COMERCIAL TRADING OF LIQUID CARGO THROUGH PORT OF MIDIA

Viorel FLORESCU[1]
Alecu TOMA, [2]
[1] University assistant, Nautical Science Department, "Mircea Cel Batran" Naval Academy
[2] Lecturer, PhD, Nautical Science Department, "Mircea Cel Batran" Naval Academy

Abstract: *Port of Midia, the second large port on the Romanian Black Sea litoral, has been projected to accommodate the Oceanic Fishing Fleet and to manipulate liquid cargo (petrochimical products) and Life Stock. Except the „traditional ways of transport „ on the road and rail way", Port of Midia is the gate for the Poarta Alba – Midia- Navodari canal which connects the Black Sea with Danube River. Industry evolution in the last 30 years has imposed changing of the harbour logistics and facilities in order to respond and to face the new challenges. Today, in the Port of Midia, the main categories of cargo operated are: Crude oil, Clean Refined Products, GPL , Scrap Iron and Life stock. The increment of the refining capacity of the petrochimical industry, has imposed the need of finding new solutions for higher eficiency of the liquid cargo handling through port of Midia. In order to export bigger quantities of clean products the port logistics and facilities will have to be reconsidered, the navigating chanel will have to be enlarged so that the oil tankers that will be accommodated by the Midia Harbor to be higher than 10.000 tdw. Same thing can be achieved with a specialized white product SPM installed off port limit.*
Key-words: *port, shipping, cargo*

1. INTRODUCTION

The second larger Romanian port on the coast of Black Sea, Port of Midia, has been conceived stricltly to serve the industrial pusrposes of the former petrochemical combinat Midia –Navodari. The entire harbour (fig.1) cover an area of 834 hectars , out of what 600 hectars beeing water surface and the rest of 234 ha being dry land. There are two breakwaters (North and South) with a total lenght of 6.97 Km.

Later on a shipyard with three floating docks and three repair berths has been organized in the Port of Midia limits.

The maximum deadweight allowed to berth in the Port of Midia is 7500tdw for cargo vessels and 10.000tdw oil tankers. The crude oil import as well as the refined products export were done innitially through Constanta Oil Terminal , using the oil tank farm and the pipeline system of the above mentioned. Goods transport between Midia and Constanta use to be made by rail.

Due to poor maintenance of the pipeline system and the cargo handling requested fees by Constanta Oil Terminal the final price of the refined products began to increase more and more at the same time the tehnologic loses during the transport being higher.

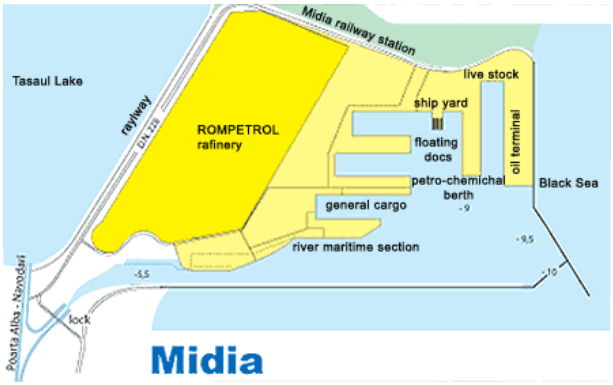

Figure 1. Port of Midia-initial plan.

Port of Midia is administrated by the National Company - S.A. Maritime Ports Administration (CN-APM-SA) Constanta, as cessionary of Ministry of Transportation and Infrastructure, cession that represent all the projects regarding the harbour infrastructure (breakwaters, berths, basins, and other terittory).

Superstructure work is done ussualy by the port operators, all the companies that are deploying their businesses inside the romanian ports being liable for their assets.

CN-APM-SA is responsible for mainenance work that has to be done in order to maintain the projected cotes of the acces chanel and turning basin.

Figure 2. Poarta Albă- Midia Năvodari acces lock in Port of Midia

Prezently the liquid cargo handling ar the berths no 1-4, 9A, 9B and 9C. Along the berths 1-4 it is maintained a depth of 9.5 metters that allows the vessels to sail with a draft of 9.00 m. and at the berths 9A and 9B can be operated tankers of a maximum deadweight of 10.000tdw but with a draft of max 8.00 metters, the deptht alongside and in basin being maintained at 9.00m.

Berth 9C is specialized to operate barges (liquid cargo) with a drft of max 4.00metters, maximum depth alongside and in the channel being 5.00m, the mentioned barges having acces to the Poarta Alba – Midia - Navodari Canal and after that to Danube – Black Sea Canal (fig 2).

The size of the export vessels has a very strong impact on the final cost of the product, nowing the fact that smoller the vessel, higher the price of the operated quantity. Considering the above mentioned the capasity of the oil tankers has increased continuously. The main cargo categories handled today in the Port of Midia are the refined products, crude oil, liquified petroleum gas (GPL), steel products and live stock, the anual transit being more than 2 million tonnes.

Petromidia refinery has been builded to refine the import crude oil and to export part of the refined products having a refining capacity of 14.000 tonnes per day or 4.8 million tonnes per year. Presently C.S. Rompetrol –S.A, is handling the import of crude oil and export of refined products mainly through Constanta Harbour but also through it's specialized liquid cargo berths from Midia Port.

Due to constructive particularityes of the harbour, nearow acces channel and reduced turning basin the operated vessels at the nominated berths are relatively small in capacity, the port being thought for tankers of maximum 10.000 tdw.

Considering the international economic situation, the Rompetrol S.A. in continuously updating the procedures and looking for new methods to reduce the costs and incresase the eficiency, one of the solutions being the new Single Point Mooring system installed of Midia Port where the crude oil tankers are discharged.

2. PORT OF MIDIA INFRASTRUCTURE DESCRIPTION

Port of Midia covers an area of 834 hectars (fig 3), out of what 600 hectars beeing water surface and the rest of 234 ha being dry land. There are two breakwaters (North and South) with a total lenght of 6.97 Km. There are also 14 berths out of what 11 are operational and 3 belong to the naval shipyard (repair berths), the total lenght of the pier being 2,24 km. The characteristics of berths and piers are stated in tha table 1.

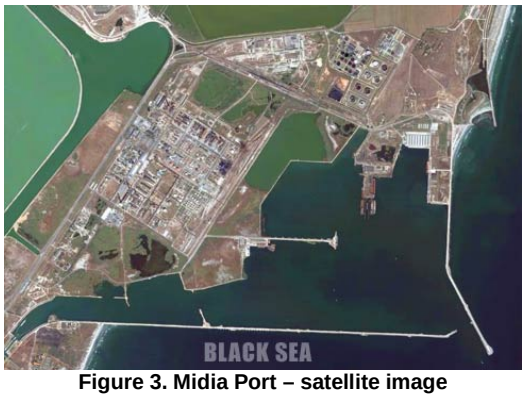

Figure 3. Midia Port – satellite image

The berthing front of the berth 1-4 is 569 metters in lenght, the pier is gravitational type with a vertical parament buided with prefabricate concrete blocks of abt 100tonnes each, mounted one over the other and consolidated at the superior part with another layer of soft concrete that grasps all the fender supports and the tehnological cannals of pipeline systems as well as the bollards used for ships berthing.

The fairway along the berths 1-4 is 100 metters wide and and 220 metters in front of the no 4 berth. Berth no. 9A is located on the east part of mol no.1 , it is 204 metters in lenght and allows the safe berthing of the oil tankers of max 10.000 tdw and approx 150metters in lenght. 9B berth on the south side of the acces breakwater , specialized on liquid cargo transfer ,has a total lenght of 205.1 metters and consists in a central platform and 4 d'Albi type dolphins , two on each of the central platform. 9C berth is 37.9 metters in lenght and it is designed to operate tanker barges up to 4000tdw.

Inside the harbour in the fairway limits the depths are varying between 9.00 to 9.50 metters with highs and lows that are reaching 8.6 metters. The aproaching cannal, 100 metters wide, from the end of breakwater till the fairway buoy depths are varying from 9.50 up to 11.50 metters.

Table 1. Port of Midia berth and basin characteristics.

BERTH	PIER		Basin acces/adiacent		Vessels characteristics	Operated goods
	DEPTH [m]	Lenght [m]	Width [m]	Depth [m]		
1-4	-9.0	569	100 (240 pier 4)	9,0	10.000 tdw	Crude oil
5-8	-9.0	637	100	9,0	10.000 tdw	Live stock
9A	-9.0	204	100	9,0	10.000 tdw	Refined products
9B	-9.0	205	100	9,0	10.000 tdw	Refined products
9C	-4.0	38	100	8,0	2000 tdw	Refined products
10-11	-8.0	191	100	8,0	-	General cargo
3 berths	-	-	-	-	-	Naval shipyard

3. CRUDE OIL AND REFINED PRODUCTS TRANSPORT INFRASTRUCTURE DEVELOPMENT

Until 1990 crude oil unloading use to be done through Oil Terminal Constanta , ant the transport to Midia refinery was done by Perto-Trans Company tjrough it's pipeline system. After 1990 specially after the private sales of the the petrochemical combinat the activity in the port of Midia has decreased dramaticcaly . The fishing fleet has

Due to poor maintenance of the pipeline system and the cargo handling requested fees by Constanta Oil Terminal the final price of the refined products began to increase more and more at the same time the tehnological loses during the transport being higher.Considering the above mentioned , Rompetrol S.A. , the most important comercial operator in Midia Harbor, has applied a series of mesures in order to fulfill the goal of a good competitivity on the international market. The refinery has been modernized, new, performance equipments were installed and new import export facilityes were considered.

been sold to foreign isvestors , the refinery closed the fertilizer procesing unit, the live stock traffic almost disapeared and the sipyard worcked at reduced capacity.

The main activity in the Port of Midia was closely related with the activity of the refinery.Generally the crude oil import has decreased with approx 30%, compared with the quantity imported in 1990, fact that had conducted to a reduced activity of the Constanta Oil Terminal.

Crude oil import is assured through the Single Point Mooring System commisioned in 2009 off Midia Port where iol tankerd up to 165.000 tdw can de berthed and operated.

Figure 4. Oil unloading terminal in Midia

The single point mooring (SPM) buoy is located approximately 8645 m offshore Midia Harbor. The water depth at the location is 23.5 meter.

The turret buoy system is designed to transport crude oil product via the terminal to or from the moored tanker, in the range of 60.000 DWT up to 165.000 DWT. The maximum flow rate during tanker offloading and loading is 7 000 m³/hT.

The SPM Buoy is connect to CALM system, PLEM and submarine hoses (fig. 6). A tanker mooring hawser arrangement and two floating hose (fig. 5) strings are used for connecting tankers to the new turret buoy installation. All are designed to survive the anticipated 100-year storm condition if no tanker is moored. The operational loads on the turret buoy are derived from finite element calculations and an assessment of local environmental conditions.

The floating part of the terminal consists of a round buoy hull and a turret with a spider construction to be moored in a water depth of 23.5 meters. The round buoy hull is the rotating part of the terminal; the turret and spider are the geostatic, fixed parts.

A main bearing assembly connects the rotating part and the geostatic fixed parts and enables load transfer between these main components and the mooring loads. A product swivel enables crude oil transfer between the turret piping and the buoy hull piping.

A PLEM facility forms the interface between the main submarine pipeline and the turret buoy submarine hoses. The PLEM is designed with a gravity base and a sliding piping support for a 40" mainline pipe and a 2 x 24" branches to match the 24" submarine hoses. A mooring lug on the turret buoy hull enables connection of the soft mooring hawser equipment.

The navigation aids system includes a battery powered electrical system with solar panels for recharging purpose of the batteries. It also includes a fog horn, marine light, radar reflector unit and local control panel.

Figure 5. Floating hose

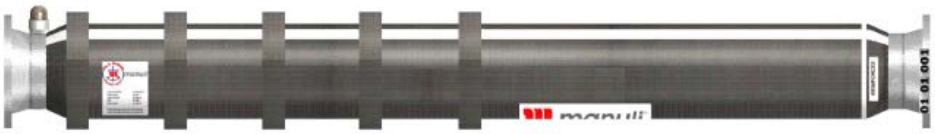

Figure 6. Submarine hose

The main obstacle for the petroleum industry in the Port of Midia consists in the spedition of the refined products rezulted from a suplementary quantity of abt 1 million tonnes per year which was aded in 2013 . Another problem is given by the reduced capacity of oil tankers that have acces in the Midia Port.

4. MIDIA NAVAL SHIPYARD DEVELOPMENT

The Naval Shipyard from Midia Port (Navodari) has been comissioned in 1987 under the name of "Black Sea Naval Shipyard", and the concept was of an industrial holding. It was sold to a private company from SIF Transilvania with a total debt of 17 billions lei in 1999. The shipyard is known today as "2X1 Holding Cape Midia Shipyard" and is the only shiyard in the contry that has as exclusive activity ship repair / rebuilding (fig. 7). 500 persons from over 3000 that are working on the platform are permanently employed by shipyard, others belonging to subcontractory companies that the holding is colaborating with.

Figure 7. General picture of Midia Shipyard

2X1 Holding Cape Midia Shipyard has assets of more than 53 million lei, with a continuously growing bussines, firts semester of 2012 the income being with one million lei greater than the same period of 2012. The holding owns tho floting docks of 10.000 tonnes and one of 20.000 tonnes and succeeds to repair more than 70 vessels every year.

5. CONCLUSIONS

The increment of the refining quantity begining with 2012 with approx 1 million tonnes per year has raised the problem of extra refined products offlanding. As local market is consuming only a limited amount of white products, there are still large amounts of cargo that has to be exported.

Knowing that this complex system of operation is a premiere in our country, complying with all the rules and regulations national and international in projecting, building, maitaining , using as well as pollution prevention is of paramount importance.

A major impact over the environment may appear only in extreem cases as ship grounding or act of god when due to the marine currents a major pollution of the romanian litoral can take place. A minor incident can happened due to accidental leaks owed to flexibile connection partition (floating hoses) between ship and SPM or between the buoy and submarine hoses. Minor leaks can appear due to corrosion of submarine pipelines or due to hidden fabric imperfections.

There are hundreds of these systems operating in whole world and yet note a major accident was notified. Romanian experience shows that during a 20 years period of use of PETROMAR underwater pipelines there were no undiserable incidents.

6. REFERENCES

1. http://www.portofconstantza.com