Vessel Report

COMPARISSON AND COMPILLING OF DIFFERENT CARGO SHIPS

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Introduction

This Technical Team has the privilege to present the reader with the information requested by the Client[1] regarding the technical evaluation of the differences between 3 types of Vessels that can transport Cargo in containers. These 3 difference types of vessels are distinguished by the location of the Bridge in the Vessel but also by many other aspects that we will discuss in this document.

Our hope lies in bringing some light to this subject and helping you gain more knowledge in this area. We will firstly start by presenting a brief description of the Vessels followed by a side-by-side comparison of them. In the conclusion we pretend to shed some new light and help you understand the key difference between them.

Description

Our team wanted you to be able to analyze which ship individually and then to really dive into the key differences so in here you can read and understand a little bit about these ships and their key features.

MSC BRIANNA – IMO 9103685

The MSC Brianna[2] is a Container Ship built in 1996 and operated by the MSC company. It sails under the flag of Panama and usually does the Mediterranean Routes between the South of Spain and Malta. It's one of the many examples of ships with the Bridge near the Stern.

It was built in 1996 and sailed already under Netherlands and British flags. It has 32 meters of beam and 294 lengths overall. Its gross Tonnage is 51931 and summer deadweight is 60200(t).

CERULEAN - IMO 9655169

The Cerulean[3] is a General Cargo Ship built in 2013 and operated by the SE SHIPPING LINES company. It sails under the flag of Singapore and usually does the Atlantic Norte Routes between Canada and the Northern Asia. It's one of the many examples of ships with the Bridge near the Bow.

It has 26 meters of beam and 168 lengths overall. Its gross Tonnage is 19454 and summer deadweight is 25240 (t).

OOCL HONG KONG - IMO 9776171

The OOCL Hong Kong[4] is a Container Ship built in 2017 and operated by the OOCL company. It sails under the flag of Hong Kong and usually does the North Sea Routes between the Baltic and Nether Region. It's one of the many examples of ships with the Bridge in the middle.

It has 59 meters of beam and 400 lengths overall. Its gross Tonnage is 210890 and summer deadweight is 191422 (t).

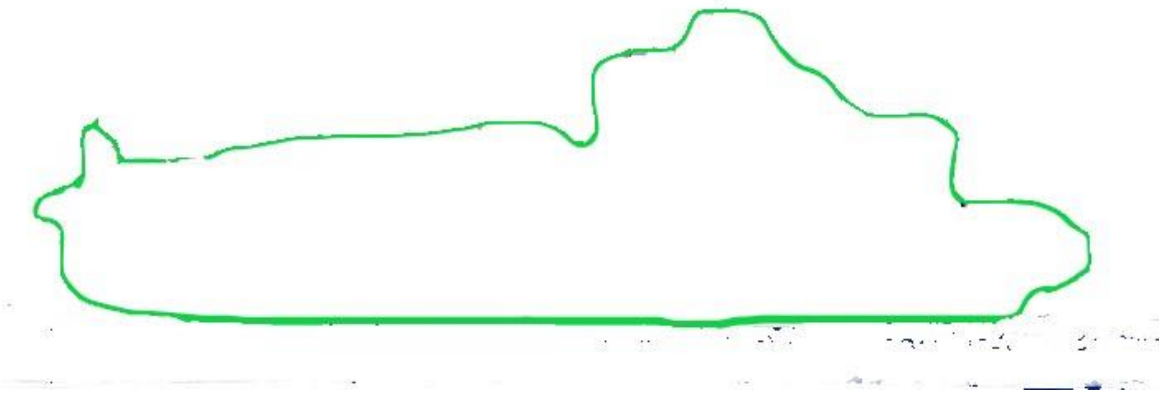
Comparison

Vessel Name	MSC BRIANNA	CERULEAN	OOCL HONG KONG
Length overall	294	168	399.870
Breadth	32	26	58.8
Deadweight	60200	25240	191422
Gross Tonnage	51931	19454	210890
Container Carrying Capacity	-	-	21,413 TEU
IMO Number	9103685	9655169	9776171
Official Number	-	-	HK- 4755
Call Sign	3FVZ7	9V9934	VRQL9
Flag	Panama	Singapore	Hong Kong
Ship Type	Container Ship	General Cargo Ship	Container Ship
Year of Built	1996	2013	2017
Port Calls (2021)	68	15	46
Travelled Distance (2021)	94162	46120	103682

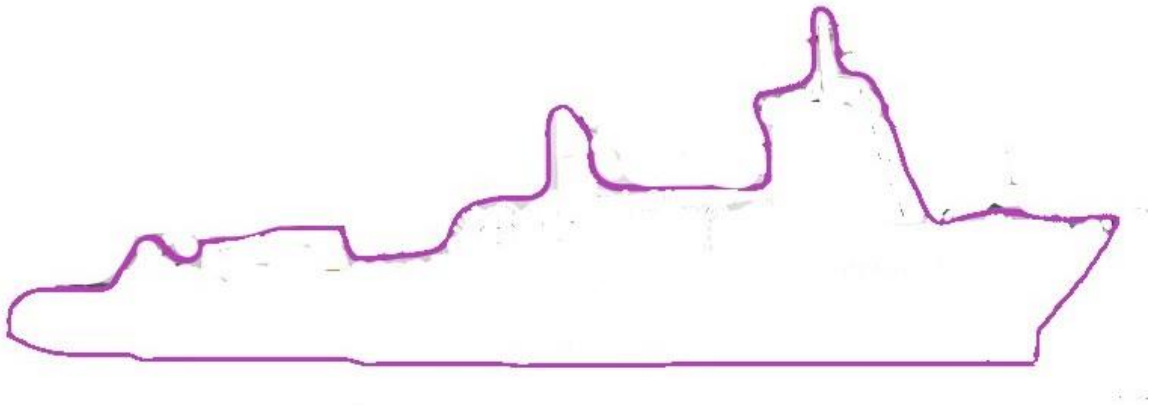
Center of Mass

There are some steps to do to calculate the center of mass of the vessels. First we need to make a sketch of the vessel's, in order to know the common geometric figure that can be related.

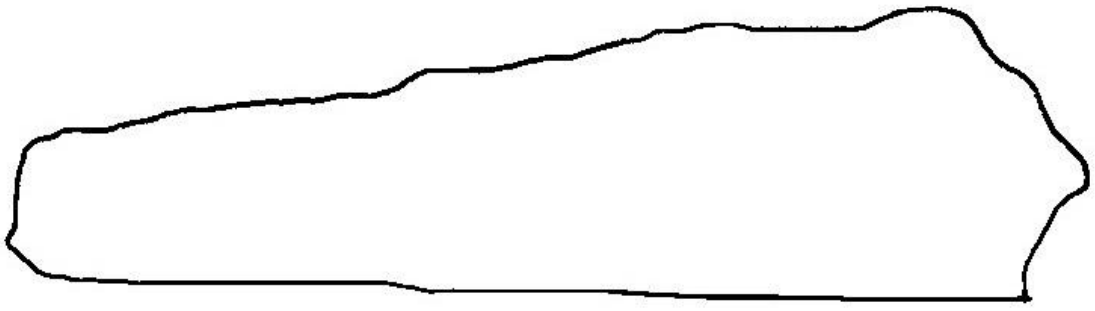
MSC BRIANNA – IMO 9103685 – SKETCH



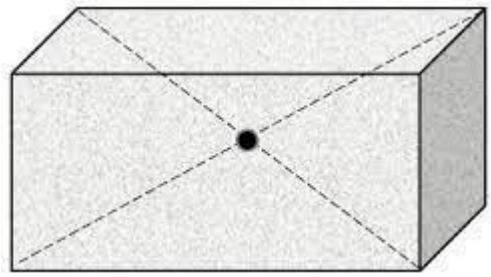
CERULEAN - IMO 9655169 – SKETCH



OOCL HONG KONG - IMO 9776171



It is possible to conclude that all 2D vessels sketch approach the geometric figure known as rectangle. However, we need to remember that in the 3D representation, the geometric figure is a parallelepiped and, therefore, the center of mass can be represented by the figure below:



Through the figure, it is possible to conclude that, considering that the boat has a balanced weight at all its points, the center of mass is located at half the length, half the width and half the height.

Then, the CM (center of mass) coordinates = (length/2) X + (width/2) Y + (height/2) Z

Considering 30 meters of height, the CM:

MSC BRIANNA: 147 X 16 Y 15 Z

CERULEAN: 84 X 13 Y 15 Z

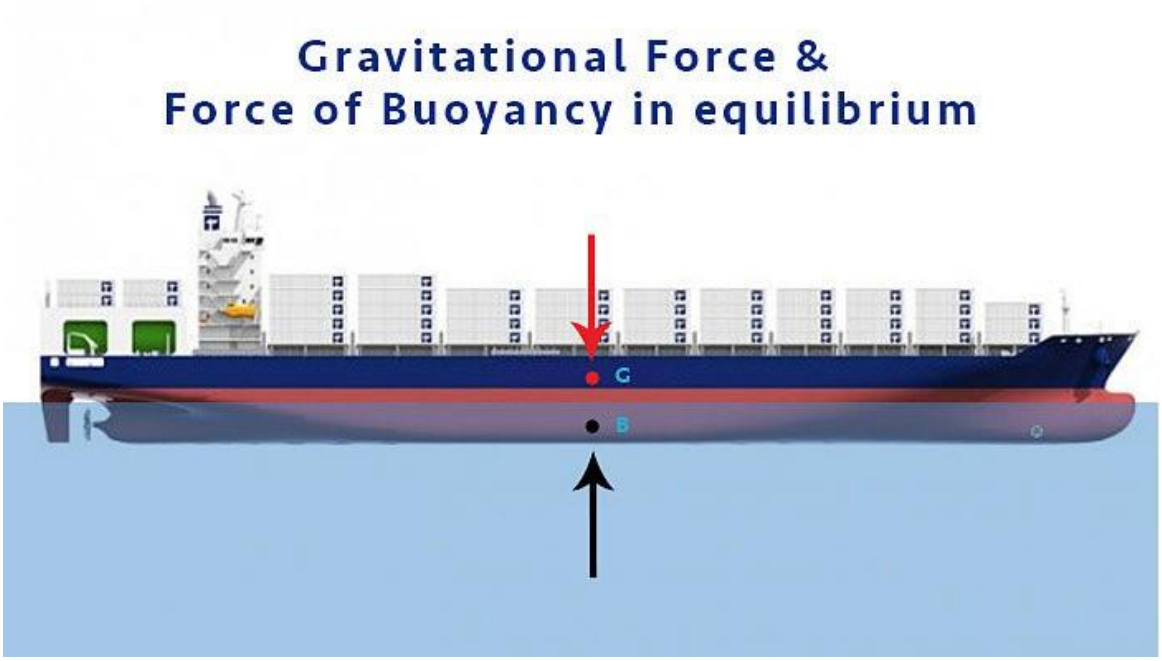
OOCL HONG KONG: 200 X 29.5 Y 15 Z

How much does the vessel sink?

To know how much the vessel sank, first we need to know the total mass placed on the vessel.

According to the statement, each container has half a ton of mass, so the total mass would be the multiplication of the mass of a container times the mass of all containers.

Subsequently, we were asked to calculate the pressure exerted by this total mass on the water. First, the submerged area must be calculated. Then it is necessary to multiply the total mass of the ship with the Earth's gravity (because there are two forces in opposite directions as the figure below can represent) and finally it is divided by the submerged area previously calculated.



Finally, it was asked to calculate the height difference above the water level that the ship had suffered. For this, it is necessary to know the submerged volume and the dimensions of the ship.

All calculations were implemented in the Java application.

Conclusion

With this analysis we can conclude that, the new ships are being built with the Bridge in the middle because of the efficient gains it provides. In the 90's many ships, especially small ones, where build with the bridge at the bow but this no are being decommissioned or replaced by other ones.

References

[1] "Integrative Project – Project Assignment LEI - 2021/2022." 2022, Accessed: Jan. 21, 2022. [Online]. Available: https://moodle.isep.ipp.pt/pluginfile.php/185144/mod_resource/content/0/LEI-21-22-Sem03 - Project Assignment_v4.0.pdf.

[2] "MSC BRIANNA, Container Ship - Details and current position - IMO 9103685 MMSI 353612000 - VesselFinder." https://www.vesselfinder.com/vessels/MSC-BRIANNA-IMO-9103685-MMSI-353612000 (accessed Jan. 20, 2022).

[3] "CERULEAN, General Cargo Ship - Details and current position - IMO 9655169 MMSI 566819000 - VesselFinder." https://www.vesselfinder.com/vessels/CERULEAN-IMO-9655169-MMSI-566819000 (accessed Jan. 20, 2022).

[4] "OOCL HONG KONG, Container Ship - Details and current position - IMO 9776171 MMSI 477333500 - VesselFinder." https://www.vesselfinder.com/vessels/OOCL-HONG-KONG-IMO-9776171-MMSI-477333500 (accessed Jan. 20, 2022).