

Preliminary design of an oil tanker vessel of 5000 dwt of multiple segregation for transport of different products.

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ABSTRACT

As of January 1, 2020, the International Maritime Organization requires all vessels to emit no more than 0.5% mass / mass of sulfur into the atmosphere. However, the country currently does not produce fuels of this characteristic, so it is forced to import it from neighboring countries. That is why the design of a ship that is profitable, feasible and autonomous for this type of operations is proposed.

For this, the sponsoring company CORPETROLSA SA plans to import low-sulfur fuel to maintain and expand the client portfolio, so it is necessary to preliminary design a 5000 DWT tanker with multiple segregations, where these products will be stored in the reservoirs belonging to the company located in the dock of the same company and the commercialization of the ferry service, which allows the supply of the fleet of international ships that enter the country's ports.

<i>Length:</i>	100.00 [m]
<i>Beam:</i>	16.50 [m]
<i>Deep:</i>	8.66 [m]
<i>Draught:</i>	6.27 [m]
<i>Velocity:</i>	12.00 [knots]
<i>Power:</i>	3475.00 [HP]

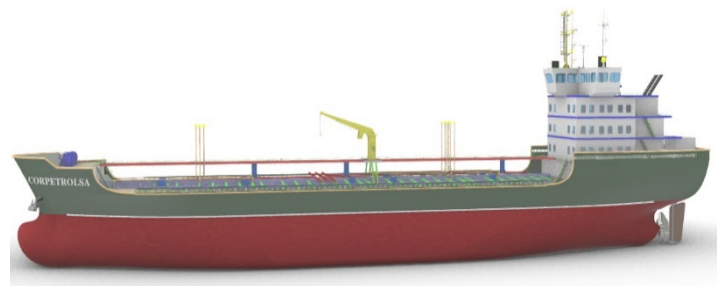


Figure 1.- Corpetrolsa Oil Tanker Vessel

Design requirements

1. Establish the main dimensions of the vessel that allows entry to the company dock for the unloading of the product.
2. Store a minimum load capacity of 5000 tons in the vessel's tanks.
3. Approximate the maximum service speed at full load of 12 knots.
4. Have 3 segregations distributed in the cargo tanks of the ship.
5. Use corrugated bulkheads in cargo tanks for easier cleaning of these.
6. Maintain on the main deck the structural elements located in the loading area to store more product in the tanks.

Among other important results achieved in this project was the cargo capacity to transport in the tanks shown in the table, with the 3 segregations implemented in the ship as shown in the figure 2.

Cargo tanks	m3
CT 1 P-S	689,11
CT 2 P-S	1204,24
CT 3 P-S	1701,26
CT 4 P-S	1702,31
CT 5 P-S	1065,82
TOTAL	6362,74

Table 1.- Capacities of B / T CORPETROLSA cargo tanks

Main particulars

The prototype ship CORPETROLSA shown in figure 1 has the following characteristics below:



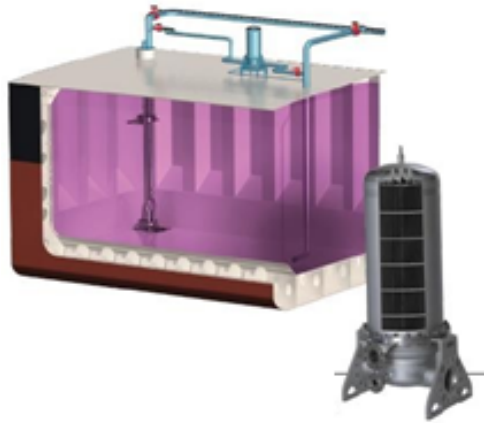


Figure 2.- Segregation of cargo tanks B/T COPETROLSA

In addition, the ballast capacity that this tanker will have is 2048.46 m3, and finally the deck structures in the loading area were implemented in the design, such as the use of the corrugated bulkheads shown in Figure 3.

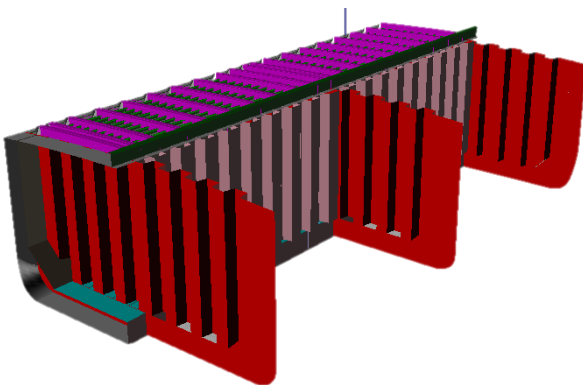
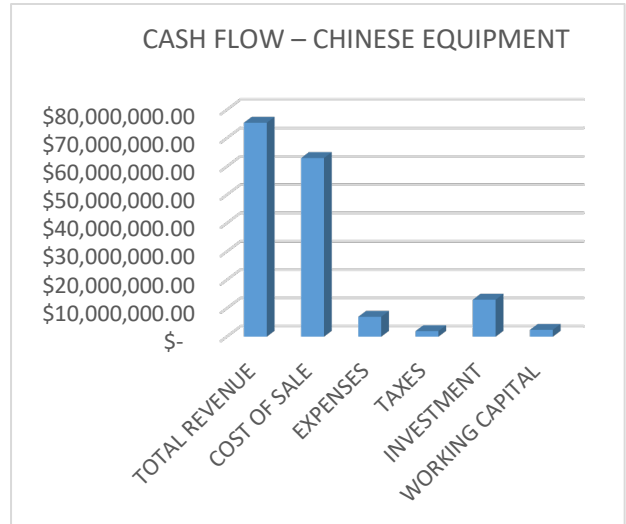


Figure 3.- Structural arrangement in the area of the B / T COPETROLSA cargo tanks.

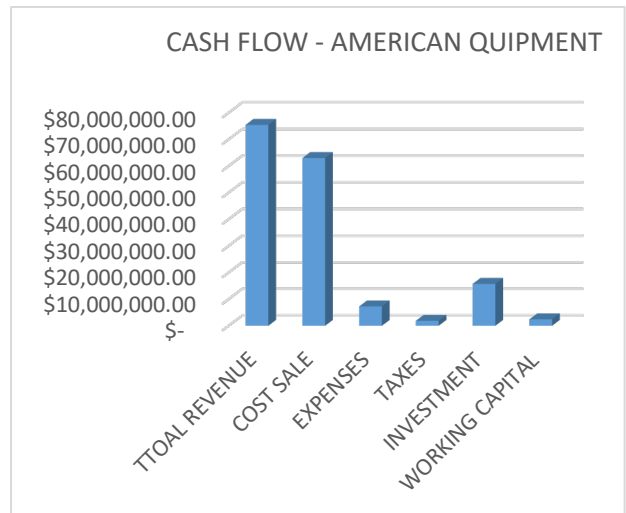
In addition, an economic analysis was performed to see the profitability of this tanker over a period of 10 years, estimating the costs of operating preventive maintenance of the vessel, as well as including the cost of design and construction for this analysis, where they were implemented 2 scenarios under the implementation of the net present value and the internal rate of return

The first scenario is with the use of Chinese equipment we have:



TIR 25,96%
VAN \$18.791.263,61

And for the second scenario with the use of American equipment we have:



TIR 21,29%
VAN \$18.959.570,21

Concluding that the first scenario presents a higher profitability to the second, but in both scenarios the tanker allows to earn money. In addition, the preliminary design was carried out in compliance with all the requirements established by the sponsoring company CORPETROLSA S.A and under all international standards that allow safe navigation, in this case it will have an autonomy of 15 days of crossing.

Key Words: Oil Tanker vessel, segregations, IMO, structural elements, TIR, VAN, international standards.

