

Chapter 11

Ocean Transportation

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- Types of Service
- Size of Vessels
- Types of Vessels
- Flag
- Non-Vessel-Operating Common Carriers
- Security

Types of Service

Ocean cargo moves under one of two types of services:

- Liner Service

A service provided by a ship that operates on a regular schedule, traveling from a group of ports to another group of ports.

- Tramp Service

A service provided by a ship that does not operate on a regular schedule and is available to be chartered for any voyage, from any port to any port.

Vessel Measurements (Weight)

- Deadweight Tonnage

The total carrying capacity of ship, measured in long tons or metric tonnes, and is determined as the difference in water displacement when the ship is empty and when it is fully loaded.

- Cargo Deadweight Tonnage

Obtained by subtracting the weight of the bunker, crew-related items and stores for a specific voyage. It is the actual cargo capacity of a ship for a given voyage.

It is the measure of greatest interest to shippers, as it is the theoretical carrying capacity of a ship.

Vessel Measurements (Volume)

- Gross Tonnage

The total *volume* of a ship's carrying capacity, measured as the space available below deck, and expressed in tons, which are in this case hundreds of cubic feet.

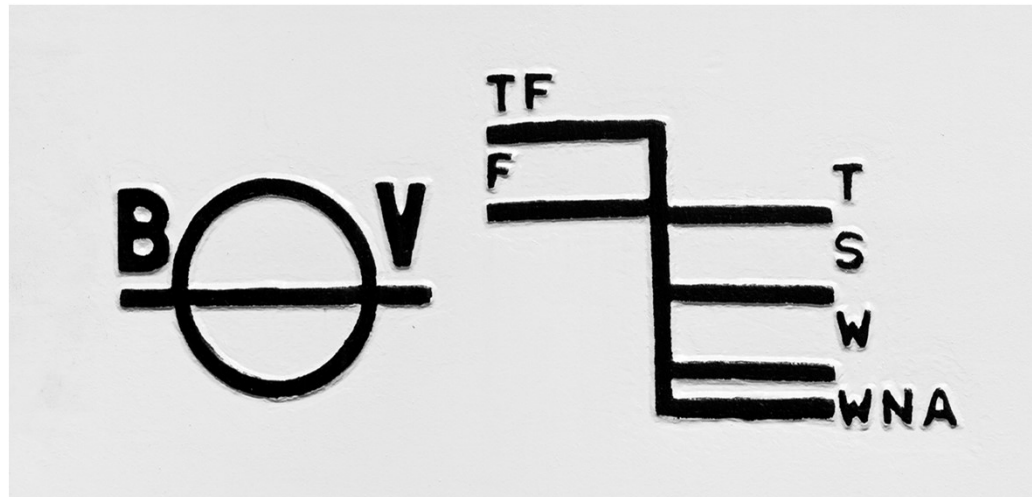
- Gross Registered Tonnage (GRT)

Gross Tonnage calculated a specific way, generally for the purpose of determining the fee that a ship will pay to use a canal (Panama GRT, or Suez GRT).

- Net Tonnage

Obtained by subtracting the volume occupied by the engine room and the space necessary for the operation of the ship (crew quarters, bridge, engine room, ...etc.) from the gross tonnage.

Plimsoll Mark & Load Lines



- The Load Lines indicate how heavily a ship can be loaded.
- The Plimsoll Mark shows the Classification Society of the ship.

TF: tropical fresh water — F: fresh water — T: tropical line S: summer line —W: winter line — WNA: winter North Atlantic line.

Size of Vessels

Multiple categories of vessels exist:

- Panamax
A ship of the maximum size that can enter the locks of the Panama Canal. The locks are 110 feet wide, 1000 feet long.
- Neo-Panamax
A ship of the maximum size that can enter the newer locks of the Panama Canal. The locks are 180 feet wide, 1,400 feet long.
- Post-Panamax
A ship that is too large to enter the locks of the Panama Canal.
- Handy Size
A ship in the 10,000 to 50,000 dead-weight ton range.

Size of Vessels

- Suez-Max
A ship roughly 150,000 dead-weight tons, the maximum size that can fit through the Suez Canal. The size changes as the canal is expanded regularly.
- Cape-Size
A large dry-bulk carriers of a capacity greater than 80,000 dead-weight tons. The term relates to the ships that originally could not fit through the Suez Canal and had to go around Africa by way of the Cape of Good Hope.
- Aframax
A large oil carrier of a capacity between 80 and 120,000 dead-weight tons. Named after the Average Freight Rate Assessment system.

Size of Vessels

- Very Large Crude Carrier (VLCC)
An oil tanker of up to 300,000 dead-weight tonnage.
- Ultra-Large Crude Carrier (ULCC)
An oil tanker of more than 300,000 dead-weight tonnage.
- Very Large Ore Carrier (VLOC)
A very large ore carrier, of more than 200,000 dead-weight tonnage.
- Ultra Large Ore Carrier (VLOC)
A very large ore carrier, of more than 300,000 dead-weight tonnage.

Types of Cargo

Ocean cargo is generally divided into four categories:

- Containers—Cargo that is placed in containers before it is loaded onto a ship. Cargo containers are metallic boxes that are 8.5 x 8 x 20, called 20-footer, or 8.5 x 8 x 40 feet, called 40-footer.
- Breakbulk—cargo that is packaged (bales, boxes, drums, crates, pallets) but not containerized. Vehicles are also considered break-bulk cargo.
- Wet bulk—liquid cargo that is loaded directly into the hold of a ship.
- Dry bulk—dry cargo that is loaded directly into the hold of a ship; although dry, it takes the shape of the hold. Grain, for example.



Containers aboard a containership. 20-footers on the left, 40-footers on the right, with a 45-foot container on the top of the stack on the right.

Source: unknown



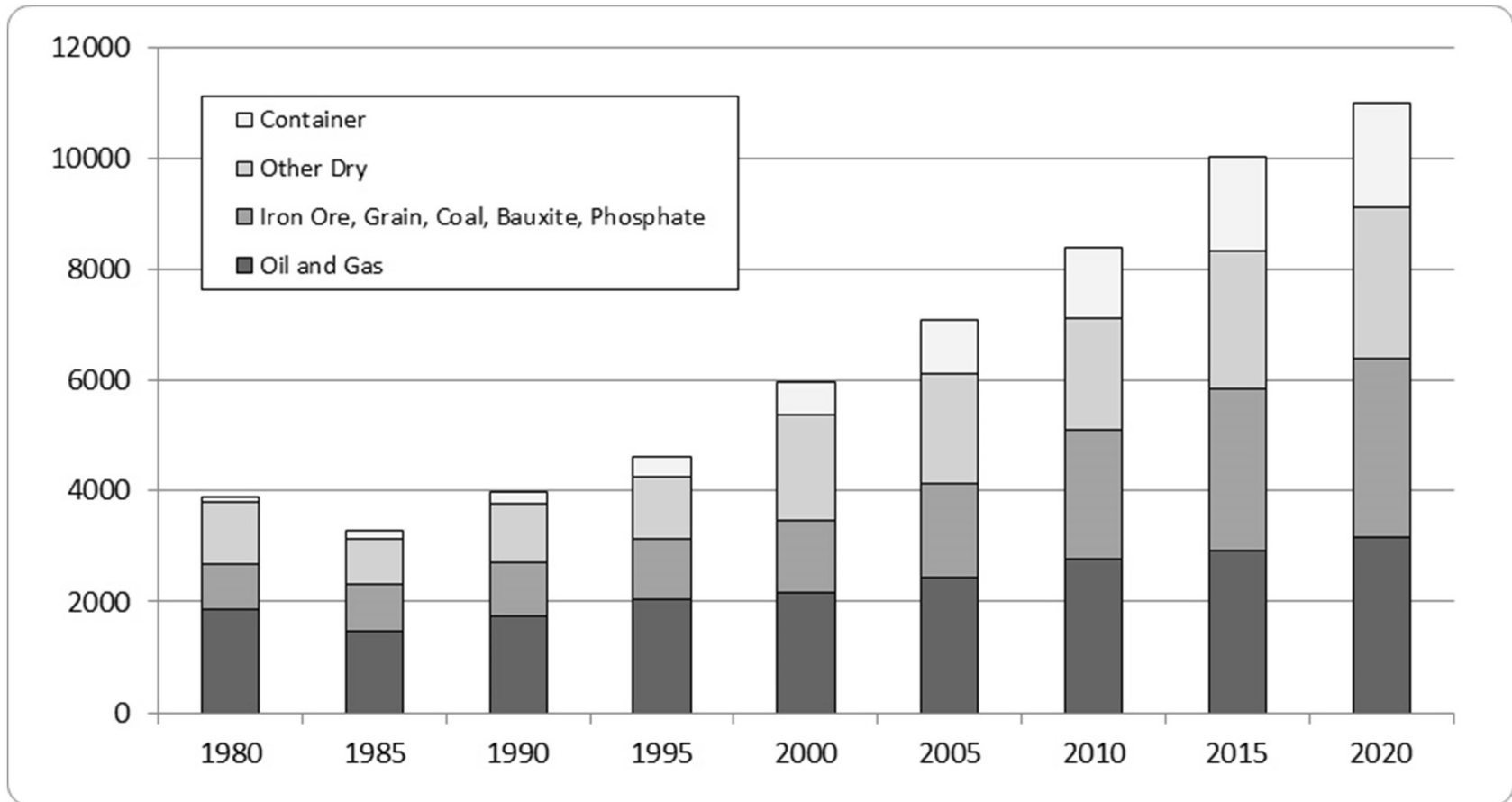
Breakbulk cargo is either too heavy or too large to be placed in a container.
Source: May Chanikran



Dry-bulk cargo is placed directly into the holds of a ship and fills them like a liquid would.
Source: unknown

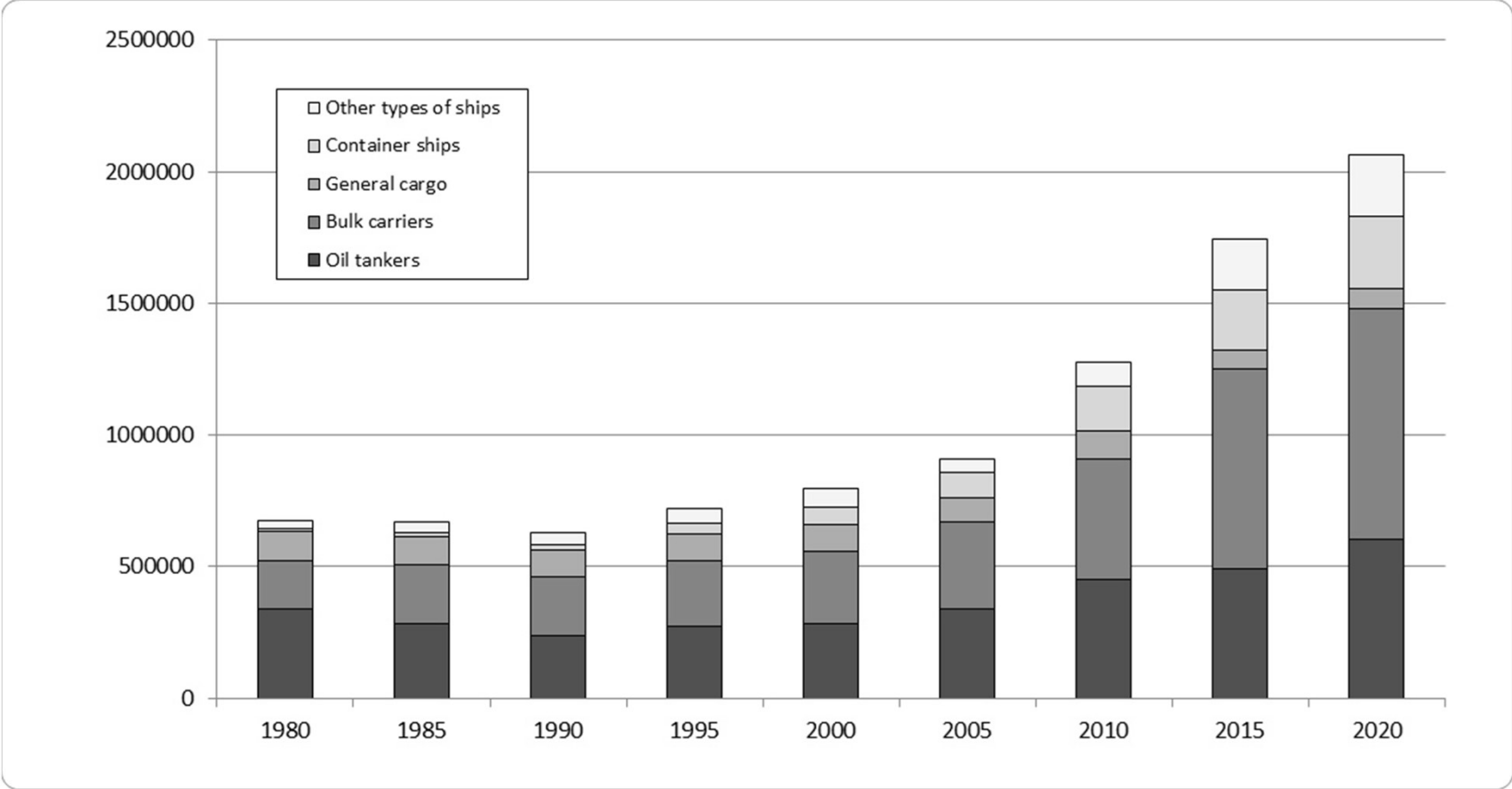


Wet-bulk cargo is liquid, such as petroleum oil transported by train.
Source: National Energy Board, Canada



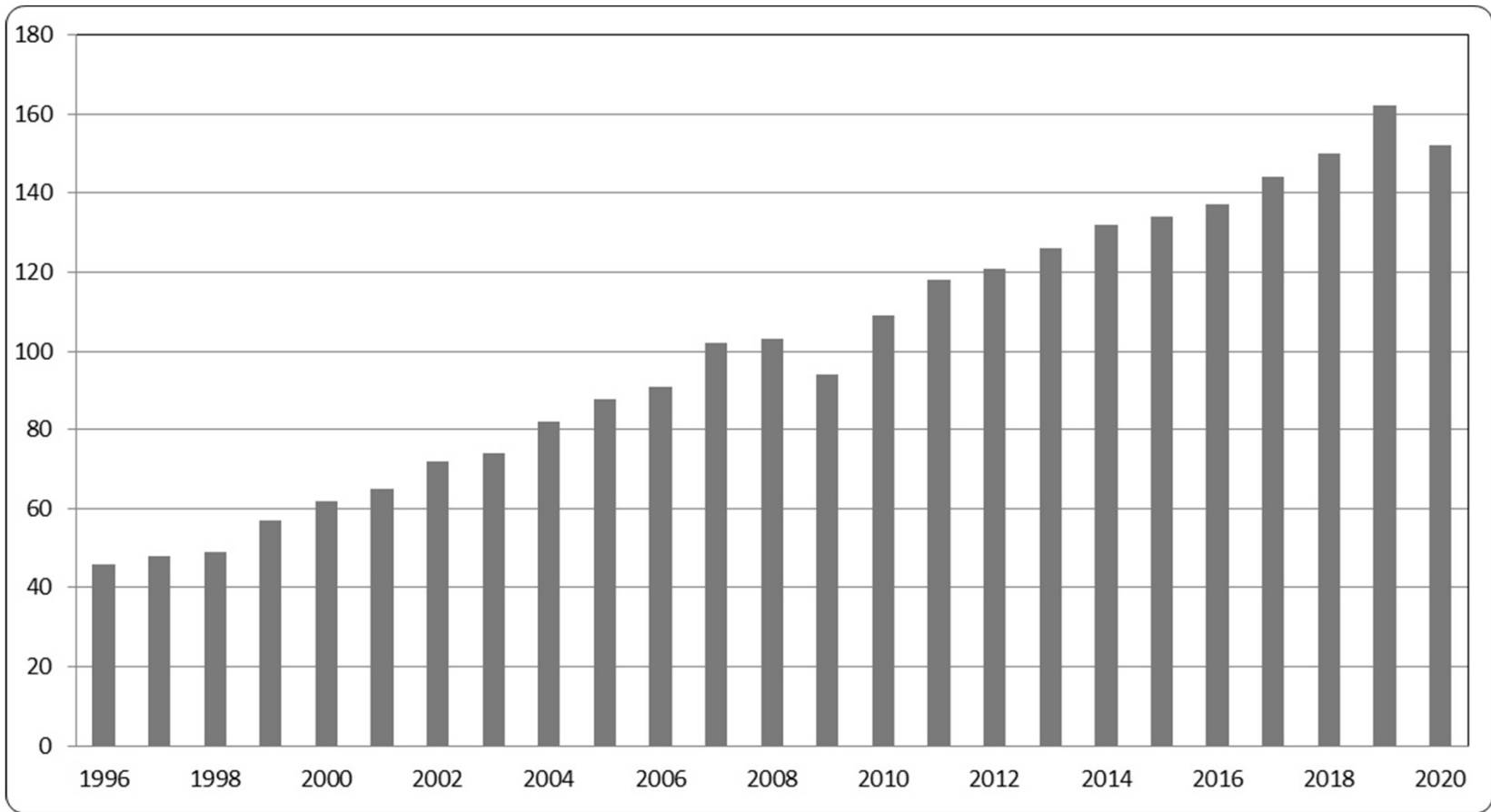
Volume (in millions of tons) of ocean transport, by type of cargo.

Source: Review of Maritime Transport



Worldwide ship capacity (in millions of DWTs), by type of cargo.

Source: Review of Maritime Transport



Worldwide transport of containers (in millions of TEUs).

Source: Review of Maritime Transport

Types of Ships

- Container Ships
- Roll-On/Roll-Off Ships
- Break-Bulk Ships
- Combination Ships
- Crude Carriers
- Product and Chemical Carriers
- Dry-Bulk Carriers
- Gas Carriers
- Supply Ships
- Heavy-Lift Ships



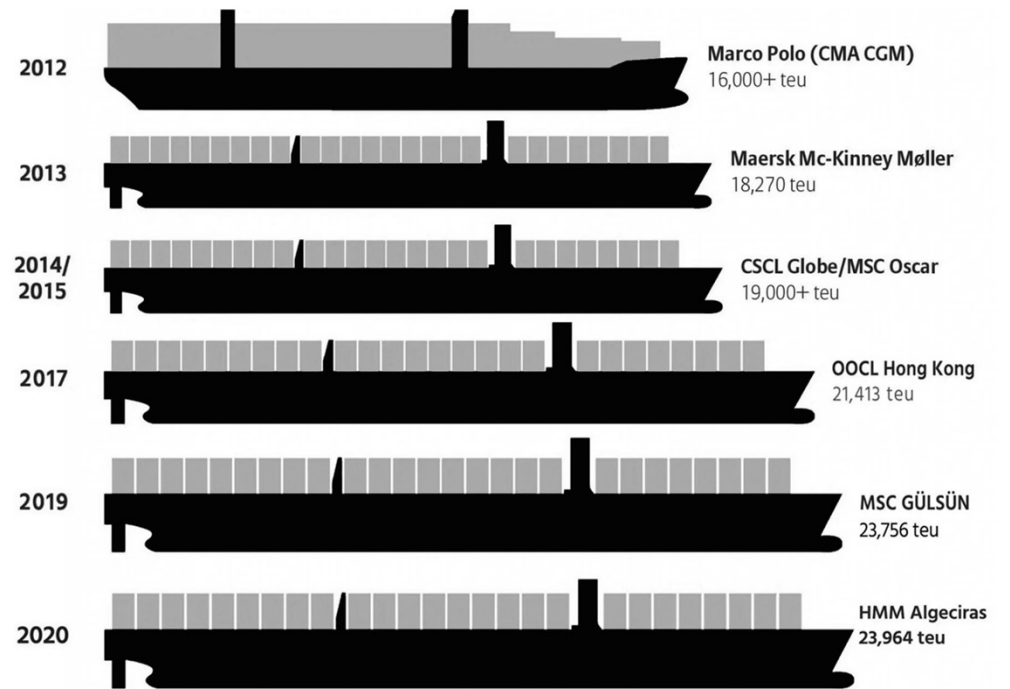
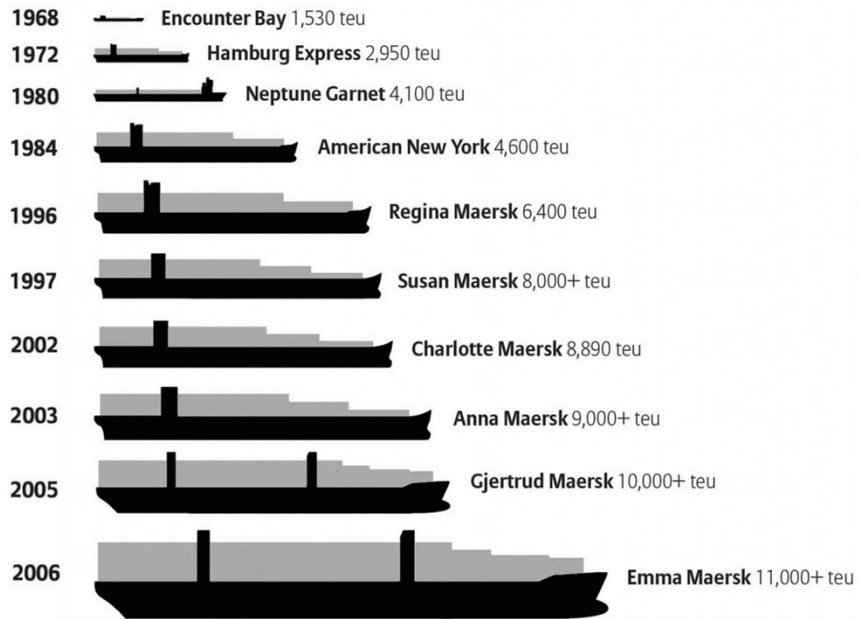
A Panamax containership in the Panama Canal locks, easily identifiable by its 13 containers abreast.

Source: Elena Fernandez Z



A Post-Panamax containership with 24 containers abreast, the HMM *Algeciras*.

Source: ArnoudNL



The evolution of container ship sizes, from the *Encounter Bay* in 1968 to the HMM *Algeciras* in 2020 (not to scale).

Source: Allianz Global Corporate and Specialty.



Containers placed in the holds (below deck) of containerships are guided by slides.

Source: Prasit Rodphan



Containers placed on the deck of containerships are tied to the ship by lash bars and twist locks.
Source: Ole Tange



Some containerships no longer have a deck and place all containers into slides. They are called hatchless containerships.

Source: Philip Lange



A roll-on roll-off [RORO] ship allows wheeled cargo to be driven onboard the ship with a ramp.
Source: James R. Martin



A roll-on roll-off [RORO] ship is a floating parking garage.
Source: Port of Marseille



A Pure Car Carrier [PCC] is a RORO ship designed to only accommodate automobiles (and nothing larger).

Source: unknown



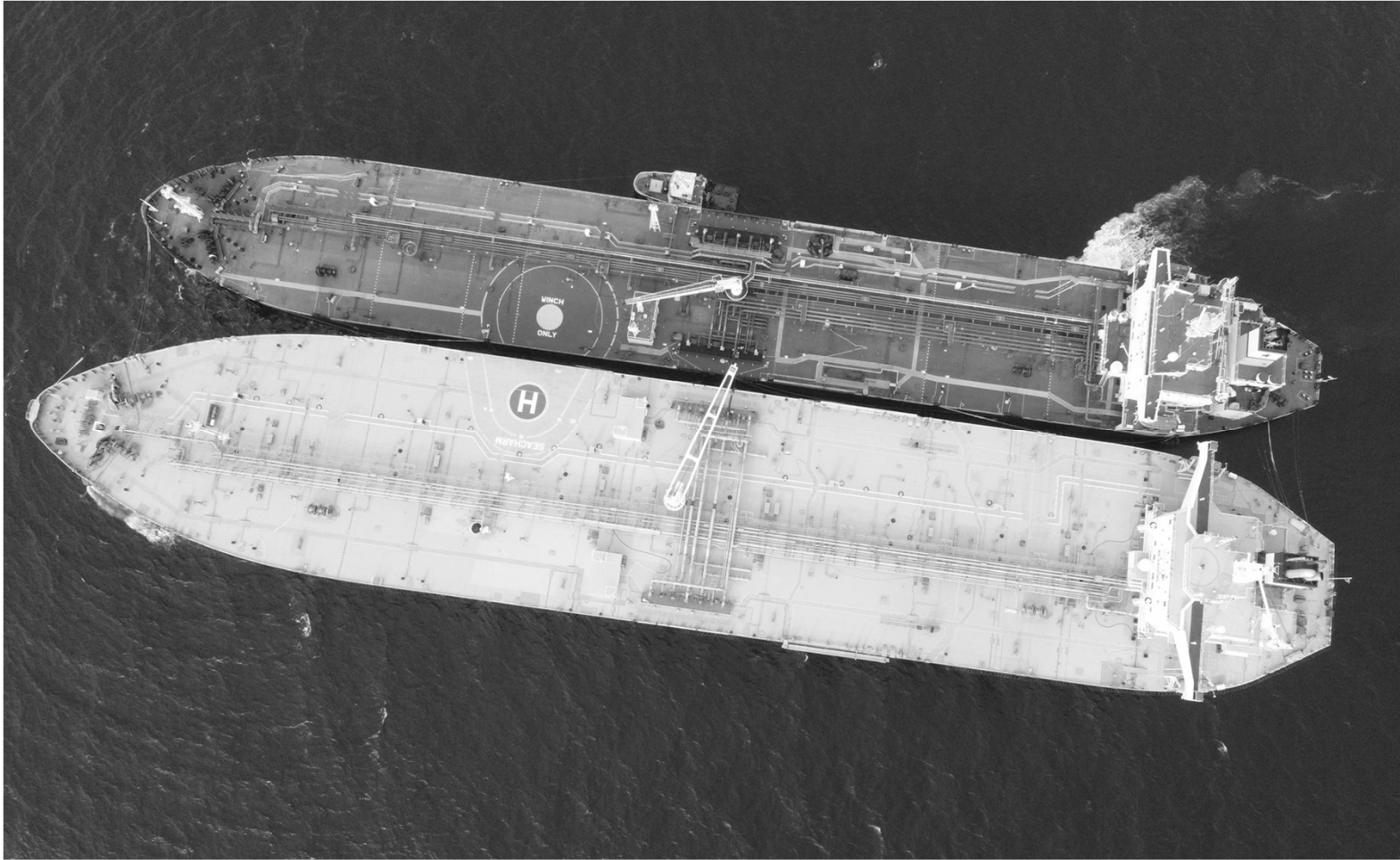
A general-cargo ship carries breakbulk cargo that is placed directly in the holds of the ship.
Source: Wathit Kettap



A combination ship carries containers, breakbulk, and roll-on roll-off cargo.
Source: Losinjska Plovida



A very large crude carrier (VLCC) in port.
Source: Kevin Nieuwland



An ultra large crude carrier (ULCC) lightering into a smaller crude carrier at sea.
Source: Erkut Acar



A product carrier (chemical carrier) with its network of pipes and tanks.
Source: Andrejs Polivanovs



A liquefied natural gas carrier with its characteristic spherical tanks.
Source: Vladimir Serebryanskiy



A dry-bulk carrier with hatches open, loading coal in Australia.
Source: Aerovista Luftfotographie



A supply ship, used to provide support to oil platforms and other ships at sea.
Source: unknown



A heavy-lift ship, used to transport very large cargo. The MV *Blue Marlin*.
Source: unknown

Flag

According to international convention, every ship must be registered in a specific country and fly that country's flag.

The country in which a ship is registered determines:

- The laws that are applicable onboard the ship (the ship is an extension of the country's territory)
- The taxes that the ship owners will pay
- The regulations that are followed onboard the ship, and their corresponding costs.

In most instances, ship owners have the ability to choose the flag that their ship will fly.

Flag Choice

Ship owners tend to choose flags that have low costs and few regulations. Such flags are called **flags of convenience**.

The countries that are considered to have “flags of convenience” are:

- Panama
- Liberia
- as well as a handful of other small countries.

Not all countries that allow ships from any nationality to fly their flag are “flags of convenience.” Most just have either an open registry or a secondary registry which are just convenient to ship owners.

Fleet by Flag of Registry

Country	Number of Vessels	Total DWT (in 000s)
Panama	7,886	328,950
Liberia	3,716	274,786
Marshall Islands	3,683	261,806
Hong Kong	2,694	201,361
Singapore	3,420	140,333
Malta	2,207	115,879
China	6,192	100,086
Bahamas	1,381	77,869
Greece	1,294	68,631
Japan	5,041	40,323

Number of Vessels and dead weight tonnage (2020) of worldwide fleet.

Source: Review of Maritime Transport

Non-Vessel-Operating Common Carriers

Non-Vessel-Operating Common Carriers (NVOCC) are shipping companies that do not own or operate their own ships.

They operate by purchasing space on a ship on a given voyage and then selling this space to companies that need to ship cargo.

Sometimes, the NVOCC has only one container onboard a ship and consolidates multiple shippers' cargo in that container.

Security

Security concerns in ocean cargo shipments are dominated by two types of requirements. In the United States, those requirements are implemented by Customs and Border Protection (CBP).

- Pre-shipment notifications

In the U.S., it is called the **Importer Security Filing (10+2 rule)**. All cargo manifests must be sent to CBP at least 24 hours before the cargo is to arrive in the U.S.

- Pre-shipment inspections

In the U.S., it is called the **Container Security Initiative (CSI)**. CBP inspectors, located in foreign ports, inspect cargo before it is loaded on ships bound for the U.S.

Some Freight Charges

ARB	· Arbitrary Charge (Cleaning Fee)
BAF or FAF	· Bunker adjustment factor, or Fuel Adjustment Factor (Surcharge)
CAF	· Currency Adjustment Factor
CY/CY	· Container Yard to Container Yard
CFS/CY	· Container Freight Stations to Container Yard movement of Cargo
Chassis Charge	· Charge for a truck chassis in the port of departure or destination
THC	· Terminal Handling charge, or Container Yard Charge