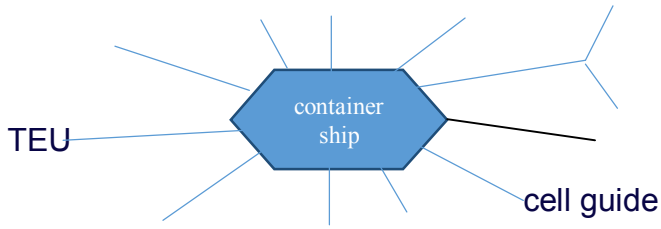
*Unit 7*

TYPES OF SHIPS

# THE CONTAINER SHIP

**Task 1:**

***Word spider - write down as many terms you know about the design and construction of the container ship***




The main characteristic of a container ship is that it depends on **shore-based lift-on/lift-off equipment**, mainly container **gantry cranes** (also called portainers), to handle its cargo. The earliest purpose-built container ships in the 1970s were all gearless, i..e without any shipboard cranes. Since then, the percentage of geared newbuilds has been decreasing overall, with only 7.5% of the container ship capacity in 2009 being equipped with cranes.

The introduction and improvement of **shoreside cranes** have been a key to the success of the container ship. The first crane that was specifically designed for container work was built in California's Port of Alameda in 1959. By the 1980s, shoreside gantry cranes were capable of moving containers on a 3-minute-cycle, or up to 400 tons per hour. In March 2010, at Port Klang in Malaysia, a new world record was set when 734 **container moves** were made in a single hour. The record was achieved using 9 cranes to simultaneously load and unload the MV *CSCL Pusan*, a ship with a capacity of 9,600 **TEU**.

***CMA CGM Marco Polo*** is a UK-registered container ship in the Explorer class owned by the CMA CGM group. On 6 November 2012, it became the largest containership in the world measured by capacity (16,020 TEU), but was surpassed on 24 February 2013 by the Maersk Triple E class (18,270 TEU).

The previous largest was *Emma Mærsk* and her seven sisters of theMærsk E-class (15,500 TEU). The capacity is 10,000 TEU if all are fully loaded 14 ton containers, compared to 11,000 for *Emma Mærsk* and even more for the Triple E Class (web-based data for 2014).

| | **Container ship** | **General characteristics** | |
|---|---|---|---|
| Name: | *CMA CGM Marco Polo* | Type: | Container ship |
| Owner: | SNC Nordenskiold | Tonnage: | 175,343 GT<br>85,361 NT<br>187,625 DWT |
| Operator: | CMA CGM | Length: | 396.0 m (1,299 ft 3 in) |
| Port of registry: | London United Kingdom | Beam: | 53.6 m (175 ft 10 in) |
| Builder: | Daewoo Shipbuilding & Marine Engineering, South Korea | Draught: | 16.0 m (52 ft 6 in) |
| Yard number: | 4161 | Depth: | 29.9 m (98 ft 1 in) (deck edge to keel) |
| Completed: | 5 November 2012 | Installed power: | Wärtsilä 14RT-flex96C (80,080 kW) |
| Maiden voyage: | 7 November 2012[14] | Propulsion: | Single shaft, fixed-pitch propeller |
| In service: | 6 November 2012[11] | Speed: | 25.1 knots (46.5 km/h; 28.9 mph) |
| Identification: | Call sign: 2FYD5<br>IMO number: 9454436<br>MMSI number: 235095231 | Capacity: | 16,020 TEU<br>1,100 TEU (reefers) |
| Status: | In service | Crew: | 27 |

**Exercise 1:**

***Pair work. Developing speaking skills. Use individual columns of the table above as cards for asking and answering questions to obtain information about the container ship. Make and give pairs of students two types of cards, each one missing a part of the information which is available to the other student on his/her card.***

**Container Ship Size Categories**

| Name | Capacity (TEU) | Length | Beam | Draft | Example | |
|---|---|---|---|---|---|---|
| Ultra Large Container Vessel (ULCV) | 14,501 and higher | 1,200 ft (366 m) and longer | 160.7 ft (49 m) and wider | 49.9 ft (15.2 m) and deeper | With a length of 399 m, a width of 59 m, draft of 14.5 m, and a capacity of 18,270 TEU, ships of the Maersk Triple E class class are able to transit the Suez canal. (Photo: MV *Mærsk Mc-Kinney Møller*.) |  |
| New panamax | 10,000–14,500 | 1,200 ft (366 m) | 160.7 ft (49 m) | 49.9 ft (15.2 m) | With a beam of 43 m, ships of the *COSCO Guangzhou* class are much too big to fit through the Panama Canal's old locks, but could easily fit through the new expansion. (Photo: The 9,500 TEU MV *COSCO Guangzhou* pierside in Hamburg. ) |  |
| Post panamax | 5,101–10,000 | | | | | |
| Panamax | 3,001 – 5,100 | 965 ft (294.13 m) | 106 ft (32.31 m) | 39.5 ft (12.04 m) | Ships of the Bay-class are at the upper limit of the Panamax class, with an overall length of 292.15 m, beam of 32.2m, and maximum depth of 13.3 m. (Photo: The 4,224 TEU MV *Providence Bay* passing through the Panama Canal.) |  |
| Feedermax | 2,001 – 3,000 | | | | Container ships under 3,000 TEU are typically called feeders. In some areas of the world, they might be outfitted with cargo cranes. (Photo: The 384 TEU MV *TransAtlantic* at anchor) |  |
| Feeder | 1,001 – 2,000 | | | | | |
| Small feeder | Up to 1,000 | | | | | |

**Exercise 2:**

***Pair work. Writing skills. Make notes that would help you describe a specific type of containership according to size (e.g. length, beam, capacity) and then write a description of***

- ***a post panamax container ship***
- ***an ULCV***
- ***a panamax container ship***
- ***a feeder container ship***

A view into the holds of a container ship.

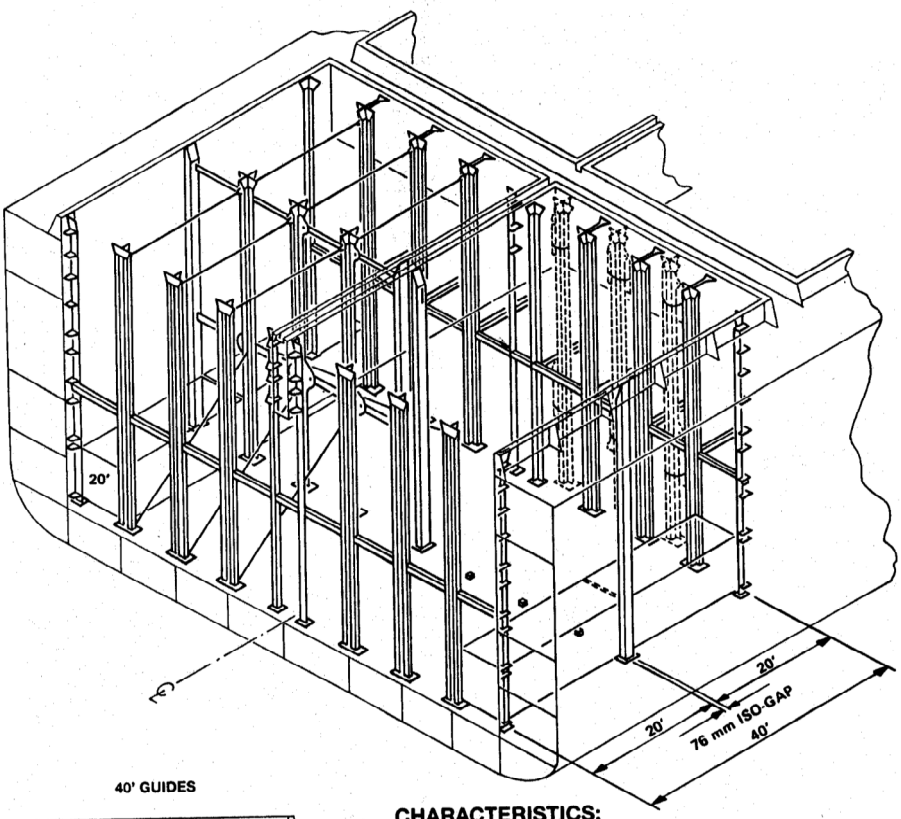
Note the vertical cell guides that organize containers athwartships.

Efficiency has always been key in the design of container ships. While containers may be carried on **conventional break-bulk ships**, cargo holds for **dedicated container ships** are specially constructed to speed loading and unloading, and to efficiently keep containers secure while at sea. A key aspect of container ship specialization is the design of the **hatches**, the openings from the main deck to the cargo holds. The **hatch openings** stretch the entire breadth of the cargo holds, and are surrounded by a raised steel structure known as the **hatch coaming**. On top of the hatch coamings are the hatch covers. Until the 1950s, hatches were typically **secured** with wooden boards and tarpaulins held down with battens. Today, some **hatch covers** can be solid metal plates that are lifted on and off the ship by cranes, while others are articulated mechanisms that are opened and closed using powerful hydraulic rams.

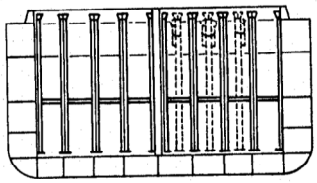
Another key component of **dedicated container-ship** design is the use of **cell guides.** Cell guides are strong vertical structures constructed of metal installed into a ship's **cargo holds**. These structures guide containers into well-defined rows during the loading process and provide some support for containers against the ship's rolling at sea. So fundamental to container ship design are cell guides that organizations such as the United Nations Conference on Trade and Development use their presence to distinguish dedicated container ships from **general break-bulk cargo ships**.

**Exercise 2**

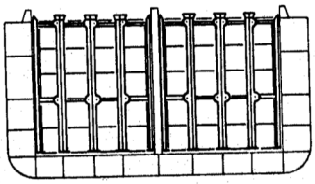
***Pair work. Discuss the meaning and use or function of the terms shown in bold letters above.***




40' GUIDES



20' GUIDES



**CHARACTERISTICS:**

40' GUIDES PERMANENT
20' GUIDES INTERCHANGEABLE (EXCEPT 20' PRESSURE RAIL)
COMBINED CELL / BLOCKSTOWAGE FOR 20' CONT. POSSIBLE
40' GUIDES FIXED
20' CROSSFORM* GUIDES CAN BE STOWED ON BOARD (BEHIND 40' GUIDES)
20' GUIDES SUPPORTED BY LONGITUDINAL PENDANTS (WIRES AND BARS)

**POSSIBLE ALTERATIONS:**

40' GUIDES DISMANTABLE
20' PRESSURE RAILS DISMANTABLE

**SPECIFICATION:**

MATERIAL : IN ACCORDANCE WITH THE CLASSIFICATION SOCIETY
FINISH : UPON CLIENT'S REQUEST
CLASS. APPROVAL: ALL ITEMS CAN BE SUPPLIED WITH THE APPROVAL OF ANY CLASSIFICATION SOCIETY UPON CLIENT'S REQUEST

## Exercise 3

***Writing skills. Study the drawing of the hold of a container ship above and write a 250-word description of the hold (characteristics, possible alterations, specification).***

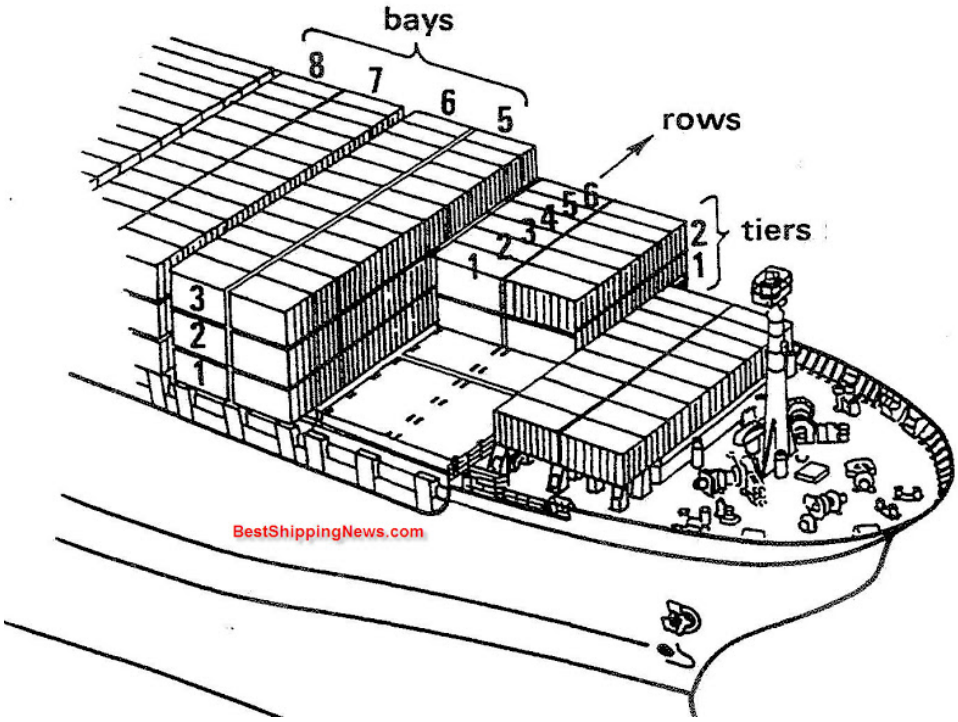
### Container numbering

Each container vessel is split into **compartments** which are termed as **bays** and depending on the size of the ship it will proceed from 01 to 40 (for example) where Bay 01 is the bay towards the Bow (the front) of the ship and Bay 40 is the Stern (the back) of the ship. Bays are numbered lengthwise from bow to stern with odd numbers for 20' containers and

even numbers for 40' containers. The even number between two 20' containers is used to define 40' bays. The bay spaces for 20' containers are numbered throughout fore to aft with odd numbers, i.e. in this case 01, 03, 05 and so on up to 75. The bay spaces for 40' containers are numbered throughout with even numbers: 02, 04, 06 and so on up to 74.

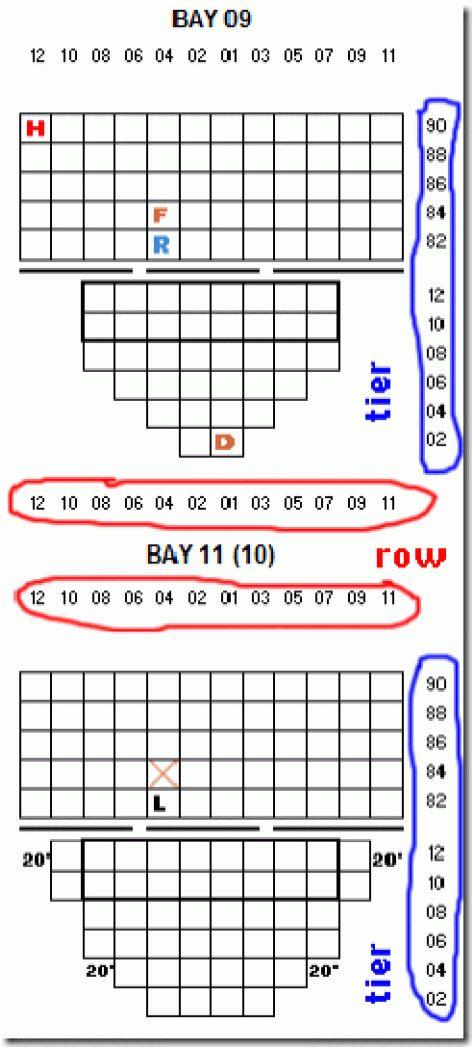
A system of three dimensions is used in **cargo plans** to describe the position of a container aboard the ship. The first coordinate is the ***row***, which starts at the front of the ship and increases aft. The second coordinate is ***tier***, with the first tier at the bottom of the cargo holds, the second tier on top of that, and so forth. The third coordinate is the ***slot***. Slots on the starboard side are given **odd numbers** and those on the port side are given **even numbers**. The slots nearest the centerline are given low numbers, and the numbers increase for slots further from the centerline.

Container ships only take 20's, 40's, and 45 foot containers. 45 footers only fit above deck. 40 foot containers are the primary container size making up about 90% of all **container shipping** and since container shipping moves 90% of the worlds **freight** over 80% of the worlds freight moves via 40 foot containers.



## Exercise 4

***Learning vocabulary. On the basis of the above text and the diagram below fill in the missing terms used in container stowage on board. Check your results against the box at the end of this unit (Supplements: No.6)***




Getting back to our stow position 090482 now – in the above diagram you will see that stow has an alphabet R – which i have used for the port of Rotterdam (each line, vessel or chief officer have their own alphabets for the ports).

So when you see a stow position as above you will know

09 = _____ number and container is a 20' (because its an odd number).. If it shows for example 10 then the container is a 40'..

04 = _____number

82 = _____ number which denotes that this is a 20' container which is stowed ON DECK.. Usually _____ tier number starts from 80 and increases by 2 per tier, so it will be 80, 82, 84, 86 etc.. If the tier number shows 02,04,06 etc then its stowed _____ DECK.

**Scenario 1** = 090482 is a 20' container stowed ON DECK on Bay 09, _____ 04 and Tier 82 – container is going to **R** for _____..

**Scenario 2** = 110482 is also a 20' container stowed ON DECK on _____ 11, Row 04 and _____ 82 which is basically the adjacent bay to the Rotterdam container and this container is going to **L** for _____.

**Scenario 3** = 090102 – which is a 20' container stowed _____ DECK on Bay 09, Row 01 and _____ 02 which is _____tier and this container is going to **D** for Dublin..

**Scenario 4** = 100484 – is a 40' container in stowed _____ on Bay 10, _____ 04 and Tier 84 and this container is going to **F** for Felixstowe.. This container is basically sitting on _____ of the Rotterdam and Le Havre containers.. Since this is a _____ container and sitting across both 9 and 11 bays , this bay is given the number 10.. The container is shown as sitting on 9 but the corresponding _____ on 11 is marked with an X which means that this slot is NOT available for placing another container because there is a 40' container already there..

For reasons of lashing and _____ containers, a 40' container can _____ on top of two 20's, but two 20's cannot sit on top of 40' (unless under deck and surrounded by other containers or within _____).

## Exercise 5

***Match the parts of the sentences in the following columns***

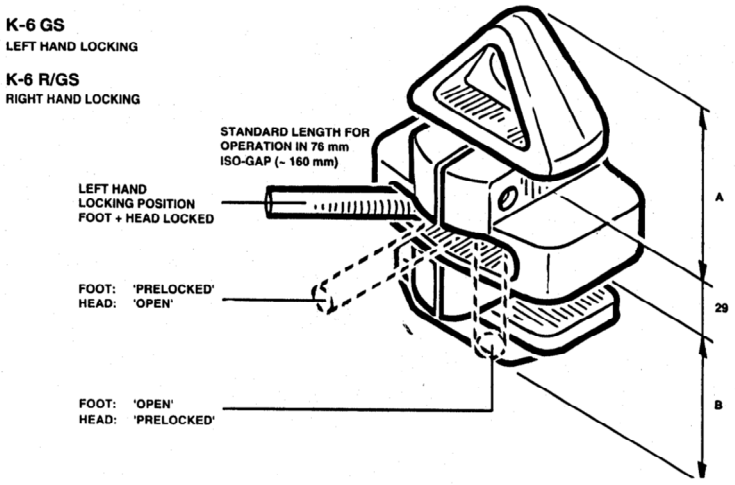
| | | |
|---|---|---|
| 1. Each container vessel is split into **compartments** | A. and even numbers for 40' containers. | **1C** |
| 2. Depending on the size of the ship the bays will proceed from 01 to 40 (for example) | B. with odd numbers, i.e. in this case 01, 03, 05 and so on up to 75. | |
| 3. Bays are numbered lengthwise from bow to stern with odd numbers for 20' containers | C. which are termed as **bays** | |
| 4. The even number between two 20' containers is used | D. where Bay 01 is the bay towards the Bow (the front) of the ship and Bay 40 is the Stern (the back) of the ship. | |
| 5. The bay spaces for 20' containers are numbered throughout fore to aft | E. to define 40' bays. | |
| 6. The bay spaces for 40' containers are numbered throughout with even numbers: | F. the second tier on top of that, and so forth. | |
| 7. The first coordinate is the ***row***, | G. 02, 04, 06 and so on up to 74. | |
| 8. The second coordinate is ***tier***, with the first tier at the bottom of the cargo holds, | H. and those on the port side are given **even numbers**. | |
| 9. Slots on the starboard side are given **odd numbers** | I. which starts at the front of the ship and increases aft | |

## Lashing systems

Twist-locks and lashing rods (*pictured*) are widely used to secure containers aboard ships.

Numerous systems are used to secure containers aboard ships, depending on factors such as the type of ship, the type of container, and the location of the container. Stowage inside the holds of *fully cellular (FC) ships* is simplest, typically using simple metal forms called **container guides**, **locating cones**, and **anti-rack spacers** to lock the containers together. Above-decks, without the extra support of the cell guides, more complicated equipment is used. Three types of systems are currently in wide use: **lashing systems**, **locking systems**, and **buttress systems**. For container lashing devices see Supplements.

Lashing systems secure containers to the ship using devices made from wire **rope**, rigid **rods**, or **chains** and devices to tension the lashings, such as **turnbuckles**. The effectiveness of **lashings** is increased by securing containers to each other, either by simple metal forms (such as **stacking cones**) or more complicated devices such as **twist-lock stackers** – the locking system. A typical **twist-lock** is inserted into the **casting hole** of one container and rotated to hold it in place, then another container is lowered on top of it. The two containers are locked together by twisting the device's **handle**. A typical twist-lock is constructed of forged steel and ductile iron and has a shear strength of 48 metric tons. The buttress system, used on some large container ships, uses a system of large **towers** attached to the ship at both ends of each cargo hold. As the ship is loaded, a rigid, removable **stacking frame** is added, structurally securing each tier of containers together.



**Exercise 6**

***Pairwork: Consider the design and function of the container lashing systems above and discuss it with your partner.***

# Maersk Line orders 10 'Triple-E' mega-ships

*Maersk Line has signed a contract for 10 of the world's largest, most efficient container vessels with an option to buy another 20. The vessels will have a capacity of 18,000 TEU and will be delivered from Korea's DSME shipyard from 2013 to 2015.*

*The new, giant container vessels will be known as Triple-E, based on the three main purposes for their creation: Economy of scale, Energy efficiency and Environmentally improved.*

*At 400 metres long, 59 metres wide and 73 metres tall, the Triple-E will be the largest vessel of any type known to be in operation. Its 18,000 twenty-foot container capacity is a massive 16 % larger (2,500 TEU) than Emma Mærsk.*

*At a cost of USD 190 million per vessel — and therefore a contract value of USD 5.7 billion should the option for a further 20 be exercised — Maersk Line is buying the ships to position itself to profit from the 5–8 % growth in trade from Asia to Europe that the company expects, and to maintain its industry leading market share in the trade.*

*The new vessels will not just set a new benchmark for size; in addition, they will ensure Maersk Line reaches its goals at the lowest possible cost, while producing the lowest possible amount of CO2 emissions — an astonishing 50% less CO2 per container moved than the industry average on the Asia–Europe trade.*

**Exercise 7**

***Group work. Note-taking. Study the text above and make your own notes (an outline with the main headings and subheadings) to be used in oral presentation of the text. Then present it to another group, which has not read this text. The outline may start as follows:***

- *contract*
- *why tripple-E?*
- *largest vessel*
- *cost and prices*
- *setting a new benchmark*

# Break-bulk cargo ships

Break bulk cargo is non containerized and is usually transported as individual pieces due to cargo often being oversized and overweight meaning freight containers or flat rack containers cannot accommodate the cargo and cannot therefore be loaded onto the vessel. Cargoes include goods such as construction equipment, oil and gas equipment, windmills, yachts and steel etc.

Due to reduction of costs and minimizing the possibility of theft/ damage much of the worlds freight is now containerized meaning it fits into ISO standard containers but because of size/weight restrictions there is still a lot of cargo (such as oversized and heavyweight equipment) which has to be shipped break bulk.

Break bulk freight transportation still has a major role to play in the international trade industry as countries expand infrastructure and require these large cargos to for the development of things such as wind farms, power plants, highways etc.

Many specialist break bulk vessels come fitted with heavy lift cranes which can manage the heaviest of cargo safely and quicker than dockside cranes, this can speed up the process of loading/unloading and reduce costs for the shipments. (http://breakbulkschedules.com/what-is-break-bulk-cargo/ )

A break bulk cargo ship therefore is a vessel designed to carry packaged (but non-unitized) shipments of all shapes, sizes, and weights. In comparison to containerships, breakbulk ships take much longer to load and unload. (http://www.businessdictionary.com/definition/breakbulk-ship.html#ixzz3D6Qzxayo). Sometimes, in some trades, the term break bulk cargo is also used to refer to general cargo or conventional break bulk cargo ship.

**Exercise 8**

***Discuss the difference between a box transport (by container ships) and the break bulk cargo concept***

# MOL Comfort Containership Sinks After Breaking in Two

http://officerofthewatch.com/2013/06/18/mol-comfort-containership-sinks-after-breaking-in-two/
June 18, 2013 by Officer of the Watch

It has been reported by the Indian Coast Guard and is widely spread in the media that MOL Comfort broke in two and sank in Arabian sea on 17 June 2013. The vessel was manned with 26 crewmembers who have been rescued by nearby vessels and are well in their health. The Bahamas flagged containership MOL Confort had a DWT of 90613 MT and a capacity of 8100 TEU.


The accident occured while the vessel was en route to Northern Europe. The accident was, most probably, caused by a crack in the vessels hulls, which might have been developed as a result of tensions and forces that occurred during sailing in rough seas, with sea up to 6 meters. This resulted in water ingress in one of the vessel's holds in the midsection area.

Vessel was en route from Far East to Northern Europe and was loaded with approximately 4,500 containers on board which, as a result of the accident, have been scattered in the adjacent area, an undetermined oil spill has also occurred. The vessel's 26 crew was consisted of 14 Filipino and 12 Russian seamen who have been sent to Colombo. The accident occurred around 200 nautical miles from Yemen, and around 840 nautical miles west of Mumbai (12'30″N 60'E) at about noon JST (07:00 local time).


According to officials the Maritime Rescue Coordination Centre, Mumbai diverted three ships – MV Hanjin Bejing, MV Zim India and MV Yantian Express, which were travelling nearby, for the rescue operation.

## Exercise 8

***Speaking skills. Highlight (or underline) the key-words to be used as notes of an outline of the accident described above. You will need these notes to write a report of the accident in 25 words.***

## Exercise 8

***Pair work. Watch the video on:*** www.youtube.com/watch?v=BuK7qr_TY3g**.** ***(or any other 3-5 minute video on a container ship accident*****), *make notes and tell the story to your partner.***

# IMO STANDARD MARINE COMMUNICATION PHRASES

## IV-C - *CARGO AND CARGO HANDLING*

### *Loading capacities and quantities*

***What is deadweight of vessel?***
- **Deadweight ... tonnes.**

***What is hold capacity of vessel?***
- **Hold capacity ... cubic metres.**

***What is bale capacity of vessel?***
- **Bale capacity ... cubic metres.**

***What is grain capacity of vessel?***
- **Grain capacity ... cubic metres.**

***What is container capacity of vessel?***
- **Container capacity ... TEU.**

***How many reefer plugs has vessel?***
- **Vessel has ... reefer plugs.**

***How many 20'/40' containers has vessel to load?***
- **Vessel has to load ... 20740'containers.**

***How many tonnes/cubic metres vessel load on deck?***
- **Vessel can load ... tonnes/cubic metres on deck.**

***How many cars/trailers/trucks/... can vessel load?***
- **Vessel can load ... cars/trailers/trucks/....**

***What is length/size/depth of no.... hold?***
- **Length/size/depth of no.... hold ... metres.**

***What is size of hatch openings?***
**- Size of hatch openings... by ... metres.**

***What is safety load of no.... hold?***
**- Safety load of upper deck/tween deck/lower deck of no.... hold... tonnes per square metre.**

# A. Comprehension & vocabulary

## A.1 Match a type of ship on the left with her cargo on the right:

| | | | |
|---|---|---|---|
| a | reefer vessel | 1 | citrus fruits |
| b | fruit carrier | 2 | frozen meat |
| c | container ship | 3 | trucks and buses |
| d | heavy lift ship | 4 | sawn wood |
| e | ro-ro vessel | 5 | 20 and 40 ft boxes |
| f | timber carrier | 6 | transformers, large boilers, etc. |

| a | b | c | d | e | f |
|---|---|---|---|---|---|
| 2 | | | | | |

## A.2 Fill in each space with a suitable synonym:

• ***box*** • ***ships*** • ***vehicle ferry*** • ***timber*** • ***citrus fruits*** • ***reefer***
• ***cranes***

1. container _____
2. lumber _____
3. oranges, lemons _____
4. refrigerated vessel _____
5. tonnage _____
6. cranage _____
7. roll-on/roll-off ship _____

## A.3 Complete the sentences using the following words:

• ***door-to-door*** • ***vehicles*** • ***over-ripening*** • **liner** ***service***
• ***heavy loads*** • ***reefers***

1. Road haulage _____ include trucks, lorries, vans, etc.
2. Heavy lift ships are specially designed to carry _____ .
3. _____ is avoided by the installation of a cool air system.
4. Container ships prevail in the _____ service.
5. Reefers are normally employed in the _____ .
6. Refrigerated ships are often called_____ .

## A.4 Answer the following questions referring to the reading text:

1. What are break bulk cargo ships?
2. Which types of cargo do they carry?
3. What type of ships will prevail in the general cargo trade?

4. Describe a ro-ro ship (i.e. *roll-on/roll-offship).*
5. Why are cool air systems installed in fruit carriers?
6. What are reefer ships designed for?
7. How are the holds and hatches of timber carriers built?
8. What is a three-island vessel?

# *B. Grammar*

### *B.1 Find the noun which each of the following adjectives qualifies in the reading text:*

*EXAMPLE*
bulky *cargo*

1. chilled _____
2. quick _____
3. refrigerating _____
4. frozen _____
5. insulated _____
6. heavy _____
7. unobstructed _____

### *B.2 The following adjectives have been used as parts of the (nominal) predicate:*

***• essential • capable • similar • predominant***

***Find these adjectives in the text and write down the sentence where they appear:***

1. ... jumbo derricks which are *capable* of lifting 200 tons.
2. _____
3. _____
4. _____
5. _____

### *B.3 Supply the right form of the verb to provide in the following sentences and translate them into your mother tongue:*

1. Container ships _____ with cells for the stowage of containers.
2. Last year a new bow ramp _____ .
3. Heavy lift ships must _____ with jumbo derricks.
4. No cranage _____ on vehicle ferries.
5. _____ you _____ the ship with the new Sailing Directions?

### *B.4 Complete the sentences with one of the following verbs:*

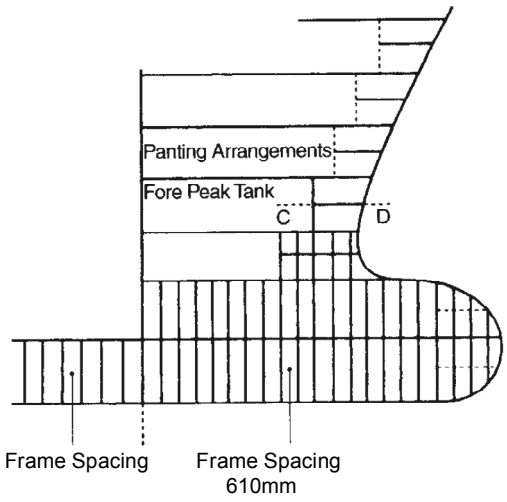
***• eliminate • reduce • facilitate • carry • keep • stow***

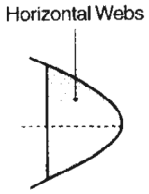
1. The cargo may be _____ in containers, on trailers, or in various types of packaging.

2. The introduction of ro-ro ships and car ferries has _____ the use of quay cranes.
3. Liner services are _____ to almost all the Mediterranean ports.
4. With the use of containers pilferage has been _____ to a minimum.
5. Three-island ships _____ he stowage of the deck cargo of timber.
6. Ro-ro ships are designed to _____ road haulagevehicles and private car.

*Bulbous Bow* *Plated Bow*

_____ _____




**D. TRANSLATION**

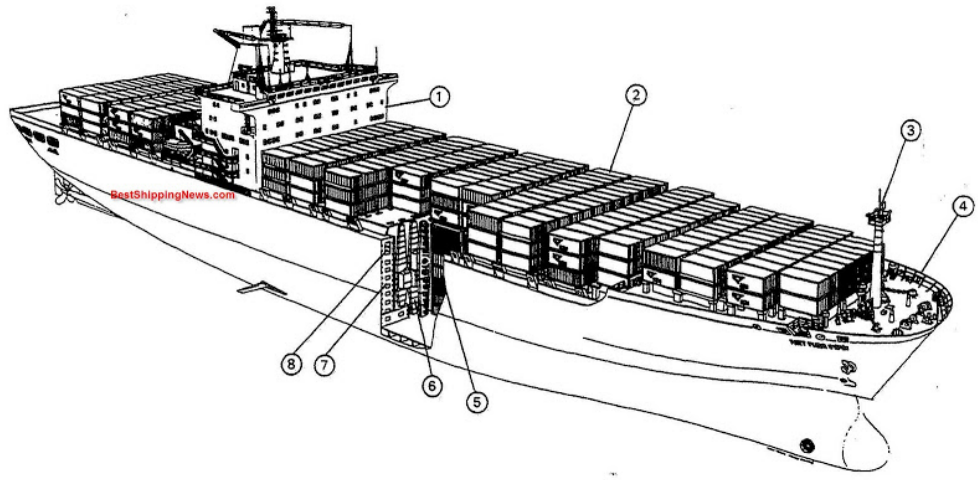
**Translate the following text into your mother tongue.**

**Post New Panamax**. By 2006, a new generation of containerships came online when Maersk shipping line introduced a ship class having a capacity in the range of 11,000 to 14,500 TEUs; the Emma Maersk, (E Class). They are dubbed "Post New Panamax" since they are bigger than the specifications of the expanded Panama Canal and can handle up to about 18,000 TEUs (Triple E Class). It remains to be seen which routes and ports these ships would service, but they are limited mostly to routes between Asia and Europe. There are larger ship designs on the drawing boards, such as the "Malacca Max" class that could carry about 27,000-30,000 TEU, but they are not expected to be constructed within a decade.

## Supplements

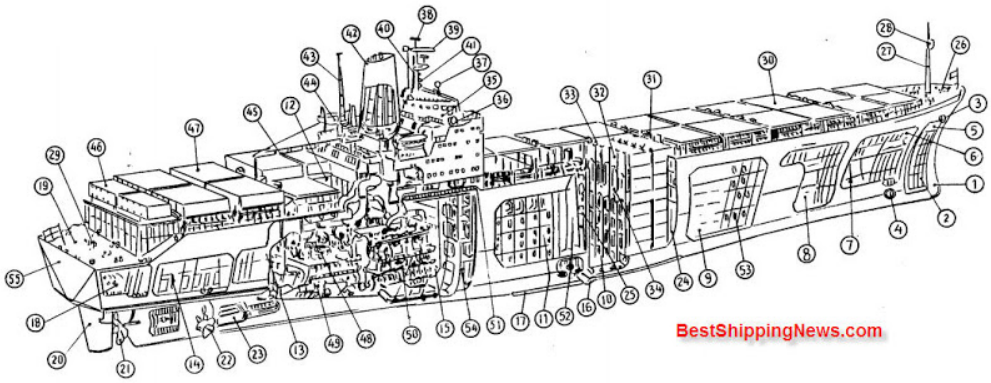
# 1. Container ship: general structure, equipment and arrangement

## Container ship

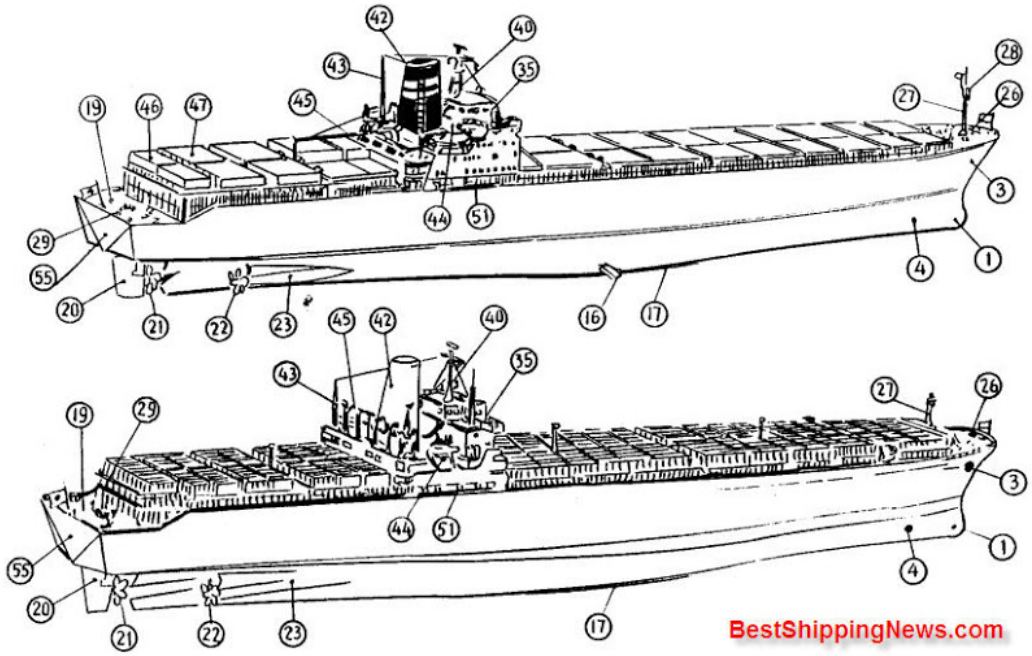



1. bridge castle front,
2. deck containers,
3. foremast and mast top,
4. forecastle,
5. insulated containers in holds,
6. container refrigeration ducts,
7. double hull,
8. passageway,

# Container ship



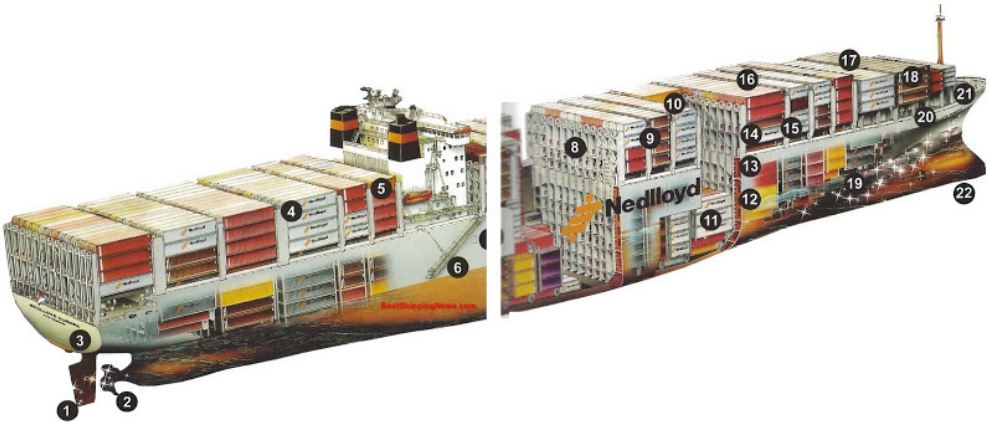

1 . Bulbous bow
2 . Fore peak tank
3 . Bow anchor
4 . Bow thruster
5 . Bo’sun store
6 . Under deck passage
7 . Not Container hold
8 . No2 Container hold
9 . No3 Container hold
10 . No4 Container hold
11 . No5 Container hold
12. No6 Container hold
13 . No7 Container hold
14 . No8 Container hold
15 . Engine room
16 . Fin stabilizer
17 . Bilge keel
18 . Steering gear room
19 . Sunken deck
20. Rudder
21 . Center propeller
22 . Side propeller
23 . Bossing
24. Side ballast tank
25. Deep ballast tank
26.Windlass
27. Foremast
28. Crow’s-nest
29 . Mooring winch
30 . Hatch cover




31 . Vent. for hold
32 . Cell guide
33 . Flip- flop
34 . Container support
35 . Wheel house
36 . Liferaft
37 . Direction finder antenna
38 . Radar scanner
39 . Signal yard
40 . Radar mast
41 . Suez signal light
42 . Funnel
43 . Antenna pole
44 . Lifeboat
45 . Crane
46 . 20′ container
47 . 40′ container
48 . Diesel generator
49 . Center main diesel engine
50 . Side main diesel engine
51 . Accommo. ladder
52. Trans. BHD
53 . Long. BHD
54 . Fore BHD in Eng. room
55 . Transom stern


1. Transom
2. Freefall lifeboat
3. Rudder + propeller
4. Double side hull with fuel or ballast water
5. Main engine
6. Accommodation
7. Stores crane
8. 20′ containers
9. 40′ containers
10. Walkway with container supports
11. Double bottom with fuel or ballast water
12. Bow thruster room
13. Bulbous bow
14. Bay 1

# Open container ship “Nediioyd Europa”



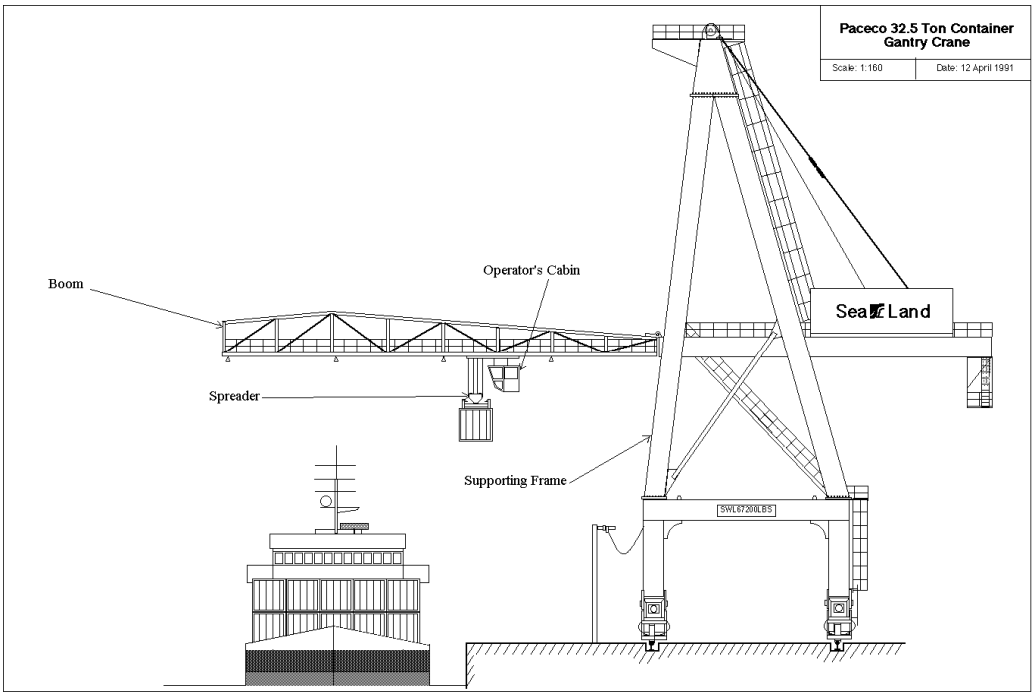

1. Rudder
2. Propeller
3. Stem
4. Container with a length of 40 feet (FEU) on a 40′ stack
5. Container with a length of 20 feet (TEU) on a 20′ stack
6. Accommodation ladder
7. Pilot or bunker door
8. Container guide rail
9. Row no 11
10. Row no 04
11. Tier no 08
12. Wing tank (water ballast)
13. Service gallery
14. Fixed stack
15. Movable stack

16. Bay no 15
17. Bay no 06
18. Tier no 86
19. Cells, hold 1 and 2, for containers with dangerous goods (explosives)
20. Container support
21. Breakwater
22. Bulbous bow

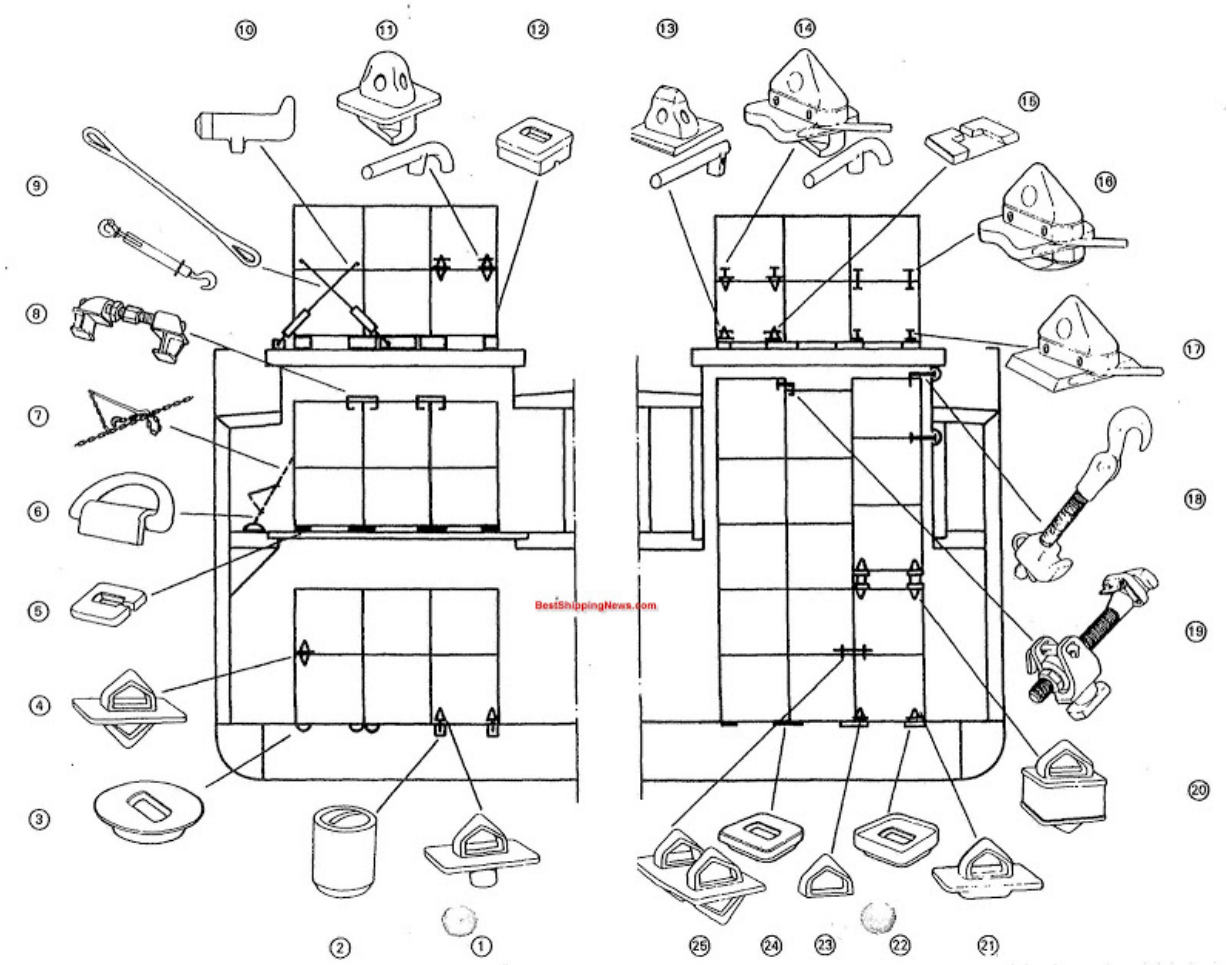
## Principal Dimensions

IMO no 8915691
Name Nedlloyd Europa
Gross Tonnage 48508
Net Tonnage 19254
Deadwt Tonnage 50620
Year when Built 1991
Engine 41615 hp Sulzer
Ship Builder Mitsubishi H.I.Nagasaki Japan
Speed 23.5 knots
Yard Number 1184
Dimensions 266.30-32.24-23.25
Depth 12.50
Vessel Type Container Ship
Call Sign PGDF
Containers 3604 teu
Flag Neth.
In Service 1997

## 2. Container gantry crane – portainer



# 3. Container securing devices




## Deck fittings

2. flush deck fitting, flush deck insert, flush foundation, circular foundation, stud bushing with plugging screw, screw plug,
5. socket, base stowing plate, base (… to be used with 21)
15. U-frame, shoe fitting, dovetailed base, companion fitting, dovetailed foundation (… to be used with13,17)
22,24. keyhole inserts (sunken, flush, raised),

## Bottom fittings

1. pin bottom fitting, base stacking cone, cone plate, bottom stacking cone, bottom locator (… to be used with 2)
21. bottom stacking cone {… to be used with 5,12,22,23).
23. guide cone,

## Stacking and locking fittings

4. stacking cone, intermediate stacking cone, stacker, stacking stud,
11. locking cone, pinstacker (with locking pin),

1416,17. twistlock, twist locking cone,
20. spacer stacking cone, compensating cone, spacer fitting (with cone top and bottom),
8,19,25. bridge fittings,
8. adjustable bridge fitting, clamp,
19. offset height clamp, compensatory bridge fitting, variable height clamp,
25. non-adjustable bruise fitting, double stacker, double intermediate stacking

## Lashing points or lashing terminals

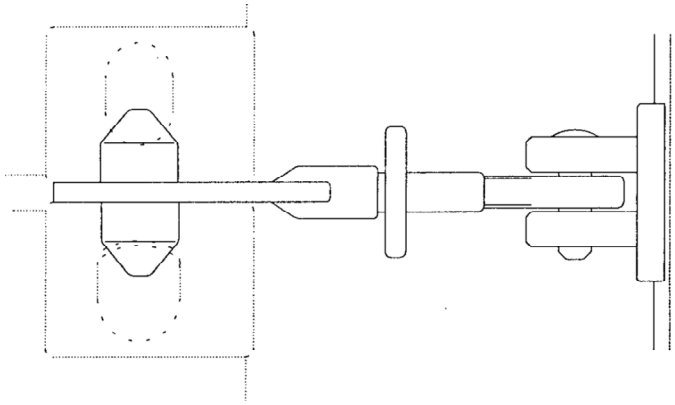
6. D-ring, lashing eye,

## Lashing equipment

7,9 loadbinders,
7. chain lashing with chain lever,
9. lashing wire and turnbuckle, <
18. bulkhead bridge fitting,

## other lashing equipment

9. lashing rod or bar, securing pads (penguin hook, elephant's foot, eye hook), webbing,



buttress

# 4. Container ship hold

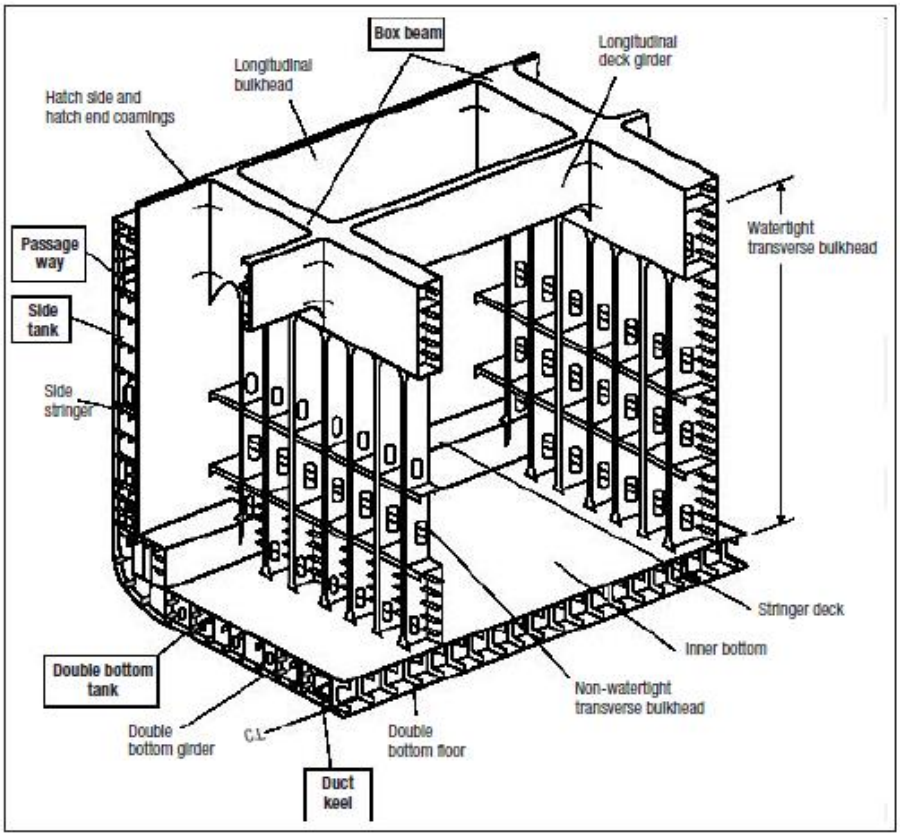
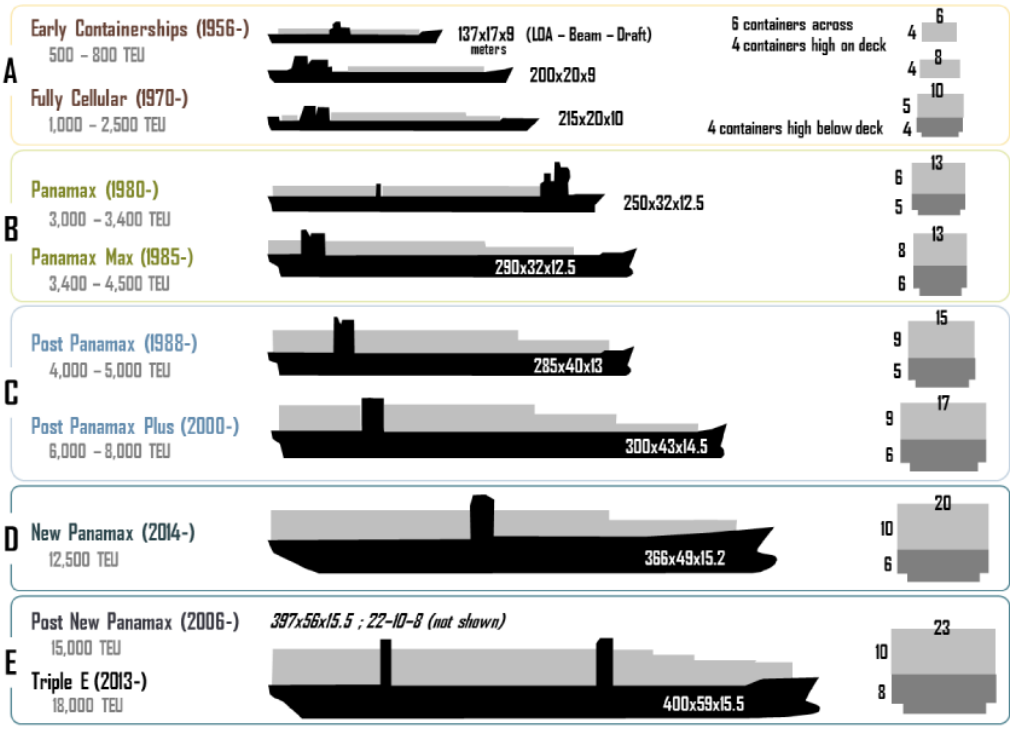



**Figure 2 Typical cargo hold configuration for a container ship**

# 5. Panamax container ships




Evolution of ContainershipsSince the beginning of containerization in the mid 1950s, containerships undertook six general waves of changes, each representing a new generation of containership:

- **A) Early containerships**. The **first generation** of containerships was composed of **modified bulk vessels or tankers** that could transport up 1,000 TEUs. The first containership, the "Ideal-X" was a converted World War II T2 tanker. The container was at the beginning of the 1960s an untested transport technology and reconverting existing ships proved out to be of lower cots and less prone to risks. These ships were carrying onboard cranes since most port terminals were not equipped to handle containers. These ships were also relatively slow, with speeds of about 18 to 20 knots and could only carry containers on the converted decks and not in their bellyhold. Once the container began to be massively adopted at the beginning of the 1970s, the construction of the first **fully cellular containerships** (**FCC; second generation**) entirely dedicated for handling containers started. All containerships are composed of cells lodging containers in stacks of different height depending on the ship capacity. Cellular containership also offer the advantage of using the whole ship to stack containers, including below deck. Cranes were removed from the ship design so that more containers could be carried (cranes remain today on some specialized containerships). The ability of ports to handle cellular containerships ceased to be a major concern with the setting of specialized container terminals around the world. Cellular containerships were also much faster with speeds of 20-24 knots, whichwould become the speed of reference in containerized shipping.
- **B) Panamax**. During the 1980s economies of scale rapidly pushed for the construction of larger containerships; the larger the number of

containers being carried the lower the costs per TEU. The process became a virtuous circle compounding larger volumes and lower costs, which significantly helped the diffusion of the container. The size limit of the Panama Canal, which came to be known as the **panamax standard**, was achieved in 1985 with a capacity of about 4,000 TEUs. Once this limit was achieved, a decade passed before a new generation of larger containerships was designed. At the same time panamax container ship designs were evolving to take maximum advantage of the canal's limitation in beam (Panamax Max). The original dimensions of the Panama Canal, built by the US Army Corps of Engineers, are similar to the dimensions of the US Inland Waterways locks, resulting in a narrow and long ship design.

- **C) Post Panamax**. Going beyond panamax was perceived as a risk in terms of the configuration of shipping networks, additional handling infrastructure as well as draft limitations at ports. The APL C10 containership class was introduced in 1988 and was the first containership class to exceeded the 32.2 m width limit of the Panama Canal. By 1996, full fledged Post Panamax containerships were introduced while capacities reached 6,600 TEUs. A ship above the panamax size requires a substantial amount of cargo to be used profitably along a service loop and by the late 1990s the rapid growth of global trade made such a ship class a marketable proposition. Once the panamax threshold was breached, ship size quickly increased with capacities reaching 8,000 TEUs (Post Panamax Plus; "Sovereign Class"). Post Panamax Containerships require deep water ports (at least 43 feet of draft) and highly efficient, but costly, portainers. This is placing pressures on ports to dredge to accommodate these draft constraints.
- **D) New Panamax (NPX)**. Refers to ships designed to fit exactly in the locks of the expanded Panama Canal, expected to open in 2015. These ships will have a capacity of about 12,500 TEU. Like its Panamax counterparts, New Panamax ships will define a specific ship class able to effectively service the Americas and the Caribbean, either from Europe or from Asia.
- **E) Post New Panamax**. By 2006, a new generation of containerships came online when Maersk shipping line introduced a ship class having a capacity in the range of 11,000 to 14,500 TEUs; the Emma Maersk, (E Class). They are dubbed "Post New Panamax" since they are bigger than the specifications of the expanded Panama Canal and can handle up to about 18,000 TEUs (Triple E Class). It remains to be seen which routes and ports these ships would service, but they are limited mostly to routes between Asia and Europe. There are larger ship designs on the drawing boards, such as the "Malacca Max" class that could carry about 27,000-30,000 TEU, but they are not expected to be constructed within a decade.

Containership speeds have peaked to an average of 20 to 25 knots and it is unlikely that speeds will increase due to energy consumption; many shipping lines are opting for slow steaming to cope with higher bunker fuel prices and overcapacity. The deployment of a class of fast containerships has remained on the drawing boards because the speed advantages they would confer would not compensate for the much higher shipping costs. Supply chains have simply been synchronized with container shipping speeds.Each subsequent generation

of containership is facing a shrinking number of harbors able to handle them and placing pressures on port infrastructure and equipment. Maritime shipping companies are incited to use the largest containerships possible on their shipping routes, since they benefit from economies of scale. However, ports and inland transportation systems have to provide substantial capital investment if they expect to accommodate larger containerships. There are thus operational limitations to deploy ships bigger than 8,000 TEU in terms of ports of call and the required infrastructure to provide an acceptable loading and unloading throughput. Also, large containership deployments require a substantial amount of cargo to be commercially feasible. Containerships in the range of 5,500 to 6,500 TEU appear to be the most flexible in terms of the ports they can access and they market they can service since using larger ships require fewer port calls.

# 6. Identifying a stow position

http://shippingandfreightresource.com/identifying-a-stow-position/

**Row** is the position where the container is placed across the width of the ship.. If you refer to the above diagram, the Row numbers are circled in Red.. It starts with 01 in the centre and progresses outwards with odd numbers on the right and even numbers on the left..
**Tier** denotes at which level the container is placed – basically how high the container is stacked on board.. In the above diagram, the Tier numbers are circled in Blue..
Getting back to our stow position 090482 now – in the above diagram you will see that stow has an alphabet R – which i have used for the port of Rotterdam (each line, vessel or chief officer have their own alphabets for the ports).. So what i am saying here is that in stow position 090482 there is 20' container that is stowed for discharge at Rotterdam..

So when you see a stow position as above you will know

09 = bay number and container is a 20' (because its an odd number).. If it shows for example 10 then the container is a 40'..

04 = row number

82 = tier number which denotes that this is a 20' container which is stowed ON DECK.. Usually ON DECK tier number starts from 80 and increases by 2 per tier, so it will be 80, 82, 84, 86 etc.. If the tier number shows 02,04,06 etc then its stowed UNDER DECK..

Lets look at a couple of scenarios from the above diagram..

Scenario 1 = 090482 is a 20' container stowed ON DECK on Bay 09, Row 04 and Tier 82 – container is going to **R**for Rotterdam..
Scenario 2 = 110482 is also a 20' container stowed ON DECK on Bay 11, Row 04 and Tier 82 which is basically the adjacent bay to the Rotterdam container and this container is going to **L** for Le Havre..
Scenario 3 = 090102 – which is a 20' container stowed UNDER DECK on Bay 09, Row 01 and Tier 02 which is bottom most tier and this container is going to **D** for Dublin..
Scenario 4 = 100484 – is a 40' container in stowed ON DECK on Bay 10, Row

04 and Tier 84 and this container is going to **F** for Felixstowe.. This container is basically sitting on TOP of the Rotterdam and Le Havre containers.. Since this is a 40' container and sitting across both 9 and 11 bays , this bay is given the number 10.. The container is shown as sitting on 9 but the corresponding slot on 11 is marked with an X which means that this slot is NOT available for placing another container because there is a 40' container already there..
For reasons of lashing and securing containers, a 40' container can sit on top of two 20's, but two 20's cannot sit on top of 40' (unless under deck and surrounded by other containers or within cell guides)

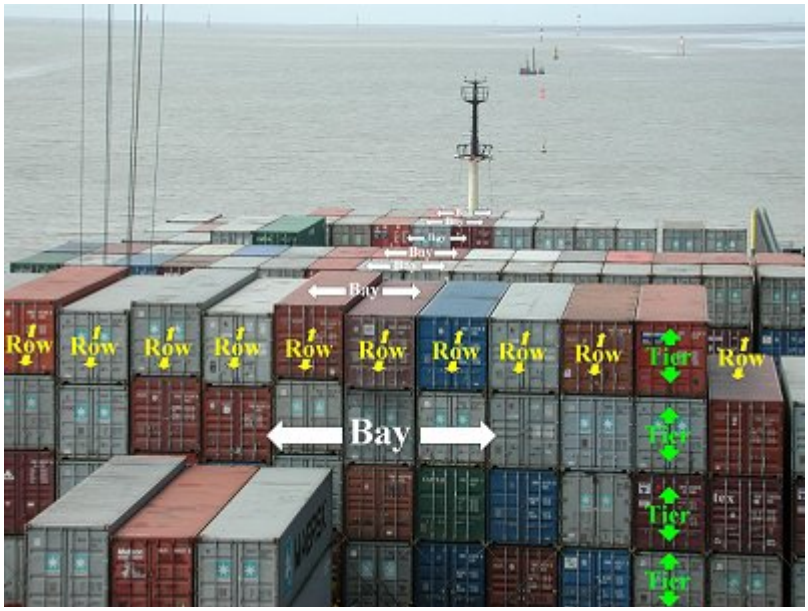
So this is how a stow position is coined and how you identify whether a container is a 20' or 40' and whether it is stowed under deck or on deck just by reading the stow position provided..

http://shippingandfreightresource.com/identifying-a-stow-position/

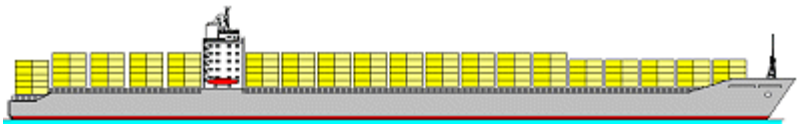
# 7. Container stowage plans

Working stowage plans are drawn up to assist in advance planning. Master plans definitively document the positioning of containers on board.

The bay-row-tier system follows a system of numerical coordinates relating to length, width and height. The stowage space of the container on board the ship is unambiguously stated in numbers and is (almost always) recorded in the shipping documents. It is then also possible to establish at a later date where the container was carried during maritime transport.

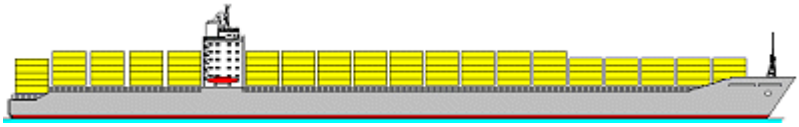



According to this principle, bays are the container blocks in the transverse direction, rows are the lengthwise rows and tiers are the vertical layers.



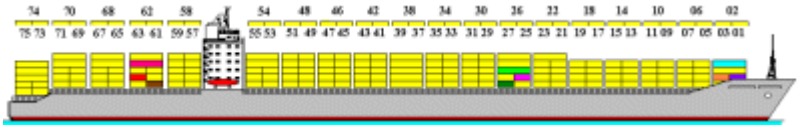
**Thirty-eight 20' container bays on a ship**

Theoretically, the thirty-eight bays could be numbered continuously from 1 to 38. However, that would only be sensible if only 20' containers could actually be loaded.



**Nineteen 40' container bays on a ship**

If the ship could only transport 40' containers, the nineteen bays could be numbered continuously from 1 to 19.

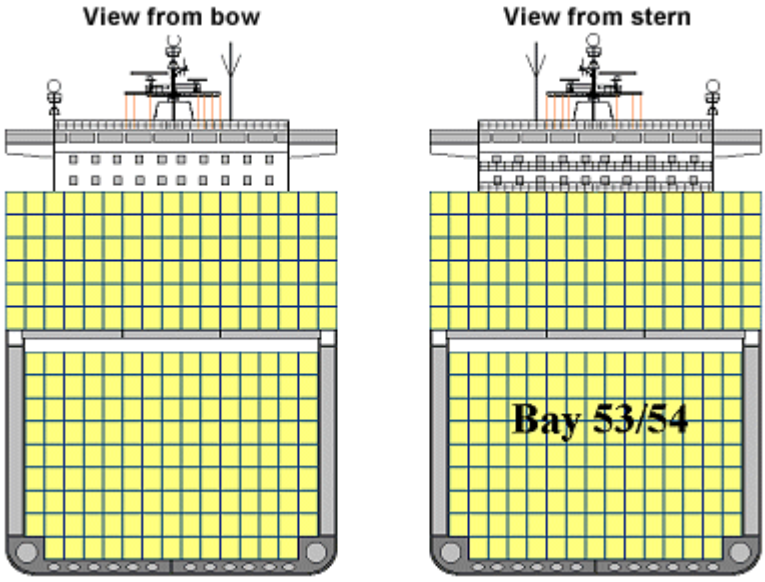


**Bay numbering system**

Since, however, the ship can transport both 20' and 40' containers, the bay spaces for 20' containers are numbered throughout fore to aft with odd numbers, i.e. in this case 01, 03, 05 and so on up to 75. The bay spaces for 40' containers are numbered throughout with even numbers: 02, 04, 06 and so on up to 74.

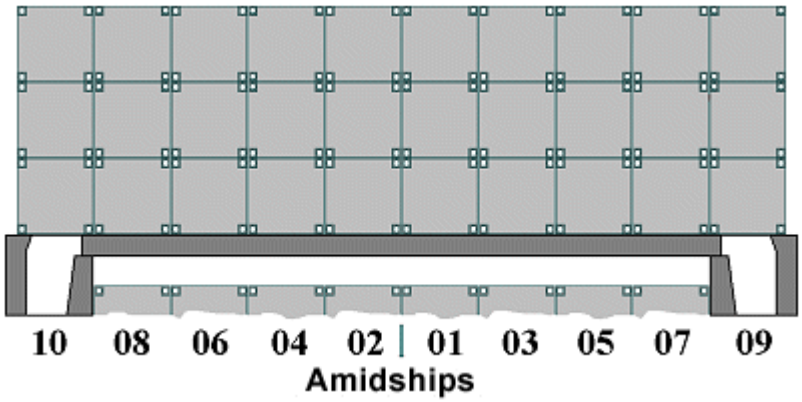
The purple 20' container in the first bay has the bay number 01. The light-brown 20' container in the second bay has the bay number 03 and the light-blue 40' container, which occupies a space in the first and second bays, has the bay number 02. The magenta-colored container has the bay number 25, the dark-green number 27 and the light-green number 26.

To illustrate a cross-section through a bay, one needs to imagine that one is standing in front of or behind the ship.



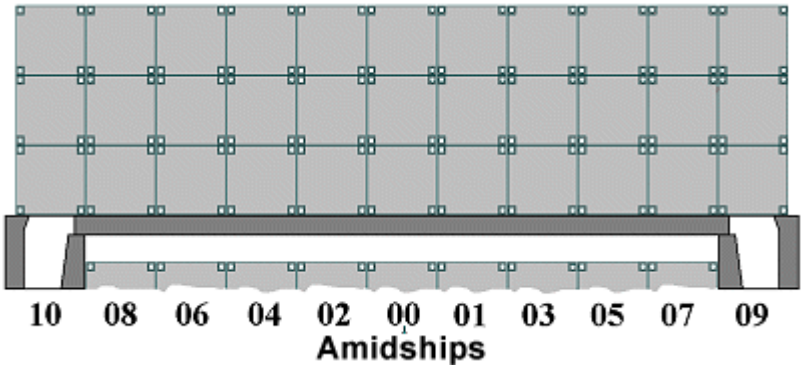

**In the case of bay plans, the respective bay is always viewed from behind.**

The rows of containers on a ship are numbered with even numbers from the center leftward and odd numbers from the center rightward.




**Row numbering where there is an even number of rows**

Where there is an odd number of rows, the middle row is numbered 00.




**Row numbering where there is an odd number of rows**

**Numbering of the port rows on board ship**

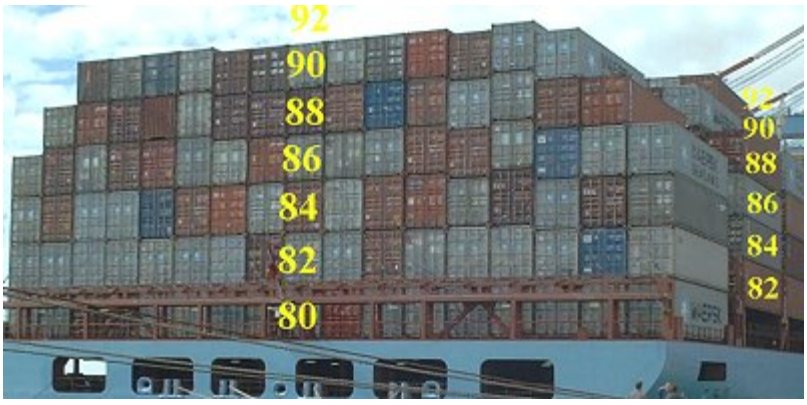
On close inspection, the photograph shows left-hand row 16, which is designed to be filled with containers only on deck, and rows 14, 12, 10, 08, 06, which may be filled both on deck and in the holds. Rows 04, 02, 00, 01 and 03 are likewise designed to be occupied in the hold and on deck. However, the hatch covers are already on in this case.

**Numbering of the starboard rows on board ship**

Rows 05, 07, 09, 11 and 13 are still empty in this bay. Row 15 is designed only for on deck occupation, and is still free in this bay.


**Row numbers of the aft bay of a ship**

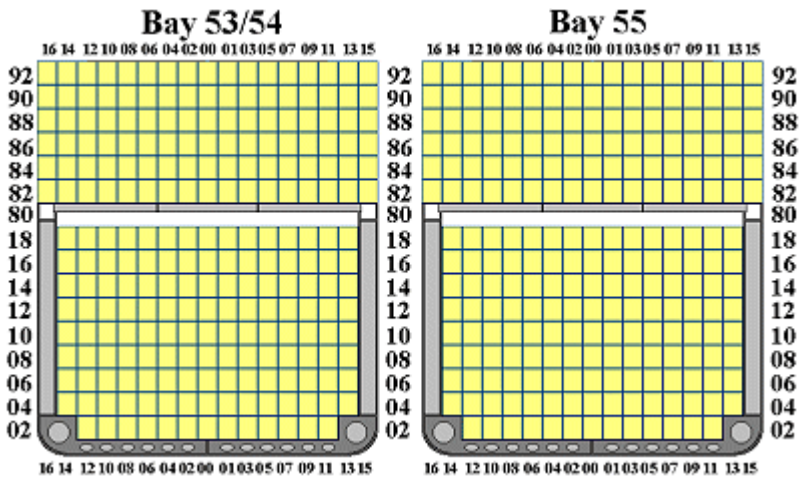
The container tiers are numbered with even numbers, starting from the bottom. The conventional way is start with 02 in the hold and then count up with 04, 06 etc. In the case of deck cargoes, it is conventional to start numbering with 80 or 82. There are sometimes slight differences between ships.




**Numbering of horizontal container layers, or tiers**

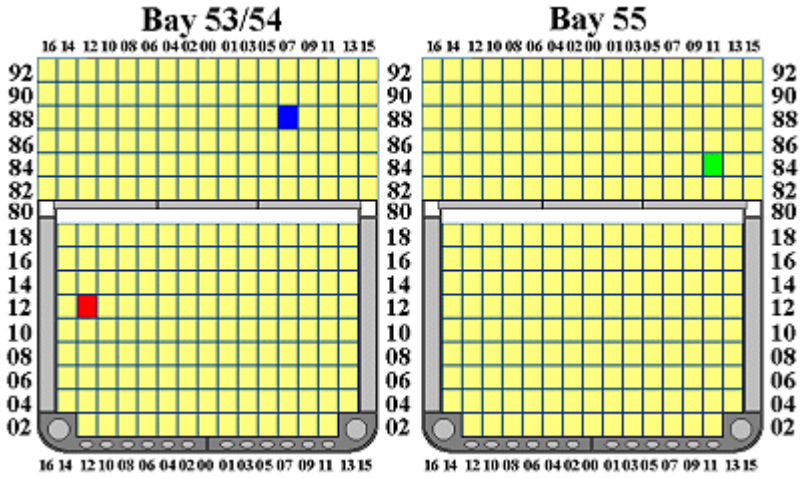
On this ship, the containers standing directly on the main deck are numbered 80 and those standing on the hatches are number 82. The number is incremented by two for each higher layer.

These bay, row and tier numbers are noted in the bay plans.




**Bay plan**

The loaded containers, with their alpha prefix, their container numbers, the port of destination or discharge and other important details are noted in the bay plans.




**Color-labeled containers in a bay plan**

According to the bay-row-tier system, the colored containers were given the following stowage space numbers:

- a 20' container in the red-colored slot: 531212
- a 40' container in the blue-colored slot: 540788
- a 20' container in the green-colored slot: 551184

The system illustrated is the most widely used. However, other numbering systems do exist, in which the coordinates are stated in a different order, for example row-bay-tier systems and similar combinations. On ro/ro ships, the slots are usually organized along lanes running lengthwise. In individual cases and if required, such information may be obtained from shipping companies,

cargo-handling companies or other competent persons.