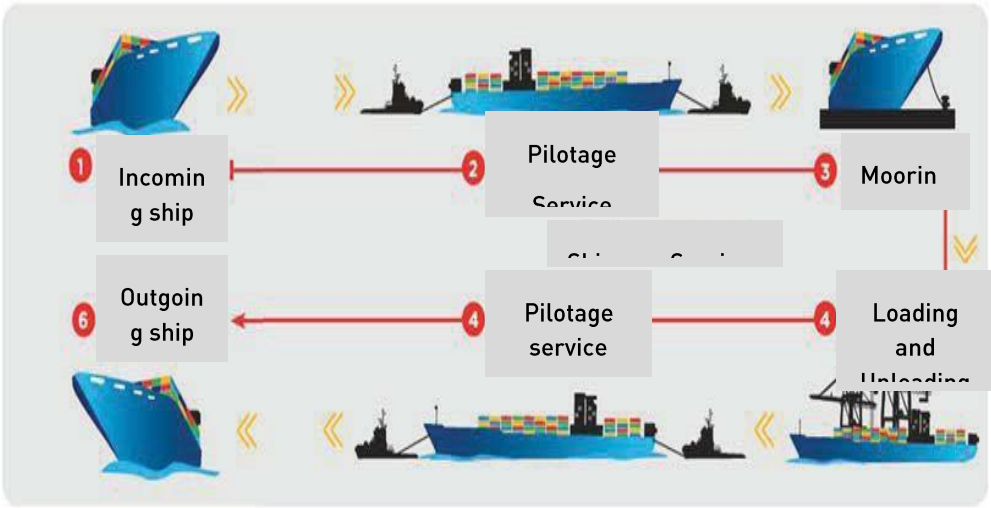


Figure 34. Ship services.

5.2. Goods Services

5.2.1. Quay Services for Goods

The unloading and loading of goods at the port are conducted at the quay. The service process is done by making a request for ship and goods services (PPKB) for freight services. The payment of quay services is based on BL/manifest and excess size of goods (KUB) which is then written in the form of the use of quay services (BPJD).

The formula of quay service rate: Tonnage of goods (ton/m3) x rates

5.2.2. Goods Service in the warehouse

Goods Service in the warehouse or in the stacking yard will be provided if the service user:

1. Applying for SBO to the owner of the warehouse/stacking yard by attaching BL/manifest of the goods that will be stacked
2. The service of the stacking yard will be given if the cargo has been released or based on the agreement of the owner of the goods and the warehouse operator.
3. In general, the bill receipt for the use of stacking space is issued based on:
    a. BL (manifest items to be stacked in the warehouse)/DO;
    b. KUB (excess size of goods);
    c. The length of time the goods are stored in the warehouse.
    d. The formula for Stacking space usage service:

        Ton/m3 of goods x rates x Length of stacking

5.2.3. Vehicle Pass Rates

A vehicle pass is charged to vehicles that are going in and out of the port, both those who carry out activities and those who do not carry out activities. Vehicles that carry out unloading or loading are subject to vehicle pass rates.

The formula of vehicle pass:

(Tonnage of goods/7 Tons) x Rates.

Note: Dividing goods in accordance with port conditions.

The goods service is charged based on:

1. Pre-receipt proof of quay services use.
2. Pre-receipt proof of stacking space use.
3. Pre-receipt proof of vehicle pass money.

Points 1, 2, and 3 are submitted to the Commercial Division, then the Commercial Division will issue a Temporary Calculation Receipt of

List for Stacking Rent and Quay Money, then the service user makes payment to the bank, and the service process is completed.

Figure 35. Goods service flow.

5.2.4. Procedures of Container Service

The following are things related to container service procedures. Container loading/unloading operating system at the port.

There are 2 conditions when carrying out the container loading and unloading operating system:

1. FCL (full container load) is done by:
    a. Unload the filled and empty containers from ships, transport (*haulage*), lift-off, and arrange it (stacking) on the stacking yard (*container yard)*.
    b. Lift on *the* filled and empty containers, transport (*haulage)*, and load them onto the ship.
2. LCL (Less than container load) is done by:
    a. Unload the filled container from the ship, transport (haulage), lift off, stack them in the container yard (CY), lift on, transporting (haulage) to CFS, releasing, and arranging it at the stacking space.
    b. Lift on the filled container of CFS area, transport (haulage) to the stacking yard, lift off, arrange (stacking), lift on, transport (haulage), and load it onto the ship.
3. System of Container/Cargo Service.
    The container service system starts from the entrance gate until the arrival at the container yard and onto the ship, or vice versa. It is an integrated service system, where the service forms a chain that cannot be separated and arranged specifically under one management, namely the container terminal. In the implementation of operations, the container terminal is inseparable from:
    a. Freight forwarding.
    b. Shipping line (shipping company).
    c. Consignee (the receiver).
    d. Shipper (the sender).
    e. Customs (*Bea dan Cukai*).
4. Service of receiving container for FCL.
    a. Freight Forwarder submits an application for a request of services/models 1E and Export Declaration to the division that issues the bill receipt and yellow card (operation

planning determines the position of the container in CY and writes it on the yellow card).

after payment, the Freight Forwarder hand in the bank receipts, receipt, 1E model and Export Declaration, as well as yellow card to the export gate executor section.

b. The export gate executor records it and hands in the yellow card to the trailer driver.

c. Arriving at CY, the trailer driver hands in the yellow card to the executor of the export yard.

d. Export yard executor heads to the location of the stacking space according to the yellow card instructions and physical executor (lift off).

5. Service of receiving container for LCL.

a. Freight Forwarder submits an application for services/1E model and Export Declaration to the division that issues the receipt based on BPRP (proof of the use of stacking yard) made by CFS export executor.

b. After the payment, the Freight Forwarder hands in bank receipts, 1E model, receipts, and Export Declaration and submits them to the export CFS (report receiving) executive department.

c. Physical execution (goods are stacked in the warehouse).

6. Service of delivery container for FCL

a. Freight Forwarder submits an application for services/1E model and DO (delivery orders) to the division which issues the receipt and blue card.

b. After payment, the Freight Forwarder hands in bank receipts, 1E model, receipts, DO, and blue card to the import gate executor section.

c. Import gate executor records it and hands in the blue card to the trailer driver.

d. Arriving at CY, the trailer driver hands in the blue card to the import executor to the location of the stacking according to the blue card instructions and physical execution (*lift on*).

7. Delivery service for LCL status
   a. Freight Forwarder submits an application for services/1E model and DO to the division that issues the receipt based on BPRP (proof of the use of stacking yard).
   b. After payment, Freight Forwarder hands in bank receipts, 1E model, receipts, and DO to the execution section of CFS import (report delivery).
   c. Physical execution (goods out of the warehouse).

Figure 36. Container loading service.

5.2.5. Container Documents

1. Documents for loading and unloading containers are:
   a. Master cable.
   b. Manifest.
   c. Discharging list.

d. Loading list.
e. Ship profile/ stowage plan.
f. Bay plan.
g. Port log.
h. Tally sheet.
i. Master statement.
j. Ship condition report.
g. Lay out (stacking planning at the CY).

2. Documents for receiving containers are:
   a. Service provision/1E model (SBO).
   b. Cargo calculation receipt.
   c. Completed bank receipt.
   d. Yellow card.
   e. Export declaration.
3. Documents for container delivery are:
   a. Service provision /1E model (DO).
   b. Unloading calculation receipt.
   c. Completed bank receipt.
   d. Blue card.
4. Documents for receiving goods are:
   a. Service provision/1E model (SBO).
   b. Cargo calculation receipt.
   c. Completed bank receipt.
   d. BPRP (proof of the use of stacking yard).
   e. Export Declaration.
   f. Tally sheet.
   g. Stuffing list.

5. Documents for Goods delivery are:
    a. Service provision /1E model (DO).
    b. Unloading calculation receipt.
    c. Completed bank receipt.
    d. BPRP (proof of the use of stacking yard).
    e. Tally sheet.
    f. Stripping list.

Table 5.1. Document Requirements for Ship and Goods Service.

DOCUMENT REQUIREMENTS FOR SHIP AND GOODS SERVICE

Ship service	***Goods service***
Ship particular for the ship's first visit and/or changes on the ship master on the SIUK database of Tanjung Emas Port;	*Copy of Cargo Manifest / list of unloading/invoice/packing list/bill of lading/Import Declaration (for imported goods);*
Certificate of Tonnage and Measurement;	*Notification letter of loading and unloading work plan;*
Master cable;	*Statement of loading and unloading work (Surat Pernyataan Kerja Bongkar Muat or SPKBM);*
Clearance In/Out from Harbormaster; Ship Arrival Notice that has been verified by the Port Authority of Tanjung Emas;	*Operation planning;*
Foreign Ship Operation Notice (Pemberitahuan Pengoperasian Kapal Asing or PPKA);	*Shipping instructions (SI), for loading the goods into the warehouse/stacking yard;*
Agency Appointment Letter (for ships with agency status);	*Application letter for the entry or exit of goods to the General Manager cq. Operations manager, for activities from the warehouse/stacking yard.*
International Ship Security Certificate (ISSC) for the ship that will conduct activities in the area of complying ISPS Code;	
Other documents needed from the authorized agency.	

CHAPTER VI.
SHIP BERTHING PROCESS

6.1. Ship Berthing Process At The Port

Upon the arrival of the ship at the berth, there is a sequence of berthing and unberthing procedure at the port that must be followed. The procedure refers to the existing regulations and laws concerning shipping.

There are several techniques of ship berthing and unberthing based on certain conditions, for example by considering the condition of current and waves. It is important to refer to the Procedure of Ship Berthing and Unberthing at the Port. Following are the example of ship berthing/unberthing preparation.

1. All instructions are given from the navigation bridge
2. However, the officer of the watch must report any dangerous situations during the mooring operation.
3. Drums/winches must be turned on at least one hour before the mooring operation begins
4. At the time of receiving or releasing a tugboat, a clear signal must be understood and recognized between the bridge and the mooring station.
5. All mooring operations must be carried out under the responsibility of the officer
6. Before arrival, Chief Officer must make sure all stoppers and ropes are ready to use. The rat guard must be installed for each mooring line.

7. Send only the number of mooring lines you can handle at a time. Do not send the entire mooring lines at the same time when the ship is approaching the berth or adjusting its position
8. To adjust the position of the ship, use only one spring line, head line, and stern line.
9. Do not use different types of mooring lines. For example, if the head line is made from nylon, then all head lines must be made of nylon of the same diameter.

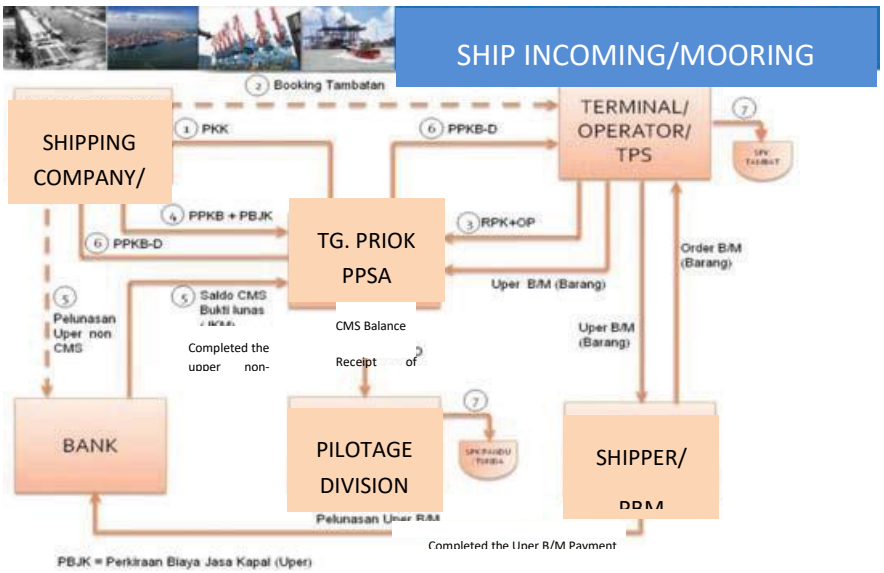


Figure 37. Ship berthing service.

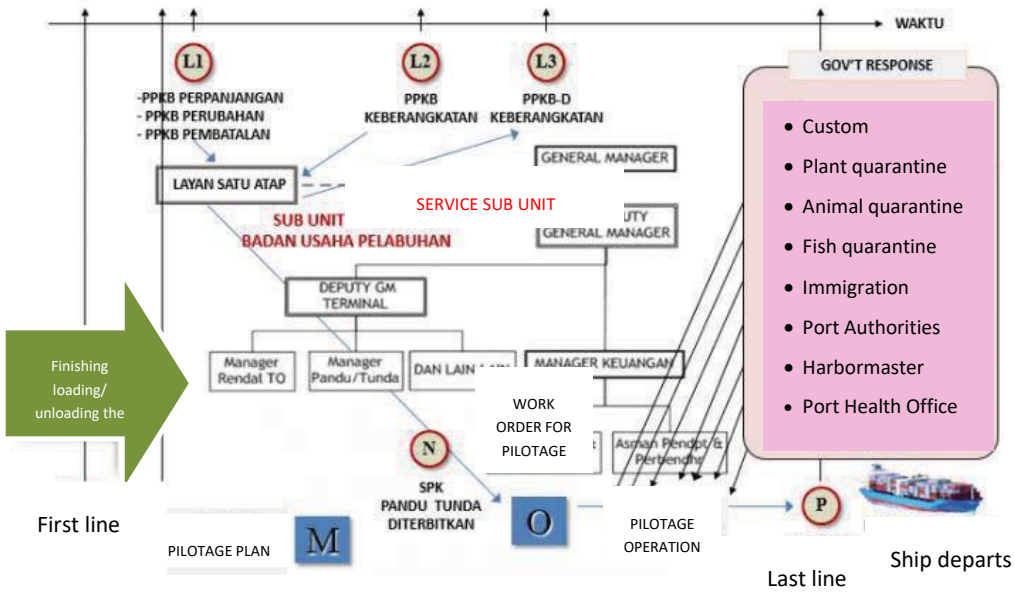


Figure 38. Procedure of inward dan outward ship.

6.2. Mooring System

Mooring lines are ropes used to moor a ship at the quay or to tow a ship by a tugboat or by another vessel. Unmooring is a rope used to release a ship at the quay or used to release a ship by a tugboat or by another vessel.

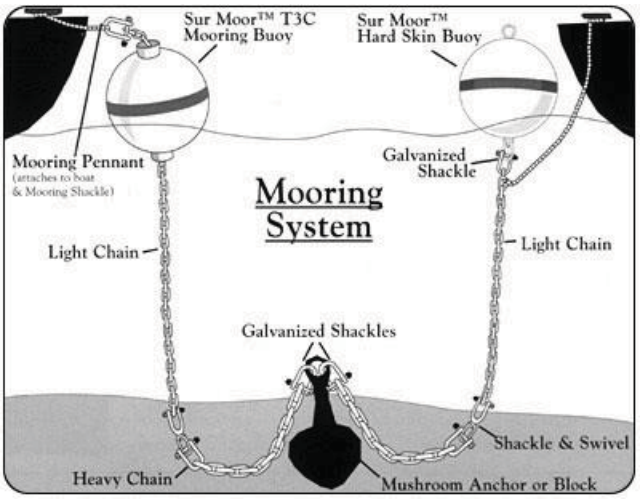


Figure 39. Mooring system.

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Port Services, Facilities and Operations

Indonesia is an archipelagic country comprising thousands of islands which leads to the fact that the country's territory is mostly water, Due to this geographical special condition, a ship is a fundamental means of transportation for this country, A port as a place for berthing the ship, boarding and disembarking passengers, and cargo loading activities is also inevitably needed,

ISBN: 978-623-8141-19-7

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Photo by: Asiatoday