

Case Study

2023

▶ Italcementi's new Turbocem

Introduction

The M/V "Turbocem" is a highly versatile self discharging cement carrier and the first vessel of Medcem, a new joint venture formed by the cement producer Italcementi and the shipping company Romeo Group. The conversion from a general cargo into a cement carrier has been performed by Van Aalst Marine & Offshore, based in Dordrecht in the Netherlands.

Overview

The vessel specifications have been decided to meet the requirements of Italcementi terminals throughout the Mediterranean area. Specifications have then been adapted to Romeo Group's requests for a better flexibility. The M/V "Turbocem" capacity is 6000DWT with overall length of 92.80 meters and width of 17.00 meters with summer draught of 6.68 meters. The vessel is equipped with a transverse bulkhead to fully separate hold I and hold II in order to transport two different kinds of cargo. The vessel is also provided with a longitudinal bulkhead which allows the possibility to depart directly after the vessel loading.

During loading process, cement particles are aerated and surrounded by air that needs about 6 hours (according to IMO regulations) to settle. Thanks to the longitudinal bulkhead, the ship does not have to wait anymore. Also, the vessel has a new upper deck on hold I and hold II, the machinery for the bulk handling equipment is housed inside a deckhouse on the new upper deck. Four identical diesel engines give the power required to drive the main components such as compressors. Electrical equipment has been taken from vessel electrical supply through a new electrical cabinet. The M/V "Turbocem" has been transformed under the supervision and approval of the classification society Bureau Veritas.

Three ways of loading (max. 500 tons per hour):

- Loading pneumatically from the terminal / ship unloader or barge discharger (SB)
- Loading mechanically from the terminal with loading bellow. (PS/SB)
- Loading directly from max. 6 bulk trucks at the same time (PS/SB)

Two ways of unloading (max. 250 tons per hour):

- Unloading pneumatically to silo of terminal (PS/SB)
- Unloading directly into two bulk trucks (PS/SB)

The M/V "Turbocem" can also transfer cargo from hold I to hold II or vice versa with a capacity of 400 tons per hour.

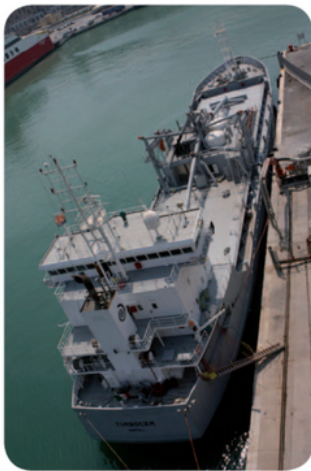
The pneumatic unloading capacity largely depends on the arrangement of the shore pipeline at the terminal. Optimizing this shore pipeline, the unloading capacity can increase from the given 250 TPH up to 400 TPH.



The pneumatic unloading capacity largely depends

The loading and unloading process is fully automatic and the operator only has to select the option on the touch screen and then presses start. The control system will put all valves in the correct position, start and stop fans that are requested to perform the process, start and stop diesel driven compressor, vacuum pump and blowers. The control system makes sure the vessel is loaded correctly by controlling the trim and the list of the vessel automatically. From the touch screen, it is also possible to visualize the filling process and the cargo volume.

The vessel has several of the Van Aalst Group's unique inventions such as the "Hurricane Aeration System" and the "Van Aalst Pinch Valves". Automation has also been adapted to suit Medcem's requests for a better flexibility.



The "Hurricane Aeration System" gives an optimum mix of air and cement during discharging. This results in a 12 % increase in discharge capacity with same amount of compressor air.

A great quantity of abrasive cement passing at a high speed through the discharge valve into the discharge line can be very hard on valves. The "Van Aalst Pinch Valves" are the only valves having a lifetime guarantee that corresponds to the handling of 100.000 tons of cement. But users have already indicated that the handling of 250.000 tons of cement is also possible. When the valve is worn out only the rubber sleeve needs to be replaced which saves time and money.

To meet Medcem's necessities, the vessel is equipped with redundancy in the system so the probability of a breakdown during loading or unloading is reduced to the minimum. To be able to fulfill this required redundancy, compressors, blowers and vacuum pumps are installed double and have the possibility to operate independently. To reduce the risk of a malfunction, engines, compressors, vacuum pumps and blowers are provided with sensors to monitor the performance of the system.

The technology to control and monitor the operation is the latest generation of our DBMAS® (Dry Bulk Management System). The system is easy to use with a 17 inch daylight touch screen, able to communicate with loading or unloading terminal and with our office that provides online assistance everywhere in the world (GSM range). The control unit is placed in a separate control cabin which has facilities such as air conditioning to monitor the operation comfortably. In case of alarm or warning from the control unit, audio and visual signals that are visible on the deck attract the operator attention.

Table 2: MV Turbocem – technical details

Class society:	Bureau Veritas
BV Reg No.	03741T
Type of vessel	Cement carrier
Length overall	92.8m
Length waterline:	84.5m
Deadweight	5803t
Conversion	2005
Loading equipment (up to 500tph)	Van Aalst Marine & Offshore
Unloading equipment (200-400tph)	Van Aalst Marine & Offshore
Conversion shipyard:	Van Aalst Marine & Offshore
Dust emission:	For all loading and discharging operation maximum 5mg/nm ³
Installed power:	1300kW (diesel) 100kW (electrical)