

Operational Environmental Management Plan (OEMP) for the 120m floating dry dock ERENEOS, Multimarine Shipyards, Limassol Port

M.I. Loizides¹, D. Petsa¹, D.L. Orthodoxou¹, X.I. Loizidou^{1*}

¹ISOTECH LTD Environmental Research and Consultancy, P.O. Box 14161, Nicosia, 2154, Cyprus

Keywords: OEMP, environmental risk, shipyards, mitigate environmental impacts

*Corresponding author: xenia@isotech.com.cy

Abstract

Multimarine Shipyards Ltd has successfully installed a 120m long Floating Dry Dock named 'ERENEOS' at Limassol Port in Cyprus. The Floating Dock, class ABS accredited, was constructed in the Ukraine in 2017 by the company Pallada Ltd and delivered to Cyprus in January 2018. The dock provides Multimarine with the ability to offer Vessel Dry docking Services. Several environment related studies (carried out by ISOTECH Ltd) have been completed prior to the installation of the dock at Limassol Port: Environmental Impact Assessment (EIA), an Environmental Permit, Construction Environmental Management Plan (CEMP) for the preparatory construction phase i.e. dredging, construction of a deck and of the two piles to facilitate the mooring of the floating dock. Multimarine Shipyards commissioned ISOTECH to prepare an Operational Environmental Management Plan (OEMP), a dynamic management system that identifies the environmental risks and legal obligations associated with the day to day operations of the Dock and specifies the management measures Multimarine will implement in order to prevent or minimise the environmental impacts associated with these operations, including guidance for the monitoring, measuring, and reporting of environmental performance during the operations. This is the first OEMP ever implemented in Cyprus. This paper provides an overview of the implementation of the OEMP for the day to day operating activities of the Floating Dry Dock 'ERENEOS' for the first year of its operation.

Keywords OEMP, environmental risk, shipyards, mitigate environmental impacts

1 INTRODUCTION

In 2018, Multimarine Ltd, a Cypriot company that operates at Limassol Port and specializes in mechanical and marine engineering services to the Marine, Power, and Oil and Gas industries, decided to invest in infrastructure that would provide dry docking services to vessels up to 7100 tonnes. A floating dock design was selected as it has several advantages over alternatives, which include inter alia the fact that (i) it does not require waterfront space, (ii) it can be constructed offsite anywhere in the world where there is expertise, and this makes its acquisition financially preferable as it can be constructed by the lowest bidder, (iii) it has a resale value as it can be sold anywhere in the world, and (iv) it can accommodate vessels that are longer than the dry dock itself (Heger, 2005). This decision of Multimarine was based to better serve the needs of the Cypriot shipping industry and the growing oil and gas sector in the Eastern Mediterranean,

The 'ERENEOS', as the Multimarine dry dock is called, was therefore constructed in the Ukraine by Pallada Ltd and delivered to Cyprus in January 2018. In accordance to relevant legislation (RoC, 2005), an Environmental Impact Assessment was implemented and a relevant Environmental Permit was received by the Department of Environment of the Cypriot Ministry of Agriculture. Additionally, and above the legislative requirements, Multimarine requested ISOTECH to prepare a Construction Environmental Management Plan (CEMP) to ensure that any environmental risks during the construction of the necessary infrastructure for the installation of the floating dock would be minimized, and to put in place procedures to swiftly mitigate any environmental impacts. Once the construction/ installation phase was completed, Multimarine commissioned ISOTECH Ltd to prepare an Operations Environmental Management Plan, used to monitor and report on all relevant environmental parameters during the operation of 'ERENEOS' in order to prevent or minimise the environmental impacts associated with these operations, including guidance for the monitoring, measuring, and reporting of environmental performance during the operations. This paper provides an overview of the implementation of the OEMP for the day to day operating activities of the Floating Dry Dock 'ERENEOS' for the first year of its operation.

2 METHOD: DEVELOPMENT OF THE OEMP

The 'ERENEOS' floating dock, which has been installed at the southeast basin of Limassol Port in Cyprus, is 120m long and 32m wide. It is U-shaped and made up of a reinforced concrete dock and two steel side walls (Figure 1).

The operating activities on the dock include the following:

- Tank Cleaning Works (Ballast Tanks, Fuel Oil Tanks, Diesel Oil Tanks, Lub Oil Tanks)
- Rudder, Propeller, Tailshaft Inspection and Maintenance
- Deck Machinery (Valves, Pumps, Winches) Overhaul and Repair
- Hull Blasting/Painting (Topsides, Vertical Sides/Boottop/Rudder Blade, Flat Bottom)
- High Pressure Water Cleaning/Washing
- Hand Scraping
- Paint Application by Rollers and/or Airless Spray
- Sea Chests Maintenance
- Anodes Renewal
- Anchor Chains Maintenance
- Chain Lockers Maintenance
- Cargo/Slop Tanks – Coating Repair
- Steel Plates and Pipes Renewal
- Welding Repairs
- Non-Destructive Testing
- Main Engine and Auxiliary Engines Overhaul

An evaluation of the foreseen activities, in combination with the environmental baseline at Limassol Port, the outcomes of the Environmental Impact Assessment (ISOTECH, 2017) and an extensive literature review on the main environmental impacts of the operation of floating docks and ship-repair activities in general (e.g. Hayman et al., 2000; Papaioannou, 2004) identified that the operation of ERENEOS could have the following environmental impacts:

- Noise emissions, particularly as it regards the operation of wet grit blasting for the cleaning of vessels hulls, steel/metal cutting operations and the operation of cranes.
- Increased water consumption due to hull cleaning operations taking place on the dock.
- Marine pollution by liquid wastes such as paints, solvents, oils, lubricants, fuel, and sludge.
- Marine pollution by solid wastes deriving from the various activities on the dock, such as empty paint cans, oily rags etc.
- Air pollution as it regards the emission of particles resulting from wet grit blasting operations, the emission of particles during painting activities and the emission of metals and gases during cutting and welding.
- Light pollution during night-time works.



Figure 1 Floating Dock ERENEOS Installed at the Limassol Port

2.1 OEMP Scope of Work

Following the identification of the main environmental impact risks from the operation of ERENEOS, the Operation Environmental Management Plan (OEMP) was developed as a dynamic management system that:

- Provides measures to avoid, minimize, and mitigate potential adverse environmental impacts associated with the operation of the Floating Dock, taking into consideration all permit terms and other legal requirements.
- Identifies roles and responsibilities of key personnel responsible for the implementation/application of the OEMP.
- Provides guidance for the monitoring, measuring, and reporting of environmental performance of all environmental aspects during operations.

2.2 Assignment of Responsibilities

A key aspect of the OEMP's development was the clear definition of roles and responsibilities as it regards the environmental performance of the 'ERENEOS', so that each key member of staff could know at any one time what they are responsible for. Specifically, roles and responsibilities were assigned to the Project Owner (i.e. Multimarine's Top Management), the Health, Safety and Environment Officer, the Dock Master, the site workers, general subcontractors and the Environmental Subcontractor (i.e. ISOTECH Ltd).

Responsibilities for training of site workers and other key personnel were clearly defined within this section of the OEMP and an accompanying training schedule was drafted. Roles and procedures for responding to environmental incidents and emergencies were also developed at this stage.

2.3 Environmental Control Plans

A total of seven Environmental Control Plans (ECP) were developed, one for each of the main potential environmental impacts of the floating dock's operation:

- ECP-001: Noise
- ECP-002: Water Management
- ECP-003: Fluid Waste Management
- ECP-004: Solid Waste Management
- ECP-005: Air Quality
- ECP-006: Light Pollution
- ECP-007: Emergency Response.

The ECPs are short (2-3 page), stand-alone documents that, for each of the potential environmental impacts, outline the mitigation/ prevention objectives and the relevant legal obligations, and assign roles and responsibilities for monitoring, reporting and the implementation of mitigation measures. The structure of each ECP appears in Table 1. The ECPs were developed to facilitate the proper implementation of the OEMP by ensuring that busy staff are able to have a quick and clear reference document regarding concrete mitigation and, if necessary, corrective actions that they have to implement.

Table 1 Structure of the Environmental Control Plans

ECP Section	Description of Content
Objectives	Goals for each ECP
Legal Limits	Deriving from EU/ National law and/or Environmental Approval
Relevant Literature	List of relevant laws and EIA referrals
Responsible Staff	Person responsible to identify potential impacts and non-conformances to undertake appropriate action
Monitoring	Monitoring requirements for the duration of the Project
Reporting	Responsibilities, format and frequency for reporting
Mitigation Measures	Provides a summary of how environmental objectives are to be achieved through practical actions
Corrective Action	Actions to be undertaken should limits and targets be exceeded
Equipment	Equipment needed to implement mitigation measures

3 OEMP OUTPUTS: MONITORING AND REPORTING

The OEMP defines procedures for the regular and consistent monitoring of the operation of ERENEOS to ensure that any environmental risks are avoided or, if necessary, mitigated (Table 2). One of the main concerns of the Permitting Authority (i.e. Department of Environment), and in fact one of the points with the greatest environmental impact potential, is the submergence of the dock for the docking and undocking of vessels. If the floating dock is not properly cleaned before submergence hazardous wastes (e.g. metal grindings, paints, solvents or lubricants) could be released in the marine environment. The developed checklists, and specifically the ‘Before Submergence’ checklist (Figure 2), ensure that all the necessary steps are implemented prior to the submergence of the dock and thus all potential releases in the marine environment are avoided.

Table 2. OEMP Reporting Schedule

Report	Frequency	Form
Daily Inspection Checklists	Daily	Checklist
Other Inspection Checklists	As required	Checklist
File with all Inspection Checklists	Monthly	Report
Monthly External Audit	Monthly	Report
Waste Management Register	All waste leaving Dock	Waste waybill
Water Consumption Register	Monthly	Report
Induction and Training Log	Prior to start of activities	Log Book
Environmental Incident Report	When incident occurs	Incident report
Corrective Action Request	When CAR is issued	CAR Form

Further to the monitoring and reporting required by Multimarine staff, monthly external audits are implemented by ISOTECH’s environmental experts, adding an additional level of control to the performance of the ERENEOS. The OEMP has also been seamlessly integrated in Multimarine’s ISO14001:2015 certification.

Question	Yes	No	Partial	Comments- Additional Information	Environmental Approval Conditions Met
Optical observation along the platform					
1					EAC 1 (essential condition), EAC 3
2					EAC 1 (essential condition), EAC 3
3					EAC 1 (essential condition), EAC 3
4					EAC 1 (essential condition), EAC 3
5					EAC 1 (essential condition), EAC 3
6					
7					
8					
9					
10					
Additional Comments / Observations:					

Figure 2 Extract from the ‘Before Submergence’ Checklist used by Multimarine

The OEMP provides Multimarine with a proof of performance:

1. The OEMP secures the environmentally responsible performance of the dock, the monitoring and reporting requirements of the permitting authorities through a “real-time” monitoring structure

2. Through the OEMP, Multimarine can provide any documents/data to the relevant authorities at any time upon request.
3. The OEMP provides traceability of possible pollutants in a shared environment such as a harbour. In a harbour several activities take place and it is of high importance to identify who is responsible in case of environmental accidents. With a system such as the OEMP in place, the company can prove whether it is responsible or not for an accident.

The Operation Environmental Management Plan is a pro-active tool, a policy decision of any company that wants to secure proof of good environmental performance and at the same time boost its accountability to the competent authorities and the general public.

References

Cyprus Shipping Chamber (2018) Annual Report 2017. Limassol, Cyprus

Deloitte (2018) Oil & Gas in Cyprus: Where Potential Lies. https://www2.deloitte.com/content/dam/Deloitte/cy/Documents/energy-resources/oil-and-gas/CY_EnergyAndResources_OilAndGas_Noexp.pdf

Hayman B, Dogliani M, Kvale I, Magerholm Fet A (2000) Technologies for reduced environmental impact from ships – Ship building, maintenance and dismantling aspects. <http://www.iot.ntnu.no/users/fet/Konferanser/2000-Treship-Newcastle.pdf>

Heger R (2005) Dockmaster Training Manual. Heger Dry Dock, Inc. http://www.hegerdrydock.com/dockmaster_training_manual.pdf

IMO (1974) International Convention for the Safety of Life at Sea (SOLAS), 1974. [http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-\(SOLAS\),-1974.aspx](http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS),-1974.aspx)

ISOTECH (2017) EIA for the construction of a 42 m long deck and the installation and operation a floating dock at the Limassol Port, by Multimarine Shipyards Ltd. Nicosia, Cyprus

Papaioannou D (2004) Environmental implications, related to the shipbuilding and ship repairing activity in Greece. Pomorski zbornik 41(1): 241-252.

Republic of Cyprus (2005) Law N(140(I)/2005-2014 of the Republic of Cyprus for the Environmental Impact Assessments of certain projects.

Acknowledgements

The authors would like to thank the Multimarine Group and especially Mr. Ereneos Phokas, Mr. Pavlos Phokas and Mr. Angelos Phokas.