

Sea cleaning activities and waste management in ports, PPA's case study

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The port of Piraeus is the largest port in Greece. The location of the port favors its function both as a commercial and tourist portal of the country and as a transit trade hub for the Balkan and Black Sea countries. It hosts a variety of port activities of particular complexity, including: Cruise Terminal, Ferry Terminals (the largest passenger port in Europe), Services for all types of cargo, Ship Repairs.

The protection of the environment and the reduction of the environmental footprint is a strategic goal and commitment for PPA S.A.

The management of the waste within the port area is one of the most significant key factors of the port environmental management. In this context, PPA S.A. assumes absolute responsibility of the sustainable management of the produced waste and protects the marine environment from marine litter. An integrated waste management planning system is implemented in the total area (land and sea) under PPA's jurisdiction.

The main sources of waste linked with the port marine environment are:

1. Waste produced by land-based port activities and installations
2. Ship-generated waste, delivered and managed to the designated port reception facilities
3. Waste generated from everyday sea cleaning works in the port area
4. Waste generated by the dealing of the sea spillage incidents & from land-based spillage incidents linked with ships operations.

PPA's waste management planning consists of:

1. Waste Management Plan for Land based port activities and installations
2. Waste Management Plan for Ship-generated Waste
3. Port Contingency Plan for responding to oil and/or other noxious substances spill incident at the sea area
4. Spill Contingency Plan for responding to dangerous substances spillages in land area

The current presentation focuses to marine clean-up operations including:

1. Waste collected from everyday sea cleaning works: collection of all types of liquid, solid or semi-liquid waste and/or residues and floating solid materials
2. Waste collected from sea spillage incidents & from land-based spillage incidents linked with ships operations: collection of petroleum and oil products and any substance, which alters the natural state of the sea water.

Waste from everyday sea cleaning works

Inspections by dedicated antipollution vessel by PPA's authorized contractor are performed in everyday base to collect all the floating waste.

The total marine cleaning area is approximately 17 km² and the length of coastline is approximately 33 km:

- 2.74 km² Passenger and Cruise port
- 14.26 km² the rest port area

The frequency of inspections/cleaning is presented in Table 1.

Table 1. Frequency of inspection/ sea cleaning:

Port area	Frequency
Passenger and Cruise port	2times /day, 7days/week
Ship repair area and commercial port	1 time/day, 5 days/week
Cleaning of the vertical sections of the seawalls and rocks along the coastline	2 times/year

According to the PPA's waste management database during the ordinary sea cleaning works are collected approx. 5 m³ of floating waste per week. The majority of the collected waste are listed as marine litters and managed as non hazardous solid waste of category EWC 20 01 99 (other fractions not otherwise specified).

Occasionally and upon the outbreak of extreme climatic phenomena the collected waste is differentiated in quantity and kind of as the sea is greatly affected by weather conditions and stream runoff. Thus, after severe storms and weather events huge volumes of large scale waste, branches, trunks, brought materials from nearby rivers and from drainage network cause pollution incidents at the marine environment. The direction of the sea currents resulted to the accumulation of the waste to specific areas at the port.

Therefore, during periods of severe storms are collected almost 10-20 m³ of waste per week. These phenomena happen with a frequency of about 5 times each year. One very severe weather event was the storm ‘Mpalos’ on 16/10/2021, when after 3 days constant urgent cleaning operations were collected 154 m³ of marine litter (8.06 tons of EWC 20 01 99).

Waste generated from spillages incidents

PPA as the management authority body of the total port area implements the provisions of the International Convention on Preparedness, Cooperation and Response to Marine Oil Pollution OPRC (1990), the Protocol on Preparedness, Cooperation and Response to Marine Pollution Incidents by Hazardous and Noxious Substances OPRC – HNS (2000) and the National legislation for the preparation and implementation of a Marine Pollution Emergency Response Plan to deal with incidents of pollution from oil and other harmful substances within the PPA's Port Zone.

In this context PPA has approved by the Hellenic Coast Guard and applies through specialized contractor:

- Sea Contingency Plan for spill incident at the sea area
- Land Contingency Plan for dangerous substances spillages in land area

Total quantities of waste collected from the sea

From all the above operations for protecting the marine environment the total waste collected the last years from sea is summarized in Figure 1.

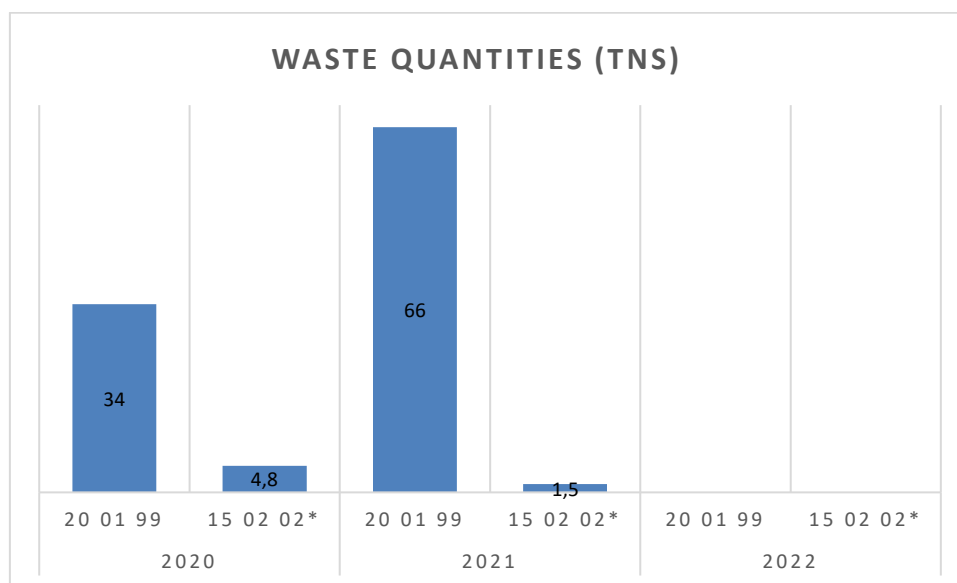


Figure 1. Waste quantities (tns) collected from sea at Piraeus port
(Source of data: Yearly Waste Report of PPA as submitted to Electronic Waste Register of Ministry of Environment. Data for year 2022 to be completed)

EWC 20 01 99 (other fractions not otherwise specified) is waste collected from everyday sea cleaning and it is managed as non hazardous solid waste, sent to recovery.

EWC 15 02 02* (absorbents, filter materials contaminated by hazardous substances) is waste from spillage incidents and it is managed as hazardous waste at special hazardous management units.

The operations described above result in high performance in the protection of the marine environment. The natural state of the sea water in the port area proves the success of the integrated waste management system implemented by PPA SA.